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University Students' Achievement in Mathematics: The Role of Student's Gender, Instructor's Gender, Educational Level, and Experience

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Abstract: Educational research that investigated the influence of gender on university students' mathematics achievement has focused mainly on student gender. The role played by instructors in determining such achievement has always been underestimated. This study is a unique attempt to understand the influence of student gender and factors related to instructors on students' performance in mathematics. Specifically, this study examines the relationship between student gender, program of study, instructor gender, educational level and teaching experience, the interaction of student gender and instructor gender, and students' achievement in Calculus I classes. Student gender was the most significant predictor of students' performance. Although male students outnumbered their female students in mathematic classes, female students outperformed their male colleagues. Instructors' teaching experience and educational level were also significant predictors of students' performance. Significant correlations were also noticed between instructor gender and students' performance.

Keywords: gender, educational level, teaching experience, mathematics performance

Introduction

Stereotypes about math performance have always been in favour of boys. Such stereotypes still hold true among parents, educators, teachers, peers and even students themselves. Those common held beliefs have affected females' enrollment in math-related courses and careers as well as females performance in math tests (Burkley et al., 2010; Spencer, Steele, & Quinn, 1999). For example, in the U.S. in computer science and engineering majors women represented less than 25% of the student population at the undergraduate and graduate level (National Science Foundation, 2009).

As stereotypes about math performance are common among educators and instructors, understanding the factors that influence university students' math performance requires investigating factors related to the instructors, particularly that researchers have attributed math stereotypes to gender-specific expectations of teachers who are more supportive and who encourage males more than females to achieve in mathematics. Such beliefs and attitudes significantly correlated with math achievement (Jacobs et al., 2005). As such the aim of this study was to reexamine the gender issue and the role played by math instructors in determining university students' math performance. The value of this research lies in the fact that it incorporates factors that were either studied in isolation or under-emphasised in the literature. Moreover, it focuses on instructor-related factors that are at the core of the teaching learning process.

Historical Background

Educational research associated with mathematics learning/teaching has focused on factors related to students' attitudes, background information, and achievement, curriculum and instruction, school environment, teacher practices, peer attitudes, home environment and parents' beliefs, and socioeconomic status (e.g. Beaton & O'Dwyer, 2002; Brady & Bowd, 2005; Cannon & Ginsburg, 2008; Kifer 2002; Schmader, Johns & Barquissau, 2004).

However, the main focus of literature has been on issues related to gender equity in mathematics achievement. Gender differences were reported among elementary school students (Jacobs et al., 2002). Whereas prior research on math achievement and gender was in favor of males, today differences seem to disappear all the way through high school (Hyde, Fennema, & Lamon, 1990; Hyde et al., 2008). Even today in the United States female students enrolled in advanced math courses at the high school and college levels out perform their male colleagues (Bridgeman & Wendler, 1991; Kimball, 1989; Stout et al., 2011).There is also no evidence for gender differences in overall aptitude for mathematics (Spelke, 2005). Yet, as mentioned earlier, women are still less likely to enroll in majors or domains that require taking mathematics courses. In the current study the gender ratio of students majoring in engineering, mathematics and physics was 7:1 favoring males.

Even among gifted students, earlier research has shown that males have always outperformed females in mathematics. Between 1972 and 1991, the Study of Mathematically Precious Youth (SMPY) showed that among the intellectually talented 12 and 13 year old American students the ratio of students who scored 700 or more on the mathematics section of the SAT test was 13 to 1 in favor of boys (Lubinski & Benbow, 1992; 1994). Lately reports showed that the ratio was 3:1, still in favor of boys (Brody & Mills, 2005).

Research in mathematics education has also examined the effect of students' value-related beliefs on students' performance as these are at the basis of social cognitive theories (e.g. Bandura, 1997; Wigfield & Eccles, 2000). Researchers have found that such beliefs were significant predictors of math performance among adolescents (Marsh & Yeung, 1998; Meece, Wigfield & Eccles, 1990). However, understanding the students' achievement and value related beliefs as well as attitudes towards mathematics don't seem to contribute or add any value to this study. Participants in this study are adult students who have already made a decision about pursuing a math path at the high school level and later a degree and careers that depend mainly on considerable knowledge of mathematics.

This work is an exploratory one that studies the factors that influence students' performance in mathematics with focus on teacher-related factors that were under-emphasised or rarely approached by researchers. As research findings have shown controversial results regarding the male and female performance in mathematics, this study will investigate the effect of student gender on university students' mathematics performance. And as the literature has rarely examined the effect of instructor gender on mathematics performance in coeducational atmosphere, this study will investigate any possible influence for instructor gender on mathematics performance as well as the interaction between instructor gender and student gender. Finally, this paper will also investigate the influence of teacher experience and educational level on students' performance in mathematics.

Another important teacher quality that received attention in the literature was the role played by teacher years of teaching experience and its possible effect on achievement. Understanding the role that is played by teacher experience and any possible influence it might have on students' math performance seems essential as especially when investigated as part of a greater framework. Literature in the field has shown that teachers' experience influences student achievement (Aaronson, Barrow & Sander, 2007; Clotfelter, Ladd & Vigdor, 2006).

Research Questions

This study is unique for three main reasons: First it addresses a combination of factors that were studied in isolation in the literature. Moreover, this study focuses on aspects that are related to math instructors, aspects that were also ignored or under-emphasised by researchers in the field.The aim of this study was to understand the relationships among university students' gender, instructors' characteristics (gender, teaching experience, and educational level) and the students' performance in a first year mathematics course. Understanding such relationships will allow educators to adopt strategies that would enhance students' performance in math. The purpose of this study is to address the following research questions:

1. Are there any relationships among university student gender, student major, instructors' teaching experience, gender, educational level, and university students' mathematics performance?

2. What combination of factors best predicts university students' performance in mathematics performance?

Method

Participants

The sample in this study, as shown in Table 1, consisted of 557 university students enrolled in a first year mathematics class (calculus I) at a Middle Eastern private university. The students were enrolled in the fall semester of 2013. Twenty three different classes were offered and taught by male and female instructors (Table 2 below). All classes used the same textbook and covered the same content material. The participants have all sat for a nationwide official exam that high school students are required to pass before joining a university. The majority of the participants were pursuing an engineering degree. Sixty students were pursuing a degree in Computer Information Technology. Forty-six students were pursuing a computer science degree. The rest were pursuing a mathematics degree (25 students) and a business and finance degree (24 students).Participants had to take calculus I because it is a prerequisite or a compulsory course that must be taken by students pursuing degrees in mathematics, engineering, business and computer sciences. Students' achievement in the calculus course was based on students' performance in two tests, a tutorial, and a final exam. Tests 1, 2, and the final exam accounted for 90 % of the total mark and the tutorial accounted for 10 %.The students who withdrew the class were not included in this study. Course Withdrawal at this university is not always related to students' performance in the class. In most of the cases, students withdraw for financial or family reasons.

Calculus I is a basic introductory differential calculus course designed to introduce students to the basic concepts of calculus. The topics include limits, continuity of a function, derivative of polynomial, trigonometric and transcendental functions, differentiation rules, and applications of the derivative.

Instruments

Though there were many Calculus I classes all exams were administered at the same time. A common grading scheme was also used to insure fair grading for all students. The tests were proctored by different instructors than those who taught the class. Instructors were responsible for grading the tests for the classes they teach but it was a blind folded process so that names of students stay anonymous.

Test 1

The first test was conducted during the fifth week of classes. It covered two topics: functions which is a review topic and limits which is a new topic. The weight of this test was 25% of the total grade.

Test 2

This test was administrated during the tenth week of classes. It covered the topic of differentiation. The weight of this test was also 25% of the total grade.

Final Exam

The final exam was conducted at the end of the semester. It was a cumulative test where more weight was put on the topics of limits and differentiation. The weight of the final exam was 40% of the total grade.

The Tutorial

Calculus I classes used to meet three times a week: two lectures for 75 minutes each and one tutorial for 50 minutes. Lectures and tutorials were run by the same instructor who was fully responsible for his/her class. The tutorial was used as a problem solving session. Students asked questions from the homework and from the lectures. The grade of the tutorial was assigned based on attendance and participation. Ten labs were conducted and one percent was assigned for each lab.

Table 1
*Student gender*major cross tabulation*

	Math	Engineering	Computer Information Technology	Computer Science	Business and Finance	Total
Male	9	363	52	42	22	488
Female	16	39	8	4	2	69
Total	25	402	60	46	24	557

Table 2
*Instructor gender*Education cross tabulation*

	PhD	MSc	Total
Male	4	3	7
Female	0	6	6
Total	4	9	13

Results

Descriptive Statistics:
Descriptive statistics revealed that around 87.61% of the participants were males (N = 488) and 12.38% were females (N = 69). This large number of male students enrolled in mathematics classes as compared to that of females reflects the typical imbalance between both groups in mathematics classes and majors that requires students to take mathematics classes.Table 3 shows the Mean and *Standard Deviations* of the various majors. Students majoring in mathematics had the highest score in Calculus I (M = 68.52), those in engineering had the next highest score (M = 55). Those majoring in Computer Information Technology and Computer Science scored 47 and 40 respectively. However, the lowest score was of those majoring in business and finance (M = 24). As to student gender, statistics in Table 5 shows that female students outperformed their male colleagues (M = 68.5 & 50 respectively). As to instructor gender, statistics in Table 5 shows that the average math score of students taught by a female teacher was higher than those taught by male teachers (M = 55 & 50 respectively). Data also revealed that instructors who had more teaching experience outperformed those with less teaching experience (M = 57 & 50 respectively). Moreover, students taught by instructors who had a master's degree slightly outperformed those taught by instructors who hold a PhD degree (M = 52 & 49 respectively).

Relationships among the various variable**s**
Due to the unique combination of factors adopted in this study, there was a need to investigate the strength of relationships among scale scores for student gender, instructor's gender, educational level, major, experience, and calculus I performance. As shown in Table 4, the data revealed significant correlations among variables ranging from 0.10 to 0.26.

Moderate correlations were observed between student gender and mathematics performance (r = 0.26, p <0 .01). Low correlations were revealed between instructor gender and mathematics performance (r = 0.10, p < 0.05) and between instructor gender and experience (r =0 .23, p <0 .01). The positive correlation indicates that female instructors had more teaching experience than male instructors. Educational level was negatively correlated with calculus I performance (r = -0.11, p < 0.01). The negative correlation shows that instructors with master's degree outperform those with a PhD degree. The negative correlations between major and calculus I performance indicates that math students outperformed those in other majors (r = -0.204, p < 0.01). Experience was also correlated with calculus I performance at the 1 % level ((r = 0.14) indicating that students of instructors with more experience teaching math have outperformed those with taught by less experienced instructors. The negative correlation (r = -0.658, p < 0.01) between educational level and instructor gender revealed that the number of PhD male instructors is higher than those of female instructors.

Table 3

Mean and standard deviation of math scores according to major

Major	Mean	N	Std. Deviation
Mathematics	68.52	25	16.36
Engineering	55.28	402	22.48
Computer Information Technology	47.37	60	22.35
Computer science	39.35	46	18.29
Business and Finance	23.96	24	16.33
Total	52.35	557	23.16

Table 4

Pearson's product moment correlations among the various variables

Scale	Student Gender (SG)	Instructor Gender (IG)	Educational Level (EL)	Major (M)	Experience (E)	Performance (P)
SG	--	0.011	-0.017	0.125**	0.022	0.261**
IG		--	-0.658**	0.004	0.231**	0.108*
EL			--	-0.064	-0.244**	-0.117**
M				--	0.007	-0.204**
E					--	0.141**
P						--

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Two way ANOVA

As one purpose of this study was to investigate the hypotheses that university students' math achievement is affected by (1) student gender, (2) instructor gender, and (3) the interaction of student gender and instructor gender, there was a need to create a new variable called the interaction of student gender and instructor gender. This new variable was included in the regression model to see if it has any possible influence on math performance. Moreover, two way ANOVA was run to compare the performance of students taught by the same sex instructor to those taught by a different sex instructor (same sex instruction). Table 5 below shows that same sex instruction does not affect student's performance. However, it showed that female instructors' outperformed their male colleagues. Even among male students, those taught by a female instructor outperformed those taught by male instructors (M = 57 and 53 respectively). Female students' taught by female instructors also outperformed those taught by male instructors (M = 79 & 69 respectively). Such findings are corroborated by the correlation results which showed a positive correlation between instructor's gender and mathematics achievement indicating that female instructors outperformed their male colleagues.

Table 5.
Mean and standard deviation of math scores as a result of gender interaction

Student Gender	Instructor Gender	Mean	Std. Deviation
Male	Male	53.31	22.722
	Female	57.33	22.975
	Total	55.07	22.897
Female	Male	68.54	20.837
	Female	79.48	13.557
	Total	73.53	18.594
Total	Male	55.12	23.011
	Female	60.13	23.192
	Total	57.33	23.204

Prediction of Students' Performance in Calculus I

Backwards multiple regression analysis was run to predict university students' performance in Calculus I (see Table 4 below). The purpose of Multiple Regression was to learn more about the relationship between a dependent variable and several independent variables. The independent variables in this research study were student gender, major students enrolled in, instructors' educational level, instructor gender, interaction between student gender and instructors' gender, and teaching experience. The simplest rules for testing the multiple correlation are $N \geq 50 + 8m$ (m is the number of independent variables) and 104 + m for testing individual predictors (Tabachnick & Fidell, 1989). With a sample size of 557and six independent variables, the number of cases is well above the minimum requirement of 110 (104 + 6) for testing individual predictors in standard multiple regression. Multiple R, R^2, and F value were reported for each cluster (model). The unstandardized coefficients (B), Standardized coefficients (Beta), t value, and significance for each individual predictor are reported. The first model tested included the six predictors. Then the model was modified using the backwards elimination procedure, which deletes the weakest non-contributing variables one at a time till a final model was identified in which all the regression coefficients were significant. Multiple Regression Analyses revealed that the initial model with the six variables was statistically significant (F = 20.020, p <0 .00, adjusted R^2 =0 .146). Removing instructor gender and interaction between student gender and instructor's gender resulted in a negligible increase (0.002) in the adjusted R^2 value. In the final model as showed in Table 6, student gender, instructor educational level, teaching experience, and major contributed for 19.2 % of the variance in Calculus I performance (F = 19.839, p < 0.00, adjusted R^2 = 19.2). The standardized regression coefficient Beta showed that student gender explained almost the third of the variance in Calculus I scores (β = 0.288). Major students enrolled in accounted for 24.4 % of the variance in students' score (β = -0.244). The negative score indicates that generally speaking students in the engineering department outperformed those in the other domains. Teaching Experience accounted for a smaller percentage of the variance (β = 0.114). The least contribution was made by instructors' educational level (β = -0.009). This indicates that students taught by instructors with master's degree outperformed those with a PhD degree.

Table 6

Backwards multiple regression predicting students' scores in mathematics

	B	*T*	$AdjR^2$	*F*
Student gender	0.288	7.282***	19.2	
Major	-0.244	-6.278***	19.839***	
Teaching experience	0.114	2.810**		
Educational level	-0.09	-2.444*		

****P* < .001two-tailed, ***P* < .01two-tailed; **P* < .05two-tailed

Discussion and Conclusions

Gender was significantly correlated with and was the best predictor of mathematics achievement. This finding is corroborated by the findings of earlier research conducted in the United States which revealed that female high school and college students outperform their male colleagues in math courses (Benbow & Stanley, 1982; Kimball, 1989; Stout et al., 2011). However, despite this fact, it is still evident that female students are still underrepresented in mathematics-related courses and careers. In this study male students represented almost 88% of the student population of students pursuing a career in math, engineering, computer science and business. This also seems to fall in harmony with data in the United States where women represent only 25% of university graduates pursuing a degree in computer science and engineering (National Science Foundation, 2009). Yet, the case in the Middle East is worse than the case in the United States. It seems that the stereotype that men are more capable and successful in pursuing careers that require knowledge of math and technology is still prevalent and this seems to affect women's self-esteem and disadvantage them. These stereotypes are dominant across ages and genders were this study took place and all over the world (Buldu, 2006). They are also common in the United States (Barman, 1999; Finson, 2003). However, with women's excelling in mathematics at the university level seems to be an important factor that would help eliminate those pervasive stereotypes that women are underachievers in mathematics and careers that requires knowledge of math and technology. This large difference in the sample sizes will affect the power of the statistical test and this would be one of the limitations of this study.

Although math related careers are thought by many as male dominant since men have more time and effort to dedicate to their work. Women on the other hand are expected to be good housewives who should devote more time to their families (Hakim, 2000). Women themselves believe that having a family and raising kids is a priority to them that surpasses all other interests (Eccles, 1986).

An important factor that seems to help eliminate these stereotypes is having female math instructors at the various instructional stages, an aspect that would help eliminate bias again females in math classes as well as increase females' self-esteem. Findings from this research seem to support this suggestion. Although instructor gender did not predict math performance, yet it was significantly correlated with performance at the 5% level. This seems to indicate that female instructors are highly motivated about their careers and seem to exert a lot of effort to eliminate the most common hold belief that males make better students and better teachers when it comes to math. This finding seems interesting especially if we notice that female teachers are less educated than males. With the majority of male teachers having a PhD degree in math, the majority of female teachers hold a master's degree. This is common in this country were this study took place because women have less chance to travel abroad to pursue a Ph.D. degree in math. Males have much bigger chances to pursue higher degrees. Also it could be related to the middle eastern culture that women at the end make better housewives and better for them to think of getting married and having a family than traveling abroad and spending another four or five years pursuing a PhD degree in math or any other scientific branch.

The finding that educational level negatively correlated with and predicted math performance is also logical because instructors with master's degree are mainly females and those with PhD degrees are males. This is supported by the fact that female teachers have more teaching experience than male teachers as they started teaching right after having their master's degree. This finding is also an indication that it is not the educational level that determines the quality of teaching.

In conclusion, this study has revealed that there is a gender gap in mathematics. However, this gender gap is in favor of women who have proven to make better students and better teachers. Findings from this study are a clear invitation to parents, educators, and students all over the world to reconsider or even change current stereotypes to make them less masculine. Although male dominance is part of the reason why women are hesitant to compete with men in historically male-dominated careers, yet finding from this study has set the first cornerstone in demolishing the pervasive stereotypes. Women make better math instructors than males; this sends a clear message that women can succeed and even overcome men even in domains and careers that are considered highly masculine. As such, women are invited to choose math-related careers particularly that females are better achievers in math at the high school and university level.

As the combination of factors in this study is unique, it would be interesting to know if findings from this study apply to other universities and cultures. Future research is invited to elaborate on this study by investigating the role that is played by instructors in other cultures and contexts.

References

Aaronson, D., Barrow, L., & Sander, W. (2007).Teachers and student achievement in the Chicago public schools. *Journal of Labor Economics, 25*(1), 95-35.

Bandura, A. (1997). Self-efficacy: The exercise of control. New York: Freeman.

Barman, C. (1999). Students' views about scientists and school science: Engaging K-8 teachers in a national study. *Journal of Science Teacher Education, 10,* 43-54.

Beaton, A.E., & O'Dwyer, L. M. (2002). Separating school, classroom and student variances and their relationship to socioeconomic status. In D.F. Robitaille & A.E. Beaton (Eds.), *Secondary analysis of the TIMSS data* (pp. 211-231). Boston, MA: Kluwer Academic Publishers.

Benbow, C. P., & Stanley, J.C. (1982). Consequences in high school and college of sex differences in mathematical reasoning ability: A longitudinal perspective. *American Educational Research Journal*, *19*, 589-622. doi:10.2307/1162546.

Buldu, M. (2006). Young children's perceptions of scientists: A preliminary study. *Educational Research, 48,* 121-132.

Brady, P., & Bowd, A. (2005). Mathematics anxiety, prior experience, and confidence to teach mathematics among preservice education students. *Teachers and Teaching: Theory and Practice, 11,* 37-46.

Bridgeman, B., & Wendler, C. (1991). Gender differences in predictors of college mathematics performance and in college mathematics course grades. *Journal of Educational Psychology, 83,* 275-284.

Brody, L.E., & Mills, C.J. (2005). Talent search research: What have we learned? *High Ability Studies, 16(1):* 97-111.

Burkley, M., Parker, J., Stermer, S.P., & Burkley, E. (2010). Trait beliefs that make women vulnerable to math disengagement. *Personality and Individual Differences*, *48*, 234-238.

Cannon, J., & Ginsburg, H.P. (2008)."Doing the math": Maternal beliefs about early mathematics versus language learning. *Early Education and Development, 19,* 238-260.

Clotfelter, C.T., Ladd, H.F., &Vigdor, J.L. (2006). Teacher-student matching and the assessment of teacher effectiveness. *Journal of Human Resources, 41*(7), 778-820.

Eccles, J.S. (1986). Gender-roles and women's achievement. *Educational Researcher*, *15,* 15-19.

Finson, K.D. (2003). Applicability of the DAST-C to the images of scientists drawn by students of different racial groups. *Journal of Elementary Science Education, 15,* 15-26.

Hakim, C. (2000). Work-lifestyles choices in the 21st century: *Preference theory*: New York: Oxford University Press.

Hyde, J.S., Fennema, E.F., & Lamon, S.J. (1990). Gender differences in mathematics performance: A meta-analysis. *Psychological Bulletin, 107*, 139-155.

Hyde, J.S., Lindberg, S.M., Linn, M.C., Ellis, A.B., & Williams, C.C. (2008). DIVERSITY: Gender similarities characterize math performance. *Science, 321,* 494-495.

Jacobs, J.E., Lanza, S., Osgood, D.W., Eccles, J.S., & Wigfield, A. (2002). Changes in children's self-competence and values: Gender and domain differences across grades one through twelve. *Child development, 73,* 509-527.

Jacobs, J.E., Davis-Kean, P., Bleeker, M., Eccles, J.S., & Malnchuk, O. (2005). I can, but I don't want to: The impact of parents, interests, and activities on gender differences in math. In A.M. Gallangher & J. C. Kaufman (Eds.), *Gender differences in mathematics*. Cambridge University Press.

Kifer, E.W. (2002).Students attitudes and perceptions. In D.F. Robitaille& A.E. Beaton (Eds.), *Secondary analysis of the TIMSS data* (pp. 211-231). Boston, MA: Kluwer Academic Publishers.

Kimball, M. M. (1989). A new perspective on women's math achievement. *Psychological Bulletin, 105,* 198-214. doi:10.1037/0033-2909.105.2.198.

Lubinski, D., & Benbow, C. P. (1994). The study of mathematically precocious youth: The first three decades of a planned 50-year study of intellectual talent. In R.F. Subotnik & K.D. Arnold (Eds.), Beyond Terman: Longitudinal studies in contemporary gifted education (pp. 255-281). Norwood, NJ: Ablex.

Lubinski, D., & Benbow, C.P. (1992). Gender differences in abilities and preferences among the gifted: Implications for the math-science pipeline. *Current Directions in Psychological Science*, 1, 61-66.

Marsh, H.W., & Yeung, M.A. (1998). Longitudinal structural equation models of academic self-concept and achievement: Gender differences in the development of math and English constructs. *American Educational Research Journal, 35,* 705-738.

Meece, J.L., Wigfield, A., & Eccles, J.S. (1990). Predictors of math anxiety and its influence on young adolescents' course enrollment intentions and performance in mathematics. *Journal of Educational Psychology, 82,* 60-70.

National Science Foundation. (2009). *TABLE C-4. Bachelor's degrees, by sex and field: 1997-2006.* Women, Minorities, and Persons, with Disabilities in Science and Engineering: 2009, Division of Science Resource Statistics. Retrieved from http://www.nsf.gov/statistics/wmpd/tables.cfm.

Schmader, T., Johns, M., & Barquissau, M. (2004). The costs of accepting gender differences: The role of stereotype endorsement in women's experience in the math domain. *Sex Roles, 50,* 835-850.

Spencer, S.J., Steele, C.M., & Quinn, D.M. (1999).Stereotype threat and women's math performance. *Journal of Experimental Social Psychology, 35,* 4-28.

Spelke, E.S. (2005). Sex differences in intrinsic aptitude for mathematics and science? *American Psychologist,* 60,950-958.

Stout, J.G., Dasgupta, N., Hunsinger, M., & McManus, M. (2011).STEMing the tide: Using in group experts to inoculate women's self-concept and professional goals in science, technology, engineering, and mathematics (STEM).*Journal of Personality and Social Psychology, 100,* 255-270. doi:10.1037/a0021385.

Tabachnick, B. & & Fidell, L. (1989). *Using multivariate statistics*. Northedge: Harper Collins.

Wigfield A., & Eccles, J.S. (2000). The development of competence beliefs, expectancies for success, and achievement values from childhood through adolescence. In A. Wigfield & J. S. Eccles (Eds.), *Development of achievement motivation* (pp. 91-120). San Diego: Academic.

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