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**THE RELATION BETWEEN ACHIEVEMENT GOALS AND
PERFORMANCE: GENDER AND SELF-ESTEEM AS
MODERATORS**

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Abstract

Common sense still sees Math as a more masculine domain and also as reflecting someone's general cognitive ability. Therefore, the general aim of the present study was to investigate whether the relation between students' achievement goals (i.e., performance-approach, performance-avoidance and mastery goals, respectively) and their Math performance is moderated by their self-esteem and gender. 180 high school students (53.3% girls and 46.7% boys) completed self-reported measures assessing their achievement goals and global self-esteem. Results showed that Math performance correlated significantly only with performance-avoidance goals and that the relationships between achievement goals and Math performance differ for boys and girls: relations between Math performance and both mastery and performance-approach goals were significant and positive only for boys, and the relation between Math performance and performance-avoidance goals was significant only for girls. Both gender and self-esteem moderated the relation between performance-approach goals and Math performance: performance-approach goals were significantly positively related to Math performance only for boys and only for students with high self-esteem. As for the performance-avoidance goals, their relation with Math performance was moderated only by gender: performance-avoidance goals were significantly negatively related to Math performance only for girls.

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Keywords: Performance, achievement goals, self-esteem, gender differences.



1. Introduction

High school is the final level of the mandatory learning in the Romanian educational system, the adolescents' academic achievement playing a crucial role in their future educational and professional choices. Therefore, it is important to deepen the understanding of both internal and contextual factors influencing high school students' academic outcomes. The present study focused on Math performance for several reasons. In this field, learning tasks are perceived to be more difficult and complex, reflecting one's general cognitive ability. Its contents are developing in a spiral, cumulative manner, hence the higher risk of failure, with the individual differences increasing over time (Aunola, Leskinen, Lerkkanen, & Nurmi, 2004; Gherasim, Butnaru, & Măirean, 2013). Previous research reported significant gender differences on Math performance, with a traditional gender gap in favor of boys, although more recent studies emphasized that this gender gap tends to narrow, or even to reverse (see Eccles 2011; Robinson & Lubienski 2011, for reviews).

2. Problem Statement

One way of explaining these differences in students' academic performance is the analysis of their (potentially different) achievement goal orientations, defined as integrated patterns of beliefs about what is important in an achievement situation that lead students to approach, engage and respond to achievement tasks and situations in specific ways (Elliot, 2005). In the present study we used the trichotomous model (Elliot & Church, 1997) which distinguishes among three types of achievement goals: mastery goals (MGs, denoting a focus on developing one's competence and improving one's mastery of the task), performance-approach goals (PapGs, denoting a competitive focus on demonstrating one's competence by outperforming others), and performance-avoidance goals, respectively (PavGs, denoting a focus on avoiding appearing incompetent by not performing worse than others). Previous studies revealed that goal orientations are differently correlated with various educational outcomes such as academic achievement, learning strategies, academic interest or academic emotions (Diaconu-Gherasim, Țepordei, Măirean, & Rusu, 2018; Gherasim et al., 2013; see also Wigfield & Cambria 2010, for a review).

Overall, studies on high school students found that, in general, both MGs and PapGs were positively associated with academic achievement, while PavGs were negatively correlated with achievement, appearing to be the most maladaptive type of goal orientation (Dickhäuser, Dinger, Janke, Spinath, & Steinmayr, 2016; Dinger, Dickhäuser, Spinath, & Steinmayr, 2013). Most of these studies were conducted on Western samples. The few studies evaluating these relations on non-Western countries (including East European countries) reported mixed results. For example, Diaconu-Gherasim and Măirean (2016) found that mastery approach goals and performance goals were not significant associated with achievement on a sample of Romanian high school students. Specifically related to the Math field, students' MGs were found to be less consistently related to Math performance, whereas results were more consistent with regard to performance goals: PapGs were found to be positively related to effective learning strategies, engagement, and performance in Math activities, while PavGs were found to have more maladaptive effects (Payne, Youngcourt, & Beaubien, 2007, for a review).

In terms of gender differences in goal orientations, previous research showed that, overall, girls tend to be more mastery focused than boys, whereas both types of performance goals were not found to be consistently different between the two gender groups (Spinath, Eckert, & Steinmayr, 2014, for a review). Nonetheless, studies on Romanian students found that girls tend to score higher on both MGs and PapGs, and lower on PavGs, showing a more adaptive motivational profile than their male colleagues (Diaconu-Gherasimet al., 2018; Gherasim et al., 2013). Moreover, both PapGs and PavGs were found to be significant predictors of Math achievement for girls, while only PavGs were significant predictors for boys.

Another internal variable considered in the present study was students' self-esteem. Results obtained by Aspelmeier, Love, McGill, Elliott, and Pierce (2012), on a sample of undergraduate students, showed that there is no gender differences on self-esteem, and that there is a significantly positively correlation between self-esteem and academic performance (i.e., GPA scores). Results also showed that self-esteem significantly positively predicted GPA in the case of the continuing-generation college students (i.e., those who had someone in their immediate family having graduated from college), but not in the case of first-generation college students. Albert and Dahling (2016) analyzed relations between mastery goal orientation, locus of control, academic self-concept and school achievement. Results showed that mastery was positively correlated with achievement, academic self-concept and locus of control (internality) and that relation between mastery and academic self-concept was stronger when internal locus of control was high rather than low.

Additionally, a meta-analysis examining gender differences in self-esteem found a small overall gender difference favouring males, but it also revealed that this difference (i.e., the effect size) increases from elementary to high school, followed by a decrease in adulthood (Kling, Hyde, Showers, & Buswell, 1999).

3. Research Questions

In the light of the previous research synthesized above, our main interest was to contribute to the understanding of the relations between students' academic achievement and their motivation in terms of achievement goal orientations, under the potential moderating influence of gender and self-esteem. We were also interested in finding out if and which results of previous studies would be replicated in a non-Western sample, namely on Romanian high school students.

4. Purpose of the Study

Therefore, the purpose of the present study was to address these issues. More specifically, we were interested in high school students' Math performance and analyzed its relations with students' achievement goals. Due to the fact that Math is perceived as being more difficult and as reflecting one's general cognitive ability, we expect self-esteem to moderate these relations. Math is also stereotyped as being a more masculine domain, an idea that once endorsed by either students or teachers might lead to gender differences in students' both motivation and performance. Moreover, since Math contents are presented and learnt in a spiral manner, these potential gender differences might increase over time,

becoming more visible at the high school level, which is why we also expected gender to significantly influence the associations considered in our study.

5. Research Methods

5.1. Participants and procedure

Participants in this study were 180 students in 9 and 10 grade, 46.7% males (84) and 53.3% females (96), with ages ranging from 15 to 17 ($M = 15.99$, $SD = .69$). Participation in the research project was entirely voluntary and anonymous. All measures, except for the final grades, were made in paper-and-pencil format with instructions given in writing.

5.2. Measures

Goal orientations was measured using the Patterns of Adaptive Learning Survey (Middelton & Midgley, 1997), validated on Romanian sample by Gherasim et al. (2013). This instrument is 16-item scale, developed to assess students' mastery goals (five items), performance-approach goals (five items) and performance-avoidance goals (six items). A 5-point Likert-type scale was used to take respondents' answers ranging from 1 representing "not at all true" to 5 representing "very true".

Self-esteem was measured using the Rosenberg Self-Esteem Scale (Rosenberg, 1965), a 10-item questionnaire measuring global self-esteem on a 4-point Likert scale, ranging from 1 = strongly disagree to 4 = strongly agree. This is a commonly used 10-item scale in psychological and educational research.

Students' academic performance in Math was measured by their first semestrial grades communicated by their form master teacher. The Romanian grading scale ranges from 1 (poor) to 10 (outstanding).

6. Findings

All the statistical analyses were carried out using the Statistical Package for Social Sciences (SPSS) version 24 for Windows and Process macro. Cronbach's alphas were computed to estimate the internal consistency of all instruments used. Descriptive statistics including means and standard deviations were calculated for the continuous variables and independent samples t-test was used to compare means between genders. Pearson product-moment correlation was used to test bivariate associations between variables in the study. Multiple regressions in macro PROCESS for SPSS were used to evaluate the interactions between the predictor variable goal orientations and gender and self-esteem and the criterion variables of math performance.

6.1. Correlations between students' achievement goals, self-esteem and math performance

Results (Table 1) show significant and positive correlation between mastery goals, performance-approach goals and performance-avoidance goals and significant and negative correlations between performance-avoidance goals with both self-esteem and Math performance.

Table 01. Alpha Cronbach and correlations between student' achievement goals, self-esteem and Math performance

Variables	1	2	3	4	5
1. Mastery goals	-				
2. Performance-approach goals	.178*	-			
3. Performance-avoidance goals	.165*	.554**	-		
4. Self-esteem	.090	-.065	-.318**	-	
5. Math performance	.083	.026	-.153*	.074	-
Alfa Cronbach	.759	.778	.749	.809	
Mean	3.50	3.52	2.73	29.19	6.60
SD	.86	.93	.91	5.90	1.59

Note: * $p \leq .05$; ** $p \leq .01$

Next, we analyzed if the relationships between achievement goals and Math achievement differ for boys and girls. Results (Table2) showed that relations between Math performance and both mastery and performance-approach goals were significant and positive only for boys, not for girls, and the relation between Math performance and performance-avoidance goals was significant only for girls, not for boys. The correlation between self-esteem and Math performance was not significant for either boys or girls.

Table 02. Correlations between students' achievement goals, self-esteem and Math performance, for boys and girls

Variables	1	2	3	4	5
1. Mastery goals	-	-.016	.018	.154	-.033
2. Performance-approach goals	.414**	-	.502**	.047	-.138
3. Performance-avoidance goals	.261*	.600**	-	-.348**	-.288**
4. Self-esteem	.081	-.128	-.219*	-	.113
5. Math performance	.256*	.219*	.002	.137	

Note: Correlations for girls, on top of diagonal; correlations for boys, under the diagonal; * $p \leq .05$; ** $p \leq .01$

6.2. Gender differences on students' achievement goals, self-esteem and Math performance

Results showed that male students had a significantly higher mean score on self-esteem than their female peers ($t = 4.498$, $p < .01$). There are no significant gender differences regarding goal orientations or Math performance.

6.3. Moderating effect of gender and self-esteem on the relationship between performance-approach goals and Math performance

A multiple regression model in the macro PROCESS for SPSS was tested to investigate whether the relationship between performance-approach goals and Math performance was moderated by gender and self-esteem. Following recommendations by Hayes (2013), investigation of moderation was performed despite instances of the predictors not exhibiting significant associations with the Math performance. Results (Table 3) indicated that: (1) the interaction between performance-approach goals and gender was significant, suggesting that the effect of performance-approach goals on Math achievement depended on gender, and (2) the interaction between performance-approach goals and self-esteem was significant, suggesting that the effect of performance-approach goals on Math achievement depended on students' self-esteem.

Table 03. Results of regression analysis of performance-approach goals, self-esteem and gender on Math performance

Variables	B	SE B	P	95 % CI	
				Lower	Upper
Gender	– .480	.247	.053	– .967	.007
Self-esteem	.033	.021	.129	– .009	.075
Performance-approach	– .011	.131	.932	– .269	.246
Performance-approach x Gender	.521	.257	.044	.014	1.028
Performance-approach x Self-esteem	.051	.025	.048	.001	.101

Moderating effect of gender

Simple slopes for the association between performance-approach goals and Math achievement were tested for girls and boys. Results revealed that performance-approach goals were significantly positively related to Math performance only for boys ($B = .318, p < .05$), but not for girls ($B = - .266, p > .05$). This interaction is illustrated in Figure 1, (a).

Moderating effect of self-esteem

Simple slopes for the association between performance-approach goals and Math achievement were tested for low, moderate, and high levels of self-esteem. Results revealed that performance-approach goals were significantly positively related to Math performance when students' self-esteem was high ($B = .405, p < .05$), but not when students' self-esteem was low ($B = - .371, p > .05$) or average ($B = .017, p > .05$). This interaction is illustrated in Figure 1, (b).

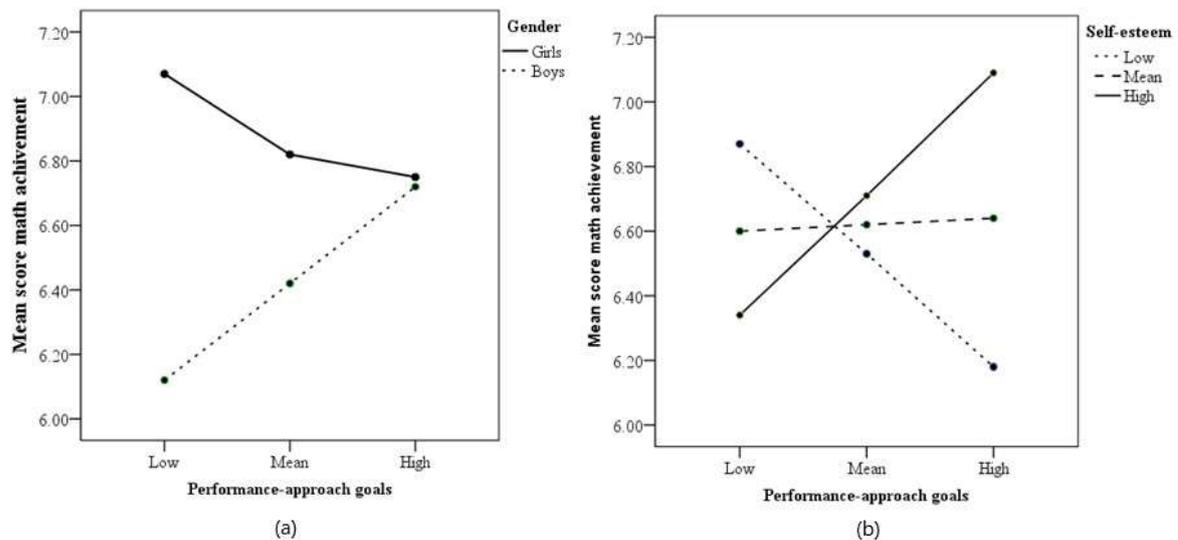


Figure 01. Gender (a) and self-esteem (b) moderated the relationship between performance-approach goals and Math performance

6.4. Moderating effect of gender on the relationship between performance-avoidance goals and Math performance

Multiple regression in the macro PROCESS for SPSS was used to evaluate whether the relationship between performance-avoidance goals and Math performance was moderated by gender. Results (Table 4) indicated that the interaction between performance-avoidance goals and gender was

significant ($B = .549$, $p < .05$), suggesting that the effect of performance-avoidance goals on Math achievement was moderated by gender.

Table 04. Results of regression analysis of performance-avoidance goals and gender on Math performance

Variables	B	SE B	P	95 % CI	
				Lower	Upper
Gender	-.469	.120	.049	-.938	-.001
Performance-avoidance	-.290	.137	.036	-.561	-.019
Performance-avoidance x Gender	.549	.273	.046	.011	1.087

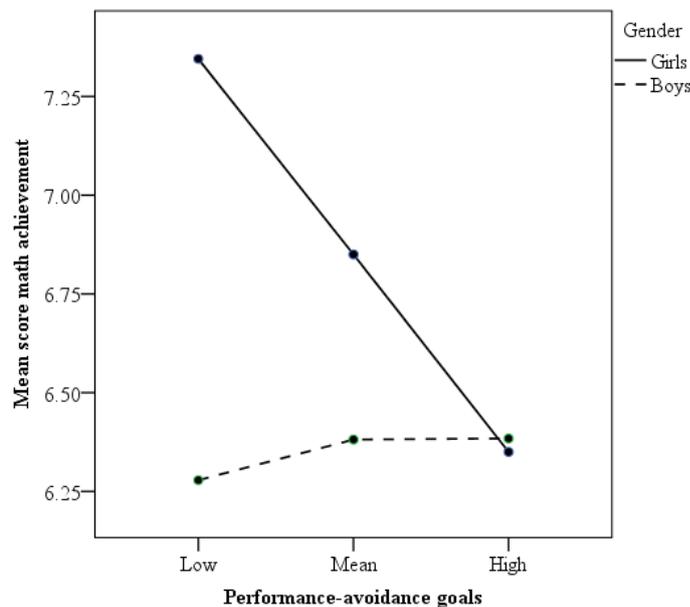


Figure 02. Gender moderated the relationship between performance-avoidance goals and Math performance

Simple slopes for the association between performance-avoidance goals and Math achievement were tested for girls and boys. Results revealed that performance-avoidance goals were significantly negatively related to Math performance only for girls ($B = -.546$, $p < .01$), but not for boys ($B = .003$, $p > .05$). This interaction is illustrated in Figure 2.

7. Conclusion

Overall, our results indicated a moderating effect of both gender and self-esteem on the relations between high school students' achievement goals and their Math performance. First, results for the whole sample showed that only the performance-avoiding goals significantly negatively correlated with Math performance, indicating that the lower the fear of appearing incompetent the better the performance. This is in line with previous findings showing that PavGs correlate positively with fear of failure and anxiety, and negatively with self-compassion (Neff, Hsieh, & Dejitterat, 2005). This is also coherent with the negative correlation between our participants' PavGs and their self-esteem, meaning that the lower the self-image and self-confidence, the higher their fear of being perceived as incompetent.

In line with some of the previous studies, no gender differences were found on Math performance or achievement goals (see Eccles, 2011; Spinath et al., 2014, for reviews). The only significant gender difference was on self-esteem, in our sample the boys having a higher level of self-esteem than their female colleagues, a result similar to what Kling et al. (1999) found in their meta-analysis.

Our moderation analyses revealed interesting findings showing that high school students' gender and self-esteem significantly moderated the relations between their goal orientations and Math performance. Thus, performance-approach goals were significantly positively related to Math performance only for boys, not for girls. Moreover, performance-approach goals were significantly positively related to Math performance when students' self-esteem was high, but not when students' self-esteem was average or low. Results also showed that performance-avoidance goals were significantly negatively associated with Math performance only for girls, not for boys, regardless of self-esteem levels. Taken all together these moderating effects depict a more positive motivational profile for the high school boys with regard to Math performance, especially when their self-esteem is also positive. When self-confident, boys have a greater tendency to endorse a competitive orientation, seeking to prove their competence by outperforming others, an attitude favouring a better performance. In turn, high school girls in our sample tend to have a good Math performance when being less anxious and less afraid of appearing incompetent in front of the others.

These slightly different motivational mechanisms for boys and girls might indicate that Math is indeed a more "sensitive" field, related to potential gender stereotypes acknowledged and possibly even endorsed by both students and their Math teachers, with a more positive influence on boys' self-confidence and competitive attitude (focused on proving being better than others), but with a more negative influence on girls' anxiety or fear of failure (focused on proving not being worse than others).

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