

# Applications of Goal Theory to Teaching Mathematics

Gulseren SEKRETER\*  
Natela DOGHONADZE \*\*

## Abstract

The aim of this research is to examine the impact of Achievement Goal motivation Theory on students' academic success. Research asserts that possessing mastery-learning oriented motivation has a positive impact on students' academic achievement. This study may be useful for students, teachers and administrators in the identification of college students who are considered at risk for math failure or students who are on the verge of dropping out of college. The research applies a quantitative method of study. Quantitative data have been analyzed using Elliot's AGQ (Achievement Goal Questionnaire). In the case study of a private Suleyman Sah University, Turkey, the focus of the AGQ has been derived from the central research question: How and why applications of Achievement Goal Theory affect students' success in mathematics at university? In order to identify students' goal orientation, Elliot's AGQ was given to 53 students who were selected randomly in math classes. Their course exam results were compared to their motivational types. Based on the quantitative data analysis, the research suggests that the best way to change one's thinking during a testing situation (and hence reduce or eliminate one's anxiety) is to intentionally change one's performance goal and performance-avoidance goal into only a mastery-learning goal.

**Keywords:** Achievement goal theory, motivation, mastery goal, performance-achievement goal, performance-avoidance goal

## Introduction

Motivation is a key factor of education which plays a critical role in success. It is a driving force behind human behaviour, therefore it is related to genuine interest, persistence, and engagement. It has long been known that motivation and academic achievement are interrelated closely (Murphy & Alexander, 2000; Alexander, Wigfield, & Eccles, 2000; Eccles & Wigfield, 2002; Abd-El-Fattah & Patrick, 2011; Rotgans & Schmidt, 2012).

According to educational psychology, there are two basic types of motivation - intrinsic and extrinsic. Intrinsic motivation occurs when people are internally motivated to do something. For example, students who love reading are intrinsically motivated to read - there is something about reading that they enjoy and that makes them want to do it even if there is no "reward" for it. Intrinsic motivation brings pleasure, learners think that the task is important, or they feel that what they are learning is significant for their improvement.

As for the extrinsically motivated students, they take action to satisfy an external influence, such as to satisfy the requirements of a course, to please the teacher, earn good marks or stay out of trouble with parents. Even though extrin-

sic motivation does not effectively promote life-long learning, sometimes teachers need to use it as well. For instance, when the task is uninteresting to students, extrinsic motivators can help to motivate students to take action. If a student is not really interested in the activity for its own sake, s/he cares only about what s/he will gain at the end of the activity. The essential difference between the two types of motivation is the students' reasons why they engage in academic work (reason for acting = goal orientation). Students engage in an activity, because they freely choose the activity based on personal interests (intrinsic motivation), or because someone or something else outside is influencing them (extrinsic motivation) (Reeve, 1996).

## Literature Review

Goal theory originated early in the 20th century. It became a particularly important theoretical framework in the study of academic motivation after 1985. Developers of goal theory assert that all human actions and behaviours are motivated by some goal. It is a social-cognitive theory of achievement motivation. Specifically, learner's achievement goals and their relation to achievement behaviours are emphasized

\* MA, Independent Researcher. E-mail: aksekreter@hotmail.com

\*\* Prof. Dr., International Black Sea University, Tbilisi, Georgia. E-mail: nateladoghonadze@ibsu.edu.ge

in researches. Several different approaches have emerged based on this theory.

For instance, Bandura (1997) and Schunk (1990) have shown that specific, proximal, and somewhat challenging goals promote both self-efficacy and improved performance. However, in order to provide self-efficacy and improved performance, an efficient goal must have four components: proximity, difficulty, specificity and feedback.

- **Proximity:** An ideal goal is a goal where the time between the reaching out and the end state is close, because human beings are more motivated to act, when there is a reward at the end of the performance of a task or a behaviour. Yet the reward should be clearly stated.

- **Difficulty:** An ideal goal is moderate in difficulty, neither too easy, to present some challenge, nor too difficult, so that success seems possible.

- **Specificity:** An ideal goal should be specific. The individual must understand what is expected from him / her, to start out for the goal. A specific goal gives direction of focus to that specific goal and away from distractions.

- **Feedback:** Measuring progress towards the goal is the integral part of setting an efficient goal. Feedback makes it possible to know whether the level of efforts is adequate and in the proper direction or needs corrections.

Nicholls and his colleagues (Nicholls et al., 1990) defined two major kinds of motivationally relevant goal patterns or orientations: ego-involved goals, which seek to maximize favourable evaluations of students' competence and minimize negative evaluations of competence (will I look smart? and -can I outperform others? - reflect ego-involved goals) and task-involved goals. With task-involved goals, individuals focus on mastering tasks and increasing their competence (how can I do this task? and what will I learn? - reflect task-involved goals).

Dweck (1999) provided a complementary analysis, distinguishing between performance goals (like ego-involved goals) and learning goals (like task-involved goals). Ames (1992) distinguished between the associations of performance goals (like ego-involved goals) and mastery goals (like task-focused goals) with both performance and task choice. With ego-involved (or performance) goals, children try to outperform others, and are more likely to perform tasks they know they can do. Task-involved (or mastery-oriented) children choose challenging tasks and are more concerned with their own progress than with outperforming others.

Related with this, Mensah and Atta (2015) asserted that long-term goals with mastery emphasis are pivotal to achieve students' learning goals. However, their results showed that students' classroom goals were more performance and less mastery-oriented, unfortunately. According to their study, there are some key classroom experiences in motivating medium achievement level students to reach their learning goals. These experiences are indicated as follows:

- more engaging classroom lessons;
- teacher's positive disposition and personality;
- teacher's personal connection with learning experience;

- application of varied instruction technics,
- relationships with supportive teacher (Mensah & Atta, 2015).

All these classroom activities assist students to gain mastery-oriented learning characteristics. Because of all these reasons the set of mastery-oriented learner characteristics are strongly associated with positive patterns of learning, achievement, student characteristics and performance (McCullum & Kajs, 2007), moreover, they have more intrinsic value for learning. On the other hand, the set of performance-oriented learner characteristics are considered negative because these characteristics were not related with academic success.

As teachers we need to ask what is the reason why a student wants to obtain an A grade in his/her class. Is it because s/he wants to look better than her classmates or is it because s/he has mastered the course content? This question is important in order to understand the cause of students' behaviours (McCullum & Kajs, 2007). However, it is not simple to give an exact answer to this question.

Elliott and Church (1997), Midgley et al. (1998) and Skaalvik (1997) focused on an important advance in this area which is the distinction between performance-approach and performance-avoidance goals. As the name implies, performance-approach goals imply engagement in achievement tasks for performance reasons, whereas performance-avoidance goals concern disengagement in order not to appear stupid. Generally, performance-approach goals appear to have more positive consequences on motivation and achievement than do performance-avoidance goals.

Elliot and McGregor (1999:5) proposed a more complex conceptualization of achievement goals to incorporate approach and avoidance orientations into a 2X2 framework. And the types of goals are: mastery approach – mastery avoidance and performance-approach – performance avoidance. That is, they described achievement goals in terms of competence, and the outcome can either be a desirable possibility (i.e., success) or an undesirable possibility (i.e., failure). Thus, when students adopt an approach orientation, they are expecting success, whereas a student who expects failure adopts an avoidance orientation. Compared to performance-approach goal, performance-avoidance is less effective. Mastery-avoidance goals may or may not coincide with both types of performance goals, which makes the term somehow confusing, this is why in my research I avoided this type of goals.

Following Elliot / McGregor framework, a mastery-approach (MAP) goal orientation is manifested in a student's desire to learn as much as possible, to be persistent, and develop his / her skills. A student, who fears losing skills and the inability to master all the material, defines a mastery-avoidance (MAV) goal orientation. Students, who exhibit a performance-approach (PAP) goal orientation, compare themselves with others and are motivated by their desire to demonstrate their ability and achievements publicly. Finally, a performance-avoidance (PAV) goal orientation describes a student, who does not want to appear incompetent or lacking in ability relative to others. The results for performance goals are not as straightforward as for mastery goals. Though all performance goals are usually found to be related to reported use of shallow-processing strategies such as rote learning or memorization (e.g., Miller et al., 1996; Nolen, 1988), unrelated to effort and persistence (e.g., Miller

et al., 1993), and negatively related to achievement (e.g., Miller et al., 1996), this is not always the case. For instance, Meece et al. (1988) found that performance-approach goals were related to both shallow and deep learning strategies.

Barzegar (2012) study, for instance, involved 260 psychology students. Mastery-approach goals in this study were found to be positively correlated with:

- the incremental theory (belief that competence increases due to hard work);
- deep strategies and academic achievement.

On the other hand, they were negatively correlated with:

- the entity theory of intelligence (belief that achievement depends on gifts and does not increase due to hard work);
- shallow strategies.

Mastery-avoidance goals were positively correlated with:

- the entity theory of intelligence;
- shallow strategies.

On the other hand, they were negatively correlated with:

- the incremental theory;
- deep strategies and academic achievement.

Analogously, performance-approach goals in this study were positively correlated with:

- the incremental theory;
- deep strategies and academic achievement.

On the other hand, they were negatively correlated with:

- the entity theory of intelligence;
- shallow strategies.

Performance-avoidance goals were positively correlated with:

- the entity theory of intelligence;
- shallow strategies.

On the other hand, they were negatively correlated with:

- the incremental theory;
- deep strategies and academic achievement.

## Achievement Goal Theory

Achievement Goal Theory (AGT) is a socio-cognitive theory of motivation which views goals as cognitive representation of various purposes that students put up in front of them (Ford & Nichols, 1991). It involves task-oriented and ego-oriented goals.

An achievement situation is the one in which a student encounters some standard of excellence and objective performance feedback to communicate success or failure feedback. Which goal a student adopts is very important to understand his or her felt anxiety during a testing / achievement situation (Kyle et al, 2014; Edwards, 2014; Yeung et al, 2014). In achievement situations, students generally adopt one of three different goals: mastery-learning, performance-approach and performance avoidance goals.

1. Task-involvement (Mastery-Learning goals): Individuals with task-involved goals focus on mastering tasks and increasing their competence. Mastery goals are rooted in the desire to improve one's competence during a learning activity. Mastery goals generally cultivate a self-based (or task-based) evaluation of one's competence, and these goals focus the student's attention to developing competence and mastering the task. Therefore, mastery goals are strongly associated with positive patterns of learning, and achievement.

A student is described as task-involved, when s/he is interested in the task for its own qualities. This is associated with higher intrinsic motivation. Task-involved students are less threatened by failure, because their own ego is not tied up in the success of the task. Therefore, they experience relatively low test anxiety and relatively good test performance.

Lin, Hung and Lin (2006) investigated in their study the relationships between student achievement in mathematics and goal orientation. Their result suggested that the better performance in mathematics tended to be associated with more mastery-oriented goal orientation. According to their result, student goal orientation accounts for additional 11% of the variance.

2. Ego-involvement (performance goals): Individuals with ego-involvement goals seek to maximize favourable evaluations of their competence and minimize negative evaluations of competence.

A student who is ego-involved will be seeking to perform the task to boost his / her own ego, for the praise that completing the task might attract, or because completing the task confirms their own self-concept (e.g. clever, strong, funny, etc.). Ego-involved students can become very anxious or discouraged in the face of failure, because such failure challenges their self-concept.

The following table shows the differences between mastery goal and performance goal in terms of students' perspective (summarized from the above literature review): Table 1.

Not all goals are directed towards approaching a desirable outcome (e.g., demonstrating competence). Goals can also be directed towards avoiding an undesirable outcome (e.g., avoiding the demonstration of incompetence to others).

### 2.a. Performance-Approach Goal

With a performance-approach goal, the student seeks to demonstrate or prove competence, especially in the presence of an audience. Performance-approach goals generally cultivate a norm-based evaluation of one's competence, and these goals focus the student's attention on the demonstration of ability relative to that of others.

**Table 1:** Comparison of mastery and performance goals

Mastery Goal	Performance Goal
<ul style="list-style-type: none"> <li>effort is the key to success</li> </ul>	<ul style="list-style-type: none"> <li>ability is the key to success</li> </ul>
<ul style="list-style-type: none"> <li>desire to become proficient</li> </ul>	<ul style="list-style-type: none"> <li>desire to outperform others</li> </ul>
<ul style="list-style-type: none"> <li>student's sense of satisfaction with the work is not tied up with external performance indicators such as earning high grades</li> </ul>	<ul style="list-style-type: none"> <li>student's sense of satisfaction is highly influenced by their grades</li> </ul>
<ul style="list-style-type: none"> <li>it is associated with deeper engagement with the task</li> </ul>	<ul style="list-style-type: none"> <li>it is associated with discouragement in the face of low marks and higher states of anxiety</li> </ul>
<ul style="list-style-type: none"> <li>students perform the task to reach competence and master the task</li> </ul>	<ul style="list-style-type: none"> <li>students perform the task to boost their own ego.</li> </ul>

### 2.b. Performance-Avoidance Goal

With a performance-avoidance goal, the student seeks to demonstrate or prove that he or she is not incompetent, especially in the presence of an audience. Performance-avoidance goals cultivate a norm-based evaluation of one's competence, and these goals focus the student's attention on the avoidance or a demonstration of low ability relative to that of others. When students pursue the performance-avoidance goal, however, they experience a relatively high anxiety and relatively poor test performance.

Before children go to school, they seem primarily concentrated on mastery goals, but when they go to school, where they are surrounded by peers, they start comparing themselves with others and to view their success as doing as well as or better than others. From this time they start to compare their abilities, which is not desirable in terms of students' self-efficacy. Therefore, performance-approach goals inspires competition, but may decrease self-efficacy, which, in turn, makes it less effective. Learners with performance approach can easily give up when they face difficulties, because they accept their limits and competencies and believe it is not possible to change it.

There are some inconsistencies with regard to how performance-approach goal orientations relate to patterns of learning. When students pursue two types of achievement goals - performance achievement and performance avoidance approach - they experience a relatively high anxiety and, consequently, a relatively low test performance. When students pursue the mastery-learning goal, however, they experience a relatively low anxiety and a relatively high test performance. Hence, adopting performance-avoidance goals and performance goals are one cause of high test anxiety. The best way to change one's thinking during a testing situation (and hence to reduce or eliminate one's anxiety) is to intentionally change one's performance and performance-avoidance goals into only mastery-learning goals.

Thus, learners' achievement goals influence their cogni-

tive processes and behavior. Mastery goals deal with the desire to acquire additional knowledge or master new skills, while performance goals deal with the desire to demonstrate high ability and make a good impression. While performance goals involve the desire to look good and receive favourable judgments from others when you perform well, performance-avoidance goals stimulate a student to do or not to do something in order not to look bad or receive unfavourable judgments from others. So, it goes without saying that in most cases mastery-approach goals are the optimal ones.

### Research questions

The following research questions guided this study:

1. How applications of Goal Theory affect students' math success at university level?
2. Do successful (in good academic standing, with a GPA of 2.0 or above) and unsuccessful (on academic probation, with a GPA below 2.0) students differ in terms of their adoption of different goal orientations?

### Research Methods

This research is a quantitative one. The quantitative data has been processed using Elliot's AGQ (Achievement Goal Questionnaire), leading to appropriate descriptive and inferential statistical analysis, including frequencies, means, and standard deviations. This study was conducted to explore whether there is a positive or negative correlation between students' achievement and their achievement goal orientations. The research helped to clarify the relative effectiveness of mastery and performance goal motivation in math achievement from teachers' and students' perspective.

## Participants

53 freshman students of a private Suleyman Sah University (Turkey) were given Elliot's AGQ (Achievement Goal Questionnaire). They were selected randomly from the volunteers in math classes. 43.4% of the sample were female and 56.6% were male.

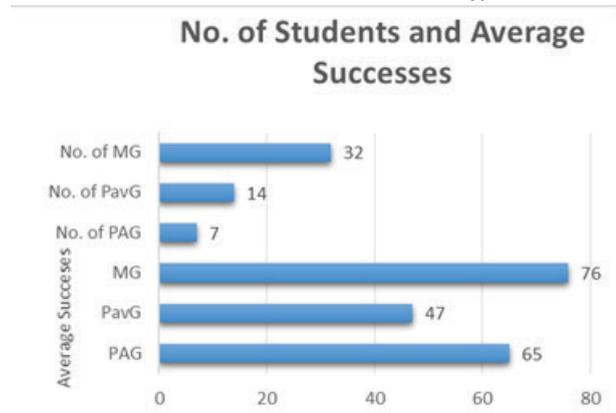
## Measures

In order to identify students' goal adaption types a questionnaire with eighteen items from the Achievement Goal Orientation Inventory (Elliot & Church, 1997) was given to randomly selected students. Also their course exam results have been compared with their motivational types. For each questionnaire, students were asked to rate whether they agree or disagree with the given statements, using a 5-point Likert scale, with scores ranging from 1 (strongly disagree) to 5 (strongly agree).

## Results :

### Research Question 1. How applications of goal theory affect students' math success at university level?

Table 2: Students' number of each motivational type and their GPA



In table 2 we see the number of students whose goal orientations are mastery, performance and performance avoidance goals; also their grade point average is shown in table 2. In further tables MG stands for mastery goal, PAG – performance approach goal, while PAVG – for performance avoidance goal.

It can be seen that among 53 students 32 have mastery goals, 14 - performance –avoidance and 7 - performance approach. The average achievement of students whose goal adoptions are mastery learning is 76 (out of 100 possible), while performance approach is 65 and performance-avoidance is 47. Thus, mastery goals were positively related to good academic standing, whereas performance-avoidance goals were negatively related to good academic standing. Performance-approach goals yielded relatively good results.

In table 3 the calculations of correlations between the number of students who have successful testing results and follow the corresponding goal approach are shown. They

were calculated with SPSS16.0 program.

We can see that the correlation is relatively high (more than 0.5). The results indicated that students' success is relatively strongly bound to the type of goal they have chosen. These results are in agreement with the results obtained by McCollum & Kajs (2007).

### Research Question 2. Do successful (students in good academic standing, with a Math Average Success of 2.0 or above) and unsuccessful (students, with a Math Average Success below 2.0) students differ in terms of their adoption of different goal orientations

To address the second research question, students' GPA and their types of goal orientations have been compared (see table 4).

Table 3: Students' GPA (grade point average) and their types of motivation

C	73-76	2.0=MG students' GPA
D	65-66	1.0=PAG students' GPA
E/F	Below 65	0.0=PAVG students' GPA

The results indicated a significant difference in goal adoption between the successful and unsuccessful students. Students who possess mastery-learning goal have a grade point average 2.0 or are successful students (this average is accepted as college students' grade in good academic standing), while students with both kinds of performance goals are unsuccessful. In more detail the results are shown in tables 5 and 6.

According to the results in table 5, this study indicated that Math Average Success is positively related to mastery goal orientation ( $r = .60, p < 0.01$ ) and performance approach goal orientation ( $r = .25, p < 0.10$ ) however, performance goal orientation correlation is quite weaker when it is compared with mastery goal. Consistent with what other researchers (Lin et al., 2006) have found, results of this study also indicated a negative correlation between Math Average Success and performance-avoidance goals ( $r = -.24, p < 0.10$ ).

Thus, the results indicated a significant difference in goal adoption between the successful and unsuccessful students. Students who possess mastery learning goal have a grade point average 2.0, they are successful students (this average is accepted as college students' points in good academic standing), while students with both kinds of performance goals are unsuccessful, especially with performance-avoidance goals.

**Table 4:** The correlations between the number of students who have successful testing results and follow the corresponding goal approach

	Number of successful students	Number of students following the given goal orientation
Number of successful students – Pearson correlation	1	0.592
Sig.(2-tailed)		0.596
N	3	3
Number of students following the given goal orientation – Pearson correlation	0.592	1
Sig.(2-tailed)	0.596	
N	3	3

**Table 5:** Means, Standard Deviation and Std. Error of Goal Orientation

	N	Mean	Std. Deviation	Std. Error
Math Score	53	67.36	23.61	3.24
MG	53	2.95	.72	.09
PAG	53	2.38	.73	.10
<b>PAvG</b>	<b>53</b>	<b>2.46</b>	<b>.60</b>	<b>.08</b>

**Table 6:** Correlations between Goal Orientations and Math Score

	r	p-value
Math Score & MG	.60*	.00
Math Score & PAG	.25**	.07
Math Score & PAVG	-.24**	.08

\*Correlation is significant at the 0.01 level  
\*\*Correlation is significant at the 0.10 level

## Conclusion

According to the gained results, this study indicated that there is a strong positive correlation between mastery-learning goal and students' academic success (Math Average Success is positively related to mastery goal orientation:  $r = .60$ ,  $p < 0.01$ ). The performance approach goal yielded a positive, however, weak relationship with Math Average Success ( $r = .25$ ,  $p < 0.10$ ). On the other hand, performance avoidance orientation correlation is negative ( $r = -.24$ ,  $p < 0.10$ ). The findings of this research provide a better understanding that the best way to change students' academic achievement level as well as reduce or eliminate their test anxiety is to take measures to change students' performance-approach and especially performance-avoidance goals into mastery-learning goals. The students with mastery approach did really well (Math Average Success 2.0), with performance-approach goals - relatively well (Math Average Success 1.0), but not well enough, while the students with performance-avoidance goals did the worst (Math Average Success 0.0). Therefore, mastery approach is more effective than performance-approach and performance-avoidance goals. Learners with performance approach can easily give up when they face difficulties, because they accept their limits and competencies and believe it is not possible to change it. The received data are in congruence with the literature viewed above (Mensah and Atta, 2015).

## Significanc

This study is important and needed for several reasons. Mainly, a gap exists in the understanding about the effectiveness of mastery and performance goal motivation in math achievement. The reason is that which goal a student adopts is very important to understand his or her felt anxiety during a testing / achievement situation. Not only adopting performance-avoidance goals, but also performance-approach goals are the causes of high test anxiety. The main reason is that these two goals are more similar than different. Individuals who adopt either of these two goals tend to be more concerned about their performance as compared to others and how they will be judged by others than about the learning process. When students pursue two types of achievement goals - performance achievement and performance avoidance approach - they experience a low test performance. When students pursue the mastery-learning goal, however, they experience a relatively high test performance. Accordingly, it can be concluded that mastery achievement goals are strongly associated with positive patterns of mathematics achievement.

The significance of the study is that it should provide understanding that learners with mastery achievement goals believe that competence develops over time through practice and effort, while learners with performance goals believe that competence is a stable characteristic and believe that competent people need not try hard, which is a ruinous viewpoint.

## Limitations

Our sample was drawn from a single university and only 53 students. Thus, the validity of these findings to university students at other institutions is limited. Another more significant limitation to the generalizability of the findings involves

not taking into consideration students' self-efficacy beliefs in math subject, as self-efficacy is also an influencing factor in students' underachievement. Specifically, differences in students' self-efficacy beliefs in math subject and goals toward learning have to be examined in the future. It is expected that the limitations with this study may be addressed through replications and additional larger-scale investigations.

## Suggestions

These findings suggest that educators should do their best to persuade students to follow mastery goals. Students who adopt performance approach and performance-avoidance goals should realize that they may be at greatest risk of failing as well as dropping out of college due to their wrong goal adaptation.

Besides, teachers' major job in math, besides just teaching the subject content, is to inspire belief that competence increases due to hard work. Teachers also can help by reducing stressful situations and minimizing negative evaluations of competence. Students who adopt ego-involved goals desire to maximize favorable evaluations of their competence in order to outperform others. However, the desire to get high grades increases the temptation to cheat. Cheating in the process of testing is always a serious problem for almost every teacher. In order to avoid it, teachers should focus on mastery learning goals rather than performance goals.

## Appendix

### Data collection questions

#### Achievement Goal Questionnaire (AGQ)

Consider what you goals for this course are; that is, what you are trying to accomplish during this course. Indicate how strongly you agree or disagree with each of the 18 statements listed below, using the following Likert 5-point scale:

Circle 1 to communicate "Strongly Disagree"

Circle 2 to communicate "Disagree"

Circle 3 neither agree nor disagree

Circle 4 to communicate "Agree"

Circle 5 to communicate "Strongly Agree"

1 2 3 4 5    1. It is important for me to do better than the other students.

1 2 3 4 5    2. I often think to myself, "What if I do badly in this class?"

1 2 3 4 5    3. I want to learn as much as possible from this class.

1 2 3 4 5    4. In a class like this, I prefer course materials that really challenge me so I can learn new things.

1 2 3 4 5    5. I worry about the possibility of getting a bad grade in this class.

1 2 3 4 5 6. My fear of performing poorly in this class is often what motivates me.

1 2 3 4 5 7. My goal in this class is to get a better grade than most of the students.

1 2 3 4 5 8. In a class like this, I prefer course materials that arouse my curiosity, even if it is difficult to learn.

1 2 3 4 5 9. I just want to avoid doing poorly in this class.

1 2 3 4 5 10. I'm afraid that if I ask my instructor a "dumb" question, he or she might not think I'm very smart.

1 2 3 4 5 11. I am motivated by the thought of outperforming my peers.

1 2 3 4 5 12. I desire to completely master the material presented in this class.

1 2 3 4 5 13. It is important for me to do well compared to others in the class.

1 2 3 4 5 14. I hope to have gained a broader and deeper knowledge when I am done with this class.

1 2 3 4 5 15. I want to do well in this class to show my ability to my family, friends, advisors, or others.

1 2 3 4 5 16. My goal for this class is to avoid performing poorly.

1 2 3 4 5 17. I am striving to demonstrate my ability relative to others in this class.

1 2 3 4 5 18. It is important for me to understand the content of this course as thoroughly as possible.

## Scoring Key

Performance: Approach Goals (M = 2.49, SD = 0.63)

Add up the numbers from the following six items and divide by six: 1, 7, 11, 13, 15, 17

Performance: Avoidance Goals (M = 2.25, SD = 0.77)

Add up the numbers from the following six items and divide by six: 2, 5, 6, 9, 10, 16

Mastery Goals (M = 3.23, SD = 0.50)

Add up the numbers from the following six items and divide by six: 3, 4, 8, 12, 14, 18

## References

Abd-El-Fattah, S.M. & Patrick, R.R. (2011). The relationship among achievement motivation orientations, achievement goals, and academic achievement and interest: A multiple mediation analysis. *Australian Journal of Educational & Developmental Psychology*, 11: 91 – 110.

Alexander, P., Wigfield, A., & Eccles, J. (2000). Expectancy-Value Theory of Achievement motivation. *Contemporary Educational Psychology*, 25(1), 68.

Ames C. (1992). Classrooms: goals, structures, and student motivation. *Journal of Educational Psychology*, 84:261–71.

Bandura, A. (1997). *Self-Efficacy: The Exercise of Control*. New York: Freeman.

Barzegar, (2012). The relationship between goal orientation and academic achievement - the mediation role of self-regulated learning strategies - a path analysis. Paper presented at the International Conference on Management, Humanity and Economics (ICMHE): 112-115. Phuket, Thailand, Aug. 11-12. Retrieved August 26, 2015 from <http://files.eric.ed.gov/fulltext/ED537835.pdf>

Dweck, C. (1999). *Self-Theories: Their Role in Motivation, Personality, and Development*.

Eccles, J.S. & Wigfield, A. (2002). Motivational beliefs, values, and goals. *Annual Review Psychology*, 53:109-32.

Edwards, O.V. (2014). Differentiating performance approach goals and their unique effects. *Universal Journal of Educational Research*, 2, 2: 134-145

Elliot, A., & Church, M. (1997). A hierarchical model of approach and avoidance achievement motivation. *Journal of Personality and Social Psychology*, 72: 218-232.

Ford, M.E. & Nichols, C.W. (1991). Using goal assessments to identify motivational patterns and facilitate behavioral regulation and achievement. In M.L. Maehr, Pintrich, P.R. *Advances in Motivation and Achievement*. Greenwich, CT: JAI Press.

Kyle, V.A., White, K. M., Hyde, M. K.; Occhipinti, S. (2014). The Role of Goal Importance in Predicting University Students' High Academic Performance. *Australian Journal of Educational & Developmental Psychology*, 14: 17-28

Lin, C. J, Hung, P. H. & Lin, S. (2006). The Power of goal orientation in predicting student mathematics achievement. 30th Conference of the International Group for the Psychology of Mathematics Education, 4, 73-81.

McCollum, D.L. & Kajs, L.T. (2007). Applying goal orientation theory in an exploration of student motivations in the domain of educational leadership. *Educational Research Quarterly*, 31: 45-59.

Meece, J. L., Blumenfeld, P. C. & Hoyle, R. H. (1988). Students' goal orientations and cognitive engagement in classroom activities. *Journal of Educational Psychology*, 80(4): 514-523.

Mensah, E. & Atta, G. (2015). Middle level students' goal orientations and motivation. *Journal of Education and Teaching Studies*, 3(2), 20-33.

Midgley, C., Kaplan, A., Middleton, M., Urdan, T., Maehr, M. L., Hicks, L., Anderman, E., & Roeser, R. W. (1998). Development and validation of scales assessing students' achievement goal orientation. *Contemporary Educational Psychology*, 23: 113-131.

Miller, R.B., Greene, B.A., Montalvo, G.P., Ravindran, B. & Nichols, J.D. (1996). Engagement in academic work: The role of learning goals, future consequences, pleasing others, and perceived ability. *Contemporary Educational Psychology*, 21, 4: 388-442

Murphy, P.K. & Alexander, P.A. (2000). A motivated exploration of motivation terminology. *Contemporary Educational Psychology*, 25: 3-53

Nicholls, J.G., Cobb, P., Yackel, E., Wood, T., & Wheatley, G. (1990). Students' theories of mathematics and their mathematical knowledge: Multiple dimensions of assessment. In Kulm, G. (ed.) *Assessing Higher Order Thinking in Mathematics*, 137-54. Washington, DC: American Association for the Advancement of Science.

Nolen, B. (1988). Reasons for studying: Motivational orientations and study strategies. *Cognition and Instruction*, 5, 4: 269-287

Reeve, J. (1996). *Motivating Others: Nurturing Inner Motivational*. Boston: Allyn and Bacon.

Rotgans, J.I. & Schmidt, H.G. (2012). The intricate relationship between motivation and achievement: Examining the mediating role of self-regulated learning and achievement-related classroom behaviors. *International Journal of Teaching and Learning in Higher Education*, 24, 2: 197-208.

Schunk, D.H. (1990). Goal setting and self-efficacy during self-regulated learning. *Educational Psychology*, 25:71-86.

Skaalvik, E.M. (1997). Self-enhancing and self-defeating ego orientation: relations with task and avoidance orientation, achievement, self-perceptions, and anxiety. *Journal of Educational Psychology*, 89, 71-81.

Yeung, A. S., Craven, R.G. & Kaur, G. (2014). Influences of mastery goal and perceived competence on educational outcomes. *Australian Journal of Educational & Developmental Psychology*, 14:117-130.