



HAL
open science

The role of multiple goals in students' motivation and achievement

Marilena Pantziara, George N. Philippou

► **To cite this version:**

Marilena Pantziara, George N. Philippou. The role of multiple goals in students' motivation and achievement. CERME 9 - Ninth Congress of the European Society for Research in Mathematics Education, Charles University in Prague, Faculty of Education; ERME, Feb 2015, Prague, Czech Republic. pp.1252-1258. hal-01287353

HAL Id: hal-01287353

<https://hal.science/hal-01287353>

Submitted on 12 Mar 2016

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

The role of multiple goals in students' motivation and achievement

Marilena Pantziara¹ and George N. Philippou²

1 Cyprus Pedagogical Institute, Latsia, Cyprus, marilena.p@cytanet.com.cy

2 Univeristy of Nicosia, Egkomi, Cyprus

Studies in the area of achievement motivation have made a distinction between mastery and performance goals. Many studies investigated the positive and negative outcomes from the adoption of each goal in students' behaviour and achievement. Recently, there is an ongoing discussion concerning the role of multiple goals in understanding students' behaviour and achievement. This paper addresses the role of mastery goals, performance goals and multiple goals, in students' mathematics achievement and motivation. Data were collected from 620 6th graders (study A, N=299 and study B, N=321). The results of both studies were consistent regarding the effect of the different multiple goals profiles on students' achievement and motivation.

Keywords: Multiple goals, motivation, achievement.

INTRODUCTION

In everyday school one can realize that some students perform better than others, tend to work harder, ask for help, are eager to participate in school activities and use more sophisticated learning strategies than other students. Researchers, mainly in the Educational Psychology domain, examine the role of motivation in the learning and teaching context in an attempt to interpret students' behavior and learning outcomes (Pintrich, 2003). Motivation has been found to play a key role in students' current and future academic success (Pintrich, 2003; Pantziara & Philippou, 2014).

In this respect a number of socio-cognitive frameworks have been developed and used in research on students' motivation in the school context (Pintrich, 2003; Elliot 1999). One of the most applicable and predominant frameworks is achievement goal theory (Elliot, 1999). Achievement goal theory focuses on goals, as the reasons and purposes for engaging

in achievement tasks (Elliot, 1999). While there is a great amount of studies that examine the role of each of these goals in students' cognition, affect and behavior, as opposite constructs, few of them refer to students holding simultaneously multiple goals. Multiple goals and their interactions have been investigated mostly in secondary and college level (Mattern, 2005; Pintrich, 2000). The current study investigates the role of multiple goals and their interaction with elementary students' motivation and achievement.

BACKGROUND AND AIMS

Achievement goal theory

Over the past three decades, achievement goal theory has emerged as an important theoretical prospect on students' motivation in school settings, as it provides a satisfactory framework that emphasizes the importance of how students think about themselves, their tasks and their performance (Midgley, Kaplan, & Middleton, 2001). Rather than considering individuals' with low or high level of motivation, achievement goal theory focuses on why individuals are motivated. The theory posits that individuals engage in academic activities to accomplish different goals. Achievement goals are defined as the competence-relevant objectives that individuals attempt to achieve and these different objectives are associated with different quality of engagement in schoolwork and different cognitive, affective, and behaviour consequences (Elliot et al., 2005; Kaplan, Middleton, Urda, & Midgely, 2002).

Within this framework, two achievement goals are described, mastery and performance goals. Mastery goals refer to an individual's objective of developing personal competence and growth (Kaplan & Maehr, 2007), while performance goals refer to demonstrating ability, focusing on attempts to create an impression often through the comparison with others

(Kaplan & Maehr, 2007). There has been noteworthy consistency over a large number of studies about the relation between mastery goal orientation and adaptive patterns of cognition, affect and behaviour. Indicatively, mastery goals were found to evoke positive processes like effort, expenditure, persistence self efficacy, self-regulated learning, positive affect and well-being (Elliot et al., 2005; Kaplan & Maehr, 2007). On the other side, research findings concerning performance goals were found to be inconsistent. A number of studies found that performance goals are associated with positive processes like positive affect, effort, persistence and graded performance (e.g., Elliot, 1999; Zusho et al., 2005). Other studies, however, reveal that performance goals are less adaptive and are related to negative affect, strategy use, and performance (Elliot & Church, 1997; Kaplan & Maehr, 2007).

In a revised goal theory perspective, researchers have distinguished between performance approach and performance avoidance goals. While performance approach goals focus on doing better than others, performance avoidance goals focus on the possibility of failure and on the attempt to avoid it (Kaplan & Maehr, 2007). Studies investigating mastery, performance approach and performance avoidance goals have consistently found that performance avoidance goals are related to maladaptive patterns of motivation, affect and performance (Pintrich, 2000).

Achievement goal theory and multiple goals

In an attempt to explain inconsistent effects of performance goals, research investigates whether students pursue these goals while at the same time pursuing mastery goals. It may be that in the classroom context, students can endorse both mastery and performance goals in different levels of each of these goals. Research so far examining mastery and performance goals, has often distinguished the effects of these two goal orientations without exploring how these two goals may jointly influence students' behaviour and performance. Qualitative studies revealed that stu-

dents expressed multiple goals for engaging in school activities (Kaplan et al., 2002).

According to Pintrich (2000), there are two views as to how these two goals can be combined to give the best outcomes concerning students' behaviour and achievement. The first view, under the revised goal theory perspective, argues that having high levels of both of these goals could be the most adaptive. If there are positive effects for mastery and for performance goals, then a focus on mastery and a focus on trying to be better than classmates at the same time would result in positive consequences. The second view, under the normative goal theory, suggests that holding performance goals could have negative effects due to the distractions fostered by students' attempts to be compared with each other or to their negative judgments concerning themselves. In this perspective students' involvement fostered by mastery goals would be diminished and lead to less positive outcomes. Under this view the most adaptive pattern would be high mastery goals and low performance goals.

The effects of multiple goals have been examined using different methodologies like cluster analysis, median splits (examining individuals with different patterns of high and low goals) or by using regression analysis to investigate interactions between goal variables. Research examining the effects of different profiles of mastery and performance goals presents evidence that the low level of mastery goals in combination with the low level of performance goals is almost always associated with negative outcomes. In addition the combination of low mastery goals and high performance goals has also been shown to lead to negative outcomes, although less negative than the combination low mastery and low performance goals (Kaplan et al., 2002).

Concerning the profiles high mastery/high performance goals and high mastery/low performance goals, earlier studies have produced mixed results. Particularly, Meece and Holt (1993) investigated ele-

Intensity of inner-mathematical orientation of sense construction	Intensity of individual orientation of sense construction		
	Low	medium	high
High	1	2	3
Medium	4	5	6
Low	7	8	9

Table 1: "Typology of sense construction" (ibid, p. 133, German in original)

mentary students' (5th and 6th grade) different profiles of multiple goal orientation in science and revealed that the group of high mastery/low performance goals showed the most positive achievement profile. Pintrich and Garcia (1991) also found in their study with college students that the specific profile of multiple goals had the most adaptive profile. Similarly, Mattern (2005) found in her study within a foundational teacher education course, that students holding simultaneously high mastery/low performance goals had the highest achievement, followed by the high mastery/high performance group. In contrast Bouffard, Boisvert, Vezeau and Larouche (1995) in their study with college students, found that the group of students with high mastery/high performance goals had the highest level of motivation, cognitive strategy use, self-regulation and achievement, followed by the group with high mastery/low performance goals.

In one of the very few longitudinal studies, Pintrich (2000) examined the changes in the behaviour, affect and achievement of four groups of junior high school students (based on the combination of high and low mastery and performance goals) in their math classroom following them from the 8th to the 9th grade. The study revealed that the two groups (high mastery/high performance and high mastery/low performance group) did not differ significantly regarding changes in motivational beliefs, self-efficacy, task value and test anxiety in the 8th and later in the 9th grade. In terms of task value, the high mastery/high performance group reported higher levels of task value than did the high mastery/low performance group. Yet, both groups ended in the same level of achievement.

In addition some researchers have suggested that holding both high mastery and high performance goals could be more adaptive than holding only high mastery goals (e.g., Harackiewicz, Barron, & Elliot, 1998). They argue that students holding high levels of both goals may be able to motivate themselves to succeed in various achievement contexts. The mixed results of the investigation of multiple goals suggest that more research is needed in this direction. Specifically, more research might be needed taking into account students' age, context and task domain. In this respect, the purpose of the current study was to investigate 6th grade students' multiple goals in the mathematics classroom. Specifically, the study aimed:

- To examine the relation between the four profiles of multiple goals (high mastery/high performance, high mastery/low performance, low mastery/high performance and low mastery/low performance) and student's achievement and motivation.
- To investigate if there is consistency in the results of two studies regarding the outcomes from the adoption of different multiple goals profiles.

METHOD

Participants and instruments used

Data were collected from two studies in Cyprus. In the first study (Study A) the participants were 299 students (164 females and 135 male) and in the second study (Study B) the participants were 321 students (185 females and 136 males). All students came from the 6th grade (average age, 11.5 years old).

In both studies the participants completed a questionnaire measuring their motivation in mathematics and a mathematics test assessing their performance in the concept of fractions. In both studies the data were collected in the mid of the second semester of the school year so as to allow for the evolution of certain motivational constructs and goals with the specific classroom context and the mathematics teacher.

The questionnaire measuring students' motivation was constructed for the needs of these studies and it comprised of 35 Likert-type five-point items (1-strongly disagree, 5-strongly agree). The questionnaire comprised of six subscales measuring: (a) mastery goals (e.g. It is important to me that I improve my mathematics skills this year), (b) performance approach goals (One of my goals is to show others that I'm good at my mathematics work), (c) performance avoidance goals (It's important to me that I don't look stupid in mathematics class), (d) self-efficacy (I'm certain I can figure out how to do the most difficult mathematics work), (e) interest (I am enjoying mathematics lessons very much), and (f) fear of failure (When I am tackling a challenging task, I find that I am reminded of my previous failures). The first four subscales were adopted from the Patterns of Adaptive Learning strategies (PALS) (Midgley et al., 2000). Students' fear of failure was assessed using nine items from the Herman's fear of failure scale (Thrash & Elliot, 2003). Interest was defined in terms of intrinsic motivation, the enjoyment

of and interest in an activity for its own sake (Elliot & Church, 1997). Students' interest was measured using seven items from the Elliot and Church's study (1997).

The mathematics test measuring students understanding of the fraction concept in both studies comprised of fraction items from published research and they assessed students' understanding of fraction as part of a whole, as measurement, fraction equivalence, fraction comparison and fraction addition. More information about the tests can be found in Pantziara and Philippou (2012). Students' achievement was based on their total score in the fraction test; each of the tasks was graded with 0 (wrong) or 1(correct).

Data analysis

In study A we conducted exploratory factor analysis for the six motivational variables using the software SPSS and in study B we conducted a confirmatory factor analysis for the six factors using EQS software. Performance goals used in this study reflected on approach performance orientation to classroom work.

To examine the interactions between mastery and performance goals we dichotomized the two scales using median splits. For the mastery goals, students scoring below 4.6 in Study A and students scoring below 5 in

Study B belonged to the low mastery group while the rest of the students to the high mastery group. For the performance goals, students scoring below 3 in both studies were classified to the low performance group and the rest of the students to the high performance group. The results of the procedure are presented in Tables 1 and 2.

Then an ANOVA analysis with multiple dependent variables was conducted in each study (A and B) to investigate for differences in groups with multiple goals concerning their motivation and achievement in mathematics.

RESULTS

A detailed description of the extraction of factors concerning the achievement goals and the motivational variables (fear of failure, self-efficacy beliefs and interest) can be found in Pantziara and Philippou (2014). Students' achievement in the fraction test was calculated regarding their total score on the tests. Specifically for Study A, the total score was 23 and for Study B the total score was 21. Tables 3 and 4 present the Mean, Standard Deviation and Cronbach's alphas for all affective variables for Study A and Study B respectively.

Low mastery N=122 (40.8%)	High mastery 177 (59.2%)
Low performance N=130 (43.5%)	High performance 169 (56.5%)

Table 1: Groups of Study A

Low mastery N=159 (49.5%)	High mastery 162 (50.5%)
Low performance N=150 (46.7%)	High performance 171 (53.3%)

Table 2: Groups of Study B

Factors for Study A	Mean (1-5)	SD	Cronbach's a
Mastery goals	4.52	.46	.71
Performance (approach) goals	3.08	.93	.80
Self-Efficacy	4.09	.62	.71
Interest	3.85	.89	.89
Fear of failure	2.20	.78	.66

Table 3: Means, Standard Deviations and Cronbach's alpha for each of the five factors-Study A

Factors for Study B	Mean (1-5)	SD	Cronbach's a
Mastery goals	4.62	.56	.68
Performance (approach) goals	3.02	1.08	.81
Self-Efficacy	4.03	.69	.66
Interest	3.84	.97	.84
Fear of failure	2.43	.80	.73

Table 4: Means, Standard Deviations and Cronbach's alpha for each of the five factors-Study B

As tables 3 and 4 present, both samples seem to have a positive view of mathematics. In both studies the mean for mastery goals is above 4.50, self efficacy above 4, interest above 3.5 and fear of failure below 2.5. Students in primary school in the specific educational setting seem to get involved in mathematics more for mastery reasons and not so for performance approach goals.

Regarding the specific objectives of the study, a one-way between groups analysis of variance was conducted to explore the impact of the different multiple goals profile on students' mathematics achievement and motivation (self-efficacy, interest and fear of failure). For study A, the results show a statistically significant difference at the $p < 0.5$ level in scores for the four groups regarding achievement $F(3, 295) = 3.5$, $p = 0.015$, for self-efficacy $F(3, 295) = 15.93$, $p < 0.001$ and for interest $F(3, 295) = 18.36$, $p < 0.001$. No statistically significant difference was found in scores for the four groups regarding fear of failure. Table 5 presents the scores for each group (mean and standard deviation) in each affective factor and achievement. Means within a row with the same subscript are significantly different from one another.

Post-hoc comparisons using the Tukey HSD test indicated that students in high mastery/low performance group had the highest achievement from all

other groups. This difference was statistically significant only for the low mastery/high performance group. This group had a higher mean achievement than the group of students with high mastery goals (Mean=13.65). Students in high mastery/high performance group declared the highest interest following by the high mastery/low performance groups. These two groups had statistically significant difference from the low mastery/low performance group concerning interest. Students' in the low mastery/low performance group had the lowest self-efficacy from the students in the other three groups, and this difference was statistically significant.

For study B, the results show a statistically significant difference at the $p < 0.5$ level in scores for the four groups regarding achievement $F(3, 317) = 6.35$, $p < 0.001$, for self-efficacy $F(3, 317) = 19.06$, $p < 0.001$, for interest $F(3, 313) = 23.32$, $p < 0.001$ and for fear of failure $F(3, 311) = 10.77$, $p < 0.001$. Table 6 presents the scores for each group (mean and standard deviation) in each affective factor and achievement. Means within a row with the same subscript are significantly different from one another.

Post-hoc comparisons using the Tukey HSD test indicated that students in high mastery/low performance group had the highest achievement from the students in the other three groups even though the difference

Dependent Variables	High mastery/low performance		High mastery/high performance		Low mastery/high performance		Low mastery/Low performance	
	M	SD	M	SD	M	SD	M	SD
Achievement	14.32 ^a	4.11	13.17	4.61	12.03 ^a	4.12	12.70	4.17
Interest	4.06 ^b	0.75	4.20 ^c	0.82	3.52	0.94	3.35 ^{b,c}	0.80
Self efficacy	4.19 ^e	0.54	4.33 ^d	0.56	3.90 ^f	0.62	3.74 ^{d,e,f}	0.60
Fear of failure	3.21	0.85	3.22	0.88	3.29	0.71	3.37	0.89

a= $p < 0.05$, b= $p < 0.001$, c= $p < 0.001$, d= $p < 0.001$, e= $p < 0.001$, f= $p < 0.05$

Table 5: Scores for each group (mean, standard deviation)-Study A

Dependent Variables	High mastery/low performance		High mastery/high performance		Low mastery/high performance		Low mastery/Low performance	
	M	SD	M	SD	M	SD	M	SD
Achievement	12.88 ^a	4.20	11.64	3.90	10.14 ^a	4.00	11.39	3.81
Interest	4.00 ^{d,e}	0.92	4.33 ^{b,c}	0.69	3.63 ^{c,e}	0.94	3.33 ^{b,d}	1.02
Self efficacy	4.06 ^{f,g}	0.68	4.47 ^f	0.45	3.84 ^f	0.67	3.70 ^{f,g}	0.70
Fear of failure	2.06 ^{h,i}	0.63	2.33 ^j	0.89	2.69 ^{i,j}	0.75	2.63 ^h	0.75

a= $p < 0.001$, b= $p < 0.001$, c= $p < 0.001$, d= $p < 0.001$, e= $p < 0.05$, f= $p < 0.001$, g= $p < 0.05$, h= $p < 0.001$, i= $p < 0.001$, j= $p < 0.05$

Table 6: Scores for each group (mean, standard deviation)-Study B

in students' achievement was statistically significant only from the group of low mastery/high performance goals. This group had a higher achievement than the group of students with high mastery goals (Mean=12.21). Students in high mastery/high performance group had the highest interest from all the students in the other three groups and the difference in scores was statistically significant for students in low mastery/high performance and low mastery/low performance group. Concerning self-efficacy, students in low mastery/low performance group had the lowest self-efficacy and this difference was statistically significant from the groups with the highest self-efficacy (high mastery/high performance, high mastery/low performance). As fear of failure is concerned, students in low mastery/high performance group had the highest fear of failure and this difference was statistically significant from the groups with the lowest fear of failure (high mastery/low performance, high mastery/high performance).

With respect to the second aim of the study, as it can be seen from tables 5 and 6 the two studies show remarkable consistency in the characteristics of the specific four groups regarding their motivation and achievement. Specifically, and concerning the groups with the most positive outcomes, the group with the highest achievement is the high mastery/low performance goals even though the mean difference was not statistically significant from the group high mastery/high performance goals. The group high mastery/high performance goals had the highest interest from all the other groups in both studies. Again the mean difference was not statistically significant for the group high mastery/low performance goals. The same group had the highest self-efficacy in both studies from all the other groups. In contrast, the group with the most negative outcomes related to achievement is the low mastery/high performance group and the group with the most negative outcomes related to motivation (self-efficacy and interest) in both studies is the group low mastery/low performance goals.

DISCUSSION

The aim of this study was to investigate the role of multiple goals and their interaction with elementary students' motivation and achievement. A general conclusion of the study is that both views - the one under the revised goal theory perspective and the normative goal theory - concerning multiple goals, are found

in this study to be applicable to the development of elementary students' achievement and motivation. Specifically, in line with the first view that holding high levels of both, mastery and performance goals could be the most adaptive, in both studies (Study A and Study B), students in the group of high mastery/high performance goals had the highest interest and the highest level of self-efficacy beliefs. These findings are in line with the results of Bouffard and colleagues (1995) study with college students, who found that this group of students had the highest level of motivation.

In line with the normative goal theory, that the most adaptive pattern would be high mastery goals and low performance goals, results of both studies (Study A and Study B) indicated that students in the group with high mastery/low performance goals had the highest achievement from all other groups even though the mean differences from the group high mastery/high performance group was not statistically significant, a result similar to Pintrich's study (2000). An important finding is that in both studies (Study A and Study B) this group had higher achievement than the groups of students with single high mastery goals. From these findings it can be concluded that performance goals when combined with mastery goals does not diminish the positive effect of mastery goals. Students who are concerned at the same time about their mastery and about their performance in comparison with others seem to have an adaptive pattern of achievement and motivation.

In line with the normative goal theory and parallel to other studies (Pintrich 2000; Kaplan et al., 2002) both studies (Study A, Study B) showed that the groups low in mastery goals both in combination with low or high level of performance goals are associated with negative results. Students in both of these groups reported low levels of achievement, interest, self efficacy and the highest levels of fear of failure.

The results of our studies may lead to the conclusion that mastery goals lead to the most adaptive patterns. Even though the results could inform teachers to work for the development of mastery goals in the mathematics classroom, the combination of high mastery goals with high performance approach goals may also lead to adaptive patterns regarding students' achievement and motivation. It was found that performance approach goals alone usually do not have a positive effect on students' interest (Zusho et al., 2005), a key

factor in students' life-long learning. In this study's results, the group with high mastery/high performance declared the highest interest.

In conclusion, we suggest that more research is needed in the domain of multiple goals in relation to students' age, different learning contexts, and different measures of students' achievement.

REFERENCES

- Elliot, A. (1999). Approach and avoidance motivation and achievement goals. *Educational Psychologist*, 34(3), 169–189.
- Elliot, A., & Church, M. (1997). A hierarchical model of approach and avoidance achievement motivation. *Journal of Personality and Social Psychology*, 72, 218–232.
- Elliot, A., Henry, K., Sell, M., & Maier, M. (2005). Achievement goals, performance contingencies, and performance attainment: an experimental test. *Journal of Educational Psychology*, 97(4), 630–640.
- Bouffard, T., Boisvert, J., Vezeau, C., & Larouche, C. (1995). The impact of goal orientation on self-regulation and performance among college students. *British Journal of Educational Psychology*, 65, 317–329.
- Harackiewicz, J., Barron, K., & Elliot, A. (1998). Rethinking achievement goals: When are they adaptive for college students and why? *Educational Psychologist*, 33, 1–21.
- Kaplan, A., & Maehr, M. (2007). The contributions and prospects of Goal Orientation Theory. *Educational Psychology Review*, 19, 141–184.
- Kaplan, A., Middleton, M., Urdan, T., & Midgley C. (2002). Achievement Goals and Goals Structures. In C. Midgley (Ed.), *Goals, Goal structures, and Patterns of Adaptive learning* (pp. 21–53). Mahwah: Lawrence Erlbaum Associates.
- Mattern, R. (2005). College students' goal orientations and achievement. *International Journal of Teaching and Learning in Higher Education*, 17(1), 27–32.
- Meece, J., & Holt, K. (1993). A pattern analysis of students' achievement goals. *Journal of Educational Psychology*, 85, 582–590.
- Midgley, C. et al. (2000). *Manual for the Patterns of Adaptive Learning Scales*. Retrieved from <http://www.umich.edu/~pals/manuals.html>
- Midgley, C., Kaplan, A., & Middleton, M. (2001). Performance-Approach goals: Good for what, for whom, under what circumstances and at what cost? *Journal of Educational Psychology*, 93(1), 77–86.
- Pantziara, M., & Philippou, G. N. (2014). Students' motivation in the mathematics classroom. Revealing causes and consequences. *International Journal of Science and Mathematics Education*. DOI: 10.1007/s10763-013-9502-0
- Pantziara, M., & Philippou, G. N. (2012). Levels of students' "conception" of fractions. *Educational Studies in Mathematics*, 79(1), 61–83.
- Pintrich, P. (2003). A motivational science perspective on the role of student motivation in learning and teaching contexts. *Journal of Educational Psychology*, 95(4), 667–686.
- Pintrich, P. (2000). Multiple Goals, Multiple Pathways: The role of goal orientation in learning and achievement. *Journal of Educational Psychology*, 92(3), 544–555.
- Pintrich, P., & Garcia T. (1991). Student goal orientation and self-regulation in the college classroom. In *Advances in motivation and achievement: Vol. 7. Enhancing motivation* (pp. 317–402). Greenwich: JAI Press
- Thrash, T. M., & Elliot, A. J. (2003). Inspiration as a psychological construct. *Journal of Personality and Social Psychology*, 84, 871–889.
- Zusho, A., Pintrich, P., & Cortina, K. (2005). Motives, goals and adaptive patterns of performance in Asian American and Anglo American students. *Learning and Individual Differences*, 15(2), 141–158.