

CORRELATIONAL ANALYSIS ON ACHIEVEMENT GOAL ORIENTATION WITH MATHEMATICS ANXIETY OF MALAYSIAN SCHOOLS STUDENTS

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Achievement goal orientation is one of the motivational constructs that plays an important role in determining students' persistence in learning. Adoption of specific goal orientation brings about different learning outcomes. Meanwhile, mathematics anxiety is an affective variable that could influence students' learning and performance. High level of anxiety has always been related to poor achievement. This study was conducted to identify the relationship between motivational construct which was achievement goal orientation with mathematics anxiety. A total of 976 Malaysian secondary school students were selected through cluster random sampling to be the respondents of the study. The instruments used were achievement goal orientation questionnaire and a self-developed mathematics anxiety scale. All the collected data were analyzed by using Pearson correlation and linear regression analyses. Findings showed that mastery and performance-avoidance orientation were significantly correlated with mathematics anxiety while performance-avoidance contributes the largest variance to the changes in mathematics anxiety. The findings may provide a useful feedback for educators regarding the factors that could enhance or inhibit students' learning in mathematics.

INTRODUCTION

Science, Technology, Engineering and Mathematics (STEM) education is an important field of education. Aligned with that, mathematics learning is given much emphasis by educators all around the world. Teaching and learning mathematics is very fundamental and essential in enhancing the acquisition of skills, construction of concepts and cultivating positive value to the students (MOE, 2002). The teaching and learning of mathematics is therefore should be executed effectively in assuring students' mastery of mathematical knowledge and the skills at all levels of education.

Psychological factors are important to be considered in the process of learning mathematics, and this study was conducted specifically to identify the relationship between cognitive-psychological factor which is achievement goal orientation with the affective-psychological factor which is anxiety in learning mathematics.

LITERATUR REVIEW

Motivation is a popular variable that has been discussed in educational research. In the context of learning, motivation is referred to one's ability, needs and desire

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to engage successfully in the process of learning (Md Yunus and Wan Ali, 2009). Many research has proved that motivation is positively and significantly related to students' mathematics achievement (Khoush, Bakht and Kayye, 2005; Md Yunus and Wan Ali, 2009). According to Reeve (2005), motivation affects one's action by driving the intention and needs to execute specific behavior. Specifically, when a student is motivated in the process of learning mathematics, the tendency to persistently put an effort to achieve the learning objective is higher as compared to the students who are less or not motivated. In other words, students who aim to achieve the best performance in their study will execute all the alternatives that can assist them to accomplish their target.

Students' motivation and engagement are the fundamental elements in the learning process. Different kinds of socio-cognitive motivational constructs have been discussed among the educators and researchers, including achievement goals orientation (Kaplan and Maehr, 2007). Achievement goals orientation is defined as the intention and aims about one's competency and achievement (Elliot, Shell, Henry and Maier, 2005). Achievement goals orientation is derived from Dweck's achievement goals theory (1986) which discusses two main types of goal orientation which are mastery goal orientation (aims at develop competence) and performance goal orientation. This two factor model of goal orientation was later extended into three factor or trichotomy model of goal orientation (Elliot and Church, 1997). In the three factor model, the performance goal orientation is further divided into two different valences which are performance-approach goal orientation (aims at outperforming or demonstrating competence to others) and performance-avoidance goal orientation (aims at avoiding the demonstration of incompetence to others).

Previous findings relating goal orientation and learning outcomes based on the two factor model were more consistent for the mastery goal orientation but not for the performance orientation (Luo *et al.*, 2011; Skaalvik, 1997). A more consistent results were found by studies using the three factor model, especially for performance-avoidance orientation (Baranik *et al.*, 2010; Linnenbrink-Garcia *et al.*, 2008; Meece *et al.*, 2006; Midgley, Kaplan and Middleton, 2001). However, findings are still inconsistent for performance-approach goal orientation with learning outcomes.

Besides the important role of achievement goals orientation as one of the cognitive-psychological aspects in students' learning process, math anxiety is one of the affective-psychological variables that can occur at different degree to almost all students at all levels of education. The experience of anxiety has significant impact to the process of teaching and learning. The phenomenon of mathematics anxiety is refer to the anxious feeling experience by an individual while facing mathematical problems (Sheffield and Hunt, 2006). The negative effects of mathematics anxiety includes the academic failure in math subject (Iossi, 2007), undesired feeling in executing mathematical task, avoidance from mathematics

class, experiencing physical interference such as headache, feeling of worry and panic and inability to do math assessment (Smith, 1997). Mathematics anxiety which closely related to the negative emotion such as worry, scare, shame, tension and dislike cause the negative consequences to the students' achievement (Richardson and Suinn, 1972).

Previous study showed a negative relationship between test anxiety with performance not only in the context of education but also in the career setting which is the higher the anxiety level, the lower performance will be perceived (Erden and Akgul, 2010; Cassady and Johnson, 2002; Hambree, 1998; Ackerman and Heggestad, 1997; Seipp, 1991). In Malaysia, mathematics anxiety is said to be the main factors that affects mathematics achievement especially to the secondary school students (Zakaria and Nordin, 2008; Darvajoo (2007). Therefore, the factors which can contribute to the mathematics anxiety should be consider thoroughly. Based on the above mention issue, this study are conducted to identify the relationship between achievement goal orientations based on the 3-factor model perspective with the mathematics anxiety experience by school students. It is essential to expand the existing study of students' achievement goals and mathematics anxiety to the Malaysian context for several reason. First, Malaysia students show a very poor results in the international assessment such as TIMSS and PISA which may possibly cause by adoption of specific goal orientation and the high level of math anxiety. Besides, the learning environment in the Malaysian classroom is very competitive which might provoke the adoption of performance-approach orientation and eventually elevate the level of anxious feeling. Lastly, the refinement that the researcher want to do in this study is the use of reliable and valid instrument that has been proved its psychometric properties in the Malaysian school students' context.

RESEARCH METHODOLOGY

This study involved 976 upper secondary school students (age=16 years old). The sample were selected from 20 schools from three different district in Johor state which were Kluang, Johor Bahru and Pontian. The selection process of the school and students were carried out through cluster, stratified and ratio sampling.

Students were required to give their response on the 24 items of self-developed Math Anxiety Scale which develop based on the established Parkinson's' Four Factors of Emotion Theory (Parkinson, 1995). The items were divided into four sub constructs which are appraisal towards external stimulus, bodily reaction, face expression and action tendencies which has been proved the reliability and validity aspects besides it has fulfill the other psychometric properties (Mohd Rustam, 2011). Besides, the items of achievement goals orientation were adapted from the Achievement Goal Questionnaire (AGOQ) (Elliot and Church, 1997). Four items included in the AGOQ were measuring mastery goal orientation while four and

five items were measuring performance-approach and performance-avoidance goal orientation respectively. All the items for both instruments has been validated by applying Rasch Measurement Model.

All the collected data were analyzed by using SPSS version 22.0. The method of successive interval were executed to transform the likert scale into interval scale in order to fulfill the condition to carry out the pearson correlation and regression analysis. Pearson correlation analysis was carried out to answer the research objective regarding the relationship between achievement goals orientation with mathematics anxiety while the simple regression analysis was applied to explore how much the variance of specific achievement goal orientation contribute in predicting students' mathematics anxiety.

FINDINGS OF STUDY

Pearson correlation analysis was done to identify the inter correlation between the three types of achievement goals orientation with students' mathematics anxiety (refer to Table 1)

Findings showed that the performance-approach orientation and mastery orientation were negatively and weakly related with mathematics anxiety with the correlation coefficient $-.057$ and $-.250$ respectively. Meanwhile, performance-avoidance orientation correlated positively and weakly with mathematics anxiety ($r=.318^{**}$). Only the correlation coefficient for mastery and performance-avoidance orientation were significant at the 0.01 confidence level. Simple linear regression has been carried out to identify the variance explained by each of the achievement goals orientation towards mathematics anxiety (refer to Table 2).

TABLE 1: INTERCORRELATION BETWEEN ACHIEVEMENT GOALS ORIENTATION WITH MATHEMATICS ANXIETY

<i>Achievement Goals Orientation</i>	<i>Mathematics Anxiety</i>
Mastery	$-.250^{**}$
Performance-Approach	$-.057$
Performance-Avoidance	$.318^{**}$

** The correlation are significant at the level 0.01 (2-tail)

TABLE 2: LINEAR REGRESSION ANALYSIS
Model Summary (d)

<i>Model</i>	<i>R</i>	<i>R Square</i>	<i>Adjusted R Square</i>	<i>Std. Error of the Estimate</i>	<i>Sig.</i>
1	.250a	.062	.061	.40552	0.00
2	.057b	.003	.002	.41811	0.77
3	.318c	.101	.100	.39708	0.00

a. Predictor: Masteri b. Predictor: Performance-Approach c. Predictor: Performance-Avoidance d. Dependent Variable: Mathematics Anxiety

The findings of linear regression showed that for the research sample of 976 students, mastery orientation and performance-avoidance goal orientation were significant predictor of mathematics anxiety but not for performance-approach orientation. However, the regression coefficient was low. Performance-avoidance contribute 10% of variance changes for mathematics anxiety while mastery orientation contribute about 6.2% the variances changes.

DISCUSSION AND CONCLUSION

Findings showed that mathematics anxiety has positive correlation coefficient with performance-approach orientation and negative correlation with mastery orientation. This results align with the findings of study conducted by Zare *et al.* (2011a,b). Negative correlation was also been reported between the relationship of mastery orientation with mathematics anxiety in the study by Putwain and Daniels (2010). However, a contradict findings was identified in the study by Lee *et al.*, (2010) which reported that performance-approach orientation positively correlated to the anxious feelings and jealousy. Besides in the context of mathematics education, study on the relationship between achievement goal and anxiety showing that mastery orientation was negatively correlated with test anxiety (Skaalvik, 1997) and computer anxiety (Rastegar *et al.*, 2010). Meanwhile, positive correlation was identified between performance-avoidance orientation with test anxiety and computer anxiety (Skaalvik, 1997; Rastegar *et al.*, 2010). Lastly, performance-approach orientation was positively correlated with test anxiety (Pintrich dan Degrotte, 1990).

By looking at the regression coefficient, the relationship between the three types of achievement goals orientation with mathematics anxiety are weak. This findings could due to the external variables that exist in mediating the relationship. Study by Lavasani *et al.*, (2011) which applied path analysis has proved that only mastery goal orientation has direct effect on anxiety. However, performance-approach and performance-avoidance goal orientation has indirect effect towards anxious which mediated by motivation and learning approach as the mediating variables. This findings imply that a student who adopted performance-approach and performance avoidance will only experience high level of anxious feeling only if the students use surface cognitive learning strategy instead of deep cognitive learning strategy.

Besides, the effect of performance-approach orientation adoption is depend on the learning environment and individual characteristics. For example, self-efficacy is one's characteristics which could give significant influence on anxiety feeling. Self-efficacy is also acts as mediating variables between the relationships of specific goal orientation with anxiety where an individu who has low self-efficacy tend to experience higher level of anxious feeling (Zare *et al.*, 2011a). Aligh with that, Zare *et al.* (2011a) has suggested that a conducive classroom environment

must be created in assuring students' anxiety feeling are in the minimum state. The alternatives that could be consider are by giving focus on the appropriateness of the task's difficulty level, the proper assessment method applied, gives students responsibility to achieve success and also focus more on individual success rather than emphasizing comparison of students ability.

In sum, positive attitude such as high self-efficacy that is form when a student direct their focus and learning goal to acquire knowledge and skills (adoption of mastery orientation) which eventually lessen the anxiety feeling of the students. Meanwhile for students who are giving too focus on social evaluation (adoption of performance-approach orientation) will create competing situation which contribute to anxious feeling as they have negative perception towards their own ability (Zare *et al.*, 2011 a). Therefore, mathematics teacher should aware the achievement goal orientation adopt by their students as this variables could predict students anxiety level and other variable in the learning process. Moreover, others external variables should be given attention as its can mediate the relationship between achievement goals orientation with mathematics anxiety. By doing so, the affective feeling of students which mathematics anxiety could be control

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