

Investigation of the Role of Effortful Control and Gender in Prediction of Classroom Participation, Teacher-Student Social Relationships and Perceived Academic Competency and Mathematical Academic Achievement

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Abstract

The present research aims to investigate the role of effortful control and gender in prediction of teacher-student social interactions, classroom participation, perceived academic competency and academic achievement of students of Anar city high schools in math. To this end, a sample made up of 285 students of the second course of high school were selected by means of multistage cluster sampling method and data were collected by means of perceived academic competency, effortful control, classroom participation, and teacher-student social relationships. Results showed that relationship between effortful control and classroom participation, perceived academic competency and math academic achievement is positive and significant but its relationship with teacher-student social relationships is negative and significant. Furthermore, results showed that perceived academic competency is a positive predictor of mathematical academic achievement. One of the other results was that effortful control is a negative predictor of teacher-student social relationships but it is a positive predictor of perceived academic competency and classroom participation. Furthermore, results showed that gender has a positive and significant impact on teacher-student social relationships and classroom participation but it does not have a significant impact on perceived academic competency.

Keywords: classroom participation, teacher-student social relationships, effortful control, perceived academic competency, academic achievement.©

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Introduction

effortful control is an indicator of students' supervision abilities and is defined as: "the efficiency of executive attention, i.e. the ability to prevent from a dominant response or having an ability to express a resulting response, having plan and ability to discover errors" (Rothbart, Bates, 2006). Students who have this ability believe that they can control their attention and behavior intentionally. Effortful control is measured by means of different methods. For example, it can be measured by hard work, having the ability to delay happiness and ability indices for prevention from voluntary behavior (Murray, Kochanska, Harlan, 2000, Rothbart, Bates, 2006, as quoted from Valiente, Lemery-Chalfant, Castro, 2007). Processes of this construct are related to rules which concern students' feelings and regulate sentimental responses and behaviors of students (Rothbart, Bates, 2006). Students with effortful control construct have many abilities. For instance, they do not get tired with doing their assignments (Zimmerman, 1998). Effortful control describes an ability for self-control which forms in students' advances like ability to prevent from effortful behavior, activation of behavior if necessary, voluntary concentration or attraction of attention. This is internalized as an innate affair and increases as the result of mental maturity and interaction with the environment in childhood (Rothbart, Posner, 2000). Furthermore, being exposed to psychological disease has a relationship with low effortful control (Lonigan, Phillips, 2001). Many studies indicate that effortful control supports reading, math and language, although this construct is not related to students' intelligence sometimes (Madden, Fabes, Martin, Hanish, Andres, Derdich, 2003, as quoted from Valiente et al, 2007). Previous studies show that effortful control of students is related to academic competency. Anyway, all results and findings are not constant or when control variables or academic competency correlations are added to the model, important impacts are reduced. When academic competency is investigated, it can be seen that other variables are also important. Studies show that relationships between students and participation in classroom can change relationship between effortful control and academic competency (Valiente et al, 2007). In educational situations, perceived academic competency is a multi-dimensional concept which is a combination of skills, attitudes and students' behavior which are effective in classroom for academic success. Academic competency has five sub-categories: motivation, study skills, inter-personal skills or social skills, commitment to classroom and academic skills which in part is divided into three subcategories: reading/language, math and critical thinking. Academic competency has application in five stages (recognition, analysis, planning, execution and assessment) (Demaray, Elliot, 1998; Diperna, Elliot, 1999; Gresham, MacMillian, Bocian, 1997). Positive social skills have also relationship with academic competency and evidence show that acceptance by friends and having social skills are related to success in math, literature and language (Ladd, 2003; as quoted from Valiente et al, 2007). Evidence collected over the past decade show that the quality of relationships between students and their teachers is related to the present and subsequent compatibility of school. Children who experience positive relationships with their teachers have more positive attitudes towards school and are more involved in lessons and more successful (Wellborn, Connell, 1991, Lynch, Stiller, Ryan, 1994, as quoted from Hughes, Gleason, Zhang, 2005). They therefore

find more friends (Howes, Matheson, Hamilton, 1994, Hughes, Cavell, Wilson, 2001). In contrast, students whose relationships with their teachers are accompanied with disagreement and struggle are more prone to leaving school. They do not advance and are rejected by their friends (Hughes et al, 2001). Effects of teacher-student relationship are strong in primary schools like impacts of teacher expectations. Although no study has compared the impact level in different ages, Essex, Armstrong, Measelle, Silver (2005) as quoted from Hughes et al (2009) reported that students' perceptions of higher level of student-teacher struggle in kindergarten predicts positive growth narrations for externalization of issues from kindergarten to the third classroom. Classroom participation refers to a participatory situation Fassinger (1995, as quoted from Mustafa, NikAbdRahman, Yunus, 2010; Bippus, Young(2000)) defined participation as any comment or question which is asked by students in classroom. Participation means getting involved in class discussions and avoiding negative behaviors. Findings show that participation in classroom has relationship with students' grades and participation in classroom adjusts relationships between effortful control and academic ability. Classroom participation causes an internal motivation and tendency to learning target (Dweck, 1989, Finn, 1993, Gottfried, 1994, as quoted from Valiente et al, 2007). Students who do not take part in classroom cannot do their tasks well. Researchers believe that motivation plays role in academic performance because it guides students' behaviors. Students who like to follow their activities value class environment (Valiente et al, 2007). Tatar (2005, as quoted from Mustafa et al, 2010) states that classroom participation plays an important role in educational success and personal progress of students in future. Astin (1999) states that students who take part in class activities have higher levels of satisfaction and hard work (Fassinger (1995, as quoted from Mustafa et al, 2010) also believes that classroom participation has been studied for children and not for adults and teenagers. The present study aims to investigate relationship between classroom participation, teacher-student social relationships, perceived academic competency, effortful control, gender and students' mathematical academic achievement in Anar City High schools.

Methodology

The present research is a descriptive study with correlation analysis. Statistical population of the research included 540 students of grades 2, 3, and 4 in the second course of high schools of Anar City, Iran. 285 students were selected by means of multistage cluster sampling according to Morgan Table. In the first stage, 5 schools were selected out of 8 high schools of the city randomly. Then, grades 2, 3, and 4 were selected in experimental and mathematical majors. 1 class was selected from each grade randomly and 25 students were selected randomly and the questionnaires were distributed among them.

Instruments

Perceived academic competency questionnaire: this questionnaire was designed by Akey (2006). This questionnaire has 9 questions and the questions are based upon 5-point Likert scale from "completely agree" to "completely disagree". Reliability of this instrument has been reported between 0.78 and 0.79. Cronbach's alpha was equal to 0.73 in this research.

Effortful control questionnaire: this questionnaire was designed by Derybery- Rathbarth(1988) and contains 32 questions. The questions are based upon 5-point Likert scale from "very much" to "never". This questionnaire has had a reliability coefficient equal to 0.87. In this research, the coefficient was equal to 0.86.

Classroom participation questionnaire: this questionnaire was designed by Reed, Long, Stinson, Antia, Sabers, Kreimier (2006) and contains 28 questions. The questions are based upon 5-point Likert scale from "completely agree to "completely disagree". Reliability of the questionnaire was equal to 0.76. this questionnaire has dimensions like teacher's understanding, students' understanding, positive emotion and negative emotion.

Teacher-student social relationships questionnaire: this questionnaire was designed by McDonald & Moberg (2002). The researcher changed the questions of the questionnaire for teacher-student social interaction. This questionnaire contains 10 questions and they measure teacher-student relationship. The respondents were asked to score the questions from zero to 5 (from completely agree to completely disagree). Higher scores were related to more powerful relationships. Reliability coefficient was 0.83.

Findings

Table 1: descriptive indices of research variables and correlation matrix between them

variable	mean	SD	1	2	3	4	5
Effortful control	75.32	15.77	1				
Classroom participation	74.26	12.17	0.225**	1			
Teacher-student social relationship	22.5	7.42	-0.122**	0.396**	1		
Academic competency	19.55	5.72	0.524**	0.077	-0.262**	1	
Math academic advance	14.55	3.75	0.218**	-0.039	-0.077	0.283**	1

Table 1 shows the results of correlation matrix analysis between research variables. results show that relationships between effortful control and classroom participation ($r=0.255$, $p<0.01$), perceived academic competency ($r=0.524$, $p<0.01$) and math academic achievement ($r=0.218$, $p<0.01$) are positive and significant but relationship between effortful control and teacher-student social relationships ($r=-0.122$, $p<0.05$) is negative and significant. Relationship between classroom participation and teacher-student social relationships ($r=0.396$, $p<0.01$) is positive and significant but it does not have any significant relationship with perceived academic competency ($r=0.077$, $p>0.05$) and math academic achievement ($r=-0.039$, $p>0.05$). Relationship between teacher-student social relationships and perceived academic competency ($r=-0.262$, $p<0.01$) was negative and significant

but its relationship with math academic achievement ($r=-0.077, p>0.05$) was not significant. Relationship between perceived academic competency and math academic achievement ($r=0.283, p<0.01$) was positive and significant.

Table 2: prediction of math academic progress in terms of predicting variables

critierion	predictor	β	SE β	t	R ²
Math academic achievement	Effortful control	0.123	0.018	1.706	0.01
	Teacher-student social relationships	0.03	0.036	0.421	0.0006
	Perceived academic competency	0.234	0.047	3.294	0.038
	Classroom participation	-0.116	0.024	-1.634	0.001
	gender	0.054	0.474	0.871	0.0027

Results of table 2 indicate that R-squared value is equal to 0.099. In other words, 9.9% of the variance of math academic achievement variable is predicted by independent variables. Moreover, the calculated F value ($F(5, 251)=5.532, p<0.01$) is significant. Investigation of regression coefficients show that only perceived academic competency has a positive and significant influence on math academic achievement ($\beta=0.234, t=3.294, p<0.01$) and one standard unit increase in academic competency results in 0.234 standard units increase in math academic achievement.

Table 3.Multivariate regression analysis for prediction of variables based upon effortful control and gender

dependent	Independent	β	SE β	t	R ²
Perceived academic progress	Effortful control	0.5	0.019	10.113	0.27
	gender	0.01	0.605	0.289	0.000
Classroom participation	Effortful control	0.22	0.043	3.435	0.041
	gender	0.16	1.363	2.812	0.028
Teacher-student social relationships	Effortful control	-0.12	0.028	-2.684	0.025
	gender	0.16	0.898	2.147	0.016

Results show that the influence of effortful control on academic competency is positive and significant and predicts 27% of its variance ($\beta=0.234, t=3.294, p<0.01, R\text{-squared}=0.27$). However, gender influence is not significant. The influence of effortful control on classroom participation is positive and significant and predicts 4.1% of its variance ($\beta=0.225, p<0.01, r\text{-squared}=0.041$). Further, the influence of gender on classroom participation is significant and predicts 2.8% of the variance of classroom participation ($\beta=0.16, t=2.812, p<0.01, r\text{-squared}=0.27$). the influence of effortful control on teacher-student social relationships is negative and significant and predicts 2.5% of its variance ($\beta=-0.12, t=-2.684, p<0.01, r\text{-squared}=0.025$). Furthermore, the influence of gender on teacher-student relationships is significant and predicts 1.6% of the variance of teacher-student social relationships ($\beta=0.16, t=2.147, p<0.01, r\text{-squared}=0.016$).

Conclusion

The present research aimed to investigate the role of effortful control and gender in prediction of classroom participation, teacher-student social relationships and perceived academic competency and students' math academic achievement in Anar City high schools. To this end, some hypotheses were proposed for relationships between effortful control and gender with classroom participation, teacher-student social relationships, perceived academic competency and academic achievement considering the theoretical framework. In investigation of the role of effortful control, gender, classroom participation, teacher-student social relationships and perceived academic competency in prediction of math academic achievement, the results showed that perceived academic competency has a positive influence on academic achievement in math. Students who feel competent in social, sports and academic terms are more probable to express more sociable behaviors, therefore they are more popular among their peers. Furthermore, Philips and Zimmerman (1990) believed that students who expressed more academic competence had more achievement than those students who had low levels of perception. These results showed that students' perception of their academic competence is an important factor in their academic achievement. Students with high levels of academic competency had more achievement than those students who underestimate their competencies. However, it must be noted that students do not have the same ability in all fields. For instance, a student is good at math and will progress in this major but he or she may not be as capable in literature. Therefore, he or she will have less achievement in literature. In general, students who have positive images of independence, initiative and resistance will acquire better academic results and will be more competent. In investigation of the role of effortful control and gender in prediction of perceived academic competency, results showed that effortful control is a positive predictor of perceived academic competency and predicts 27% of its variance. Results of Valiente et al (2007) showed that effortful control is related to absence at school and reported academic competency in American-Mexican students. Previous revisions of these researchers show that effortful control of students is related to academic competency. Students who can control their plans and works feel more competent. Effortful control can cause self-control and these results in students' achievement and students can have appropriate behavior when necessary and this self-control is internalized in childhood. In investigation of the role of effortful control and gender in prediction of classroom participation, the results showed that effortful control and gender are positive predictors of classroom participation. Valiente et al (2007) as quoted from the results of studies conducted by Berndt and Keefe (1995), Birch and Laad (1997) and Murray and Greenberg

(2000) showed that students who do not take part in classroom and are not related to school do not obey rules. Children who can control their time and behavior can manage their feelings and express appropriate behavior and develop necessary skills. In investigation of the role of effortful control and gender in prediction of teacher-student social relationships, results showed that effortful control is a negative predictor of teacher-student social relationships and gender is a positive predictor of teacher-student social relationships. Valiente et al (2007) as quoted from the results of studies conducted by Berndt and Keefe (1995), Birch and Laad (1997) and Murray and Greenberg (2000) stated that effortful control has relationship with students' relationships and when students have weak effortful control, they lack discipline and their relationships with other students and teachers are weak and receive less trainings. Teachers must give power and opportunity to think and learn. Therefore, the first goal of teachers must be establishment of a favorable relationship and not a controlling relationship so that the students can trust in teachers. Having relationship with others helps students with correcting errors and this is very important for their growth. Children who have the skill for effortful control tend to provide social skill and express less behavioral problems. If teachers and parents control children very much and take freedom of action from them, they can establish relationship with others and other peers. Therefore, it can be said that classroom control by teacher and parents' control must be such that children can establish appropriate communications and they can express more appropriate behavior in society and excess self-care can prevent from relationship. Students who can manage their behavior, feeling and time and are able to develop their relationships with others can get involved in society by means of good communication.

Reference

1. Astin, A. W. (1999). Student involvement: A developmental theory for higher education. *Journal of College Student Development*, 40, 518-529.
2. Bippus, A. M., & Young, S. L. (2000). What behaviors reflect involvement in a course? Students' perceptions and differences between high and low communication apprehensive. *Communication Research Reports*, 17, 310-319.
3. Demaray, M. K., & Elliott, S. N. (1998). Teachers' judgments of students' academic functioning: A comparison of actual and predicted performances. *School Psychology Quarterly*, 13, 8-24.
4. DiPerna, J. C., & Elliott, S. N. (1999). Development and validation of the Academic Competence Evaluation Scales. *Journal of Psych educational Assessment*, 17, 207-225.
5. Gresham, F. M., MacMillan, D. L., & Bocian, K. M. (1997). Teachers as "tests": Differential validity of teacher judgments in identifying students at-risk for learning difficulties. *School Psychology Review*, 26, 47-60.
6. Howes, C., Matheson, C. C., & Hamilton, C. E. (1994). Maternal, Teacher, and Childcare History Correlates of Children's Relationships with Peers. *Child Development*, 65, 264-273.
7. Hughes, J. N., Cavell, T. A., Willson V. (2001). Further support for the developmental significance of the quality of the teacher-student relationship. *Journal of School Psychology*; 39:289-301.
8. Hughes, J. N., Gleason, K. A., Zhang, D. (2005). Relationship influences on teachers perception of academic in academically at-risk minority and majority first grad students, *Journal of school psychology*, 43:303-320
9. Lonigan, C. J., & Phillips, B. M. (2001). Temperamental influences on the development of anxiety disorders. In M. W. Vasey & M. R. Dadds (Eds.), *The Developmental Psychopathology of Anxiety* (pp. 60-91). New York: Oxford University Press.
10. Phillips, D.A., & Zimmerman, M. (1990). The development course of perceived competence and incompetence among competent children. In R.J. Stenberg, & J. Kolligian Jr. (Eds.) *competence considered* (pp. 41-66). New Haven, CT: Yale university press.
11. Rothbart, M., & Bates, J. (2006). Temperament. In N. Eisenberg, W. Damon, & L. M. Richard (Eds.), *Handbook of child psychology: Vol. 3, Social, emotional, and personality development (6th ed.)* (pp. 99-166). Hoboken, NJ US: John Wiley & Sons Inc.
12. Siti Maziha Mustapha, Nik Suryani Nik Abd. Rahman & Melor Md. Yunus. (2010b). Factors influencing classroom participation: a case study of Malaysian undergraduate student. *Procedia Social and Behavioral Sciences*. 9, 1079-1084.
13. Valient, C., Lemery, K. C., Swanson, J., Reiser, M. (2000). Prediction of Children's Academic Competence from their Effortful Control, Relationships and classroom Participation, 1-6
14. Zimmerman B. J., Developing self-fulfilling cycles of academic regulation: An analysis of exemplary instructional models. In: Schunk DH, editor. *Self-regulated learning: From teaching to self-reflective practice*. Guilford Press; New York, NY: 1998. pp. 1-19.

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