Original Article

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Medical student's academic performance: The role of academic emotions and motivation

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Abstract

Introduction: Identification of the factors that promote academic performance is of importance in the success rate of medical students. This study aimed to find the relationship between emotions, motivation and academic performance of medical students.

Methods: This descriptive-correlative study was conducted among 370 medical students in Shiraz University of Medical Sciences using convenience sampling. Academic emotions questionnaire (AEQ) including 75 items and college student version of work preference inventory including 30 items were used to collect the data. The Cronbach's alpha for the eight types of academic emotions ranged from 0.73 to 0.86, and for the intrinsic and extrinsic motivation it was 0.81 and 0.87, respectively. The data were analyzed using Pearson correlation, multiple regression, independent t-test and one-way ANOVA through SPSS, 14.

Results: Results indicated a positive and significant correlation between positive emotions (enjoyment, hope, pride) and students' academic performance ($r=0.37$, $r=0.27$ and $r=0.39$, respectively, with $p<0.01$). A negative and significant correlation was found between negative emotions (anger, anxiety, hopelessness, shame and boredom) with students' academic performance ($r=-0.15$, $r=-0.24$, $r=-0.23$, $r=-0.215$ and $r=-0.21$, respectively, with $p<0.01$). There was a positive and significant correlation between intrinsic and extrinsic motivation and academic performance ($r=0.63$, $r=0.14$, with $p<0.01$, $p<0.05$, respectively). Emotions related to enjoyment, hope, pride, hopelessness, boredom and intrinsic motivation were shown as the key predictors of students' academic performance.

Conclusion: The results of this study showed the key role of motivation and positive emotions in increasing medical students' academic performance.

Keywords: Academic emotions, Motivation, Academic performance, Medical students

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Introduction

Identification of the key factors that promote and/or correlate with academic achievement (achieving high grades and performance) is substantial (1). Several factors are related to the students' performance and success in educational settings (2), including emotions, which is closely related to cognitive, motivational, behavioral, and physiological processes (3, 4). The Pekruns' control-value (5) offers a comprehensive framework for studying the influence of various emotions experienced by students in academic settings. This theory is based on assumptions from expectancy value theories of emotions, transactional approaches, attributional theories, and models of the performance effects of

emotion. Students' learning and performance can be influenced in different ways by various emotions, including academic emotion which is directly linked to different academic outcomes (4). These emotions perpetually accompany learning and effect the processing of information (6). Although learning processes and its outcomes are influenced by academic emotion, student's academic outcomes may also evoke emotions (7). Academic emotions are classified as positive emotions including enjoying learning, hope of success and pride, and negative emotions including anger, boredom, anxiety, hopelessness and shame (8, 9) that can promote or demote the students' self-regulation, motivation, memory, cognitive resources, sense of belonging and subsequently academic achievement (1, 3-5).

From another aspect, academic achievement as a cognitive domain is subject to influences from emotions and motivation in particular. Motivation is considered as an essential element in the learning process and achievement (10, 11). Research on medical students' motivation is essential because it is different from other fields. Medical education is interwoven with clinical work; the learning and teaching environment in medical education is very specific due to working with patients and medical students are seen as very motivated individuals. However, our literature review showed that the role of motivation in promoting the students' academic performance has not been adequately demonstrated in medical education (12).

There are several theories of motivation, which can be related to the quantity or quality of motivation. Quantity of motivation is related to its high or low, while, quality of motivation refers to its source, i.e. whether it is internal or external (13). Individuals are motivated by a variety of different factors/variables (e.g. value an activity or strong external coercion) to undertake different actions resulting in varied experiences and consequences. Self-determination Theory (SDT) suggests a continuum of motivation and emphasize the quality of motivation (13). This theory assumes that individuals with intrinsic motivation achieve better outcomes such as deep learning and better performance than individuals with external motivation (14).

Based on the Pekrun et al.'s views, academic emotions can strongly influence the students' performance, and motivation plays a mediating role in this regard (15). Emotions can impact the students' academic achievements through two ways of influencing the intrinsic motivation for learning (interest in learning) as well as extrinsic motivation (gaining positive or avoiding negative outcomes) (3). The connection between emotions and motivation describes academic achievement (16), and some scholars believe that positive emotions such as pride, enjoyment and hope could increase the students' both intrinsic and extrinsic motivation (3). Conversely, negative emotions are suggested to uniformly reduce motivation (3). Specifically, some negative emotions like shame and anxiety can debilitate intrinsic motivation, but can influence strong extrinsic motivation in order to elude failure (3). The impact of students' motivation on academic outcomes may enhance through emotions they experienced in educational settings (17-20). Despite the significant role that emotions play in academic settings, only a few researches have studied the relationship between negative/positive emotions and academic performance (21). Hence, in the context of medical education we have limited evidence about the impact of emotions on medical students' achievement (9, 22). In addition, most researches in this area have been done in Western countries (23). Cross-cultural psychologists have discussed that the relationships between variables may be influenced by cultural and social circumstance. Thus, generalizing these findings to other parts of the world has been criticized by some scholars (24). Since research on academic emotions and motivation in the context of Asia in general (25) and especially in medical education in Iran is limited, it is important to study the role of medical students' emotions and motivation in their academic achievement.

Methods

A descriptive-correlative research design was used among 370 medical students at Shiraz University of Medical Sciences using convenience sampling based on Kerjeci and Morgan sample size Table (26). Ethical considerations included the participants' permission prior to the completion of the study, anonymous responses to the survey, and accurate and valid reporting of the research results.

Two self-report questionnaires were used for data collection purposes:

A) **Academic Emotions Questionnaire:** Data were collected by academic emotions questionnaires (AEQ) of Pekrun et al. (2005). The AEQ consists of three distinct sections including class, test and learning-related emotion (this scale has a good international reliability) (3). We used the learning-related emotion scale which consists of 75 statements and 8 emotions. AEQ is rated on a 5-point Likert scale (1=completely disagree, 5=completely agree) and covers eight distinct emotions as positive and negative dimensions.

Positive emotions include pride (8 items), hope (5 items) and enjoyment (9 items). Also, negative emotions include anger (10 items), boredom (11 items), shame (11 items), anxiety (11 items), and hopelessness (10 items). Cronbach's alpha for the eight types of academic emotion was reported from 0.73 to 0.86 in the current study.

B) **Work Preference Inventory (WPI):** To assess the students' motivational style, the college student version of Work Preference Inventory (WPI) was used. The WPI includes 30 items made to assess the motivational style that is preferred by students (intrinsic motivation and extrinsic motivation) (27). Good test-retest reliability has been reported for both intrinsic (0.84) and extrinsic (0.94) scales (28). This scale was used in Iranian medical students with appropriate reliability. The current study showed Cronbach's alphas of 0.81 and 0.87 for intrinsic and extrinsic motivation, respectively.

C) **Academic achievement:** Academic achievement of medical students was assessed by GPA (grade point average) and high scores represented a higher level of academic performance.

Ethical Considerations: After explaining the goals of the study, informed consent was obtained. The questionnaires were anonymous and we ensured the participants that their information would remain confidential and would be published totally. Ethical approval for this project was achieved through Shiraz University of Medical Sciences (number 15107).

For data analysis, descriptive statistics, Pearson's correlations, Simultaneous Multiple Regression, Independent T-Test and One Way ANOVA were used through SPSS, 14.

Results

A total of 345 students completed the questionnaires. Nineteen collected questionnaires were omitted since they were considered as invalid (no response on average score or the same response to each item). Finally, 326 questionnaires were considered valid (134 females and 192 males). The response rate was approximately 93.24%. The students' age ranged from 18 to 37. The majority of student were in the basic sciences period (40.4%), followed by internship period (34.6% and externship (25.1%). Data analysis started by performing Pearson correlations between the measured variables and correlation matrix for all variables (Table 1). The primary goal of this investigation was to assess the relationship among the students' academic emotions and motivation and academic performance. Correlation results showed that higher levels of positive emotions (Enjoyment, Hope, Pride) were correlated with higher levels of academic performance ($p<0.01$). Negative emotions (Anger, Anxiety, Hopeless, Shame, and Boredom) were negatively correlated with academic performance. Positive emotions (Pride, Hope, and Enjoyment) were significantly positively correlated with intrinsic motivation. Negative emotions (Shame, Anger, Hopeless, Anxiety, and Boredom) were significantly negatively correlated with intrinsic motivation. Positive and significant correlations were observed between positive emotions (Pride, Enjoyment, and Hope) and extrinsic motivation. Negative emotions (Shame, Anger, Hopeless, Anxiety, and Boredom) were negatively correlated with extrinsic motivation, but only the correlation coefficients of shame and boredom were significant. Finally, the results showed that intrinsic and extrinsic motivation were positively correlated with academic performance (Table 1).

Simultaneous multiple regression analysis was performed to investigate the contribution of each independent variable (academic emotions and motivation) in predicting the dependent variable (student's academic performance). Positive emotions ($\beta=0.117$) and intrinsic motivation ($\beta=0.565$) were predictors of academic performance, explaining 40% of academic performance variance (Table 2).

Table 1: Correlation matrix for variables

	1	2	3	4	5	6	7	8	9	10	11
1- Enjoyment	1										
2- Hope	0.39**	1									
3- Pride	0.49**	0.73**	1								
4- Anger	-0.09	-0.04	-0.04	1							
5- Anxiety	-0.19**	-0.08	-0.10	0.30**	1						
6- Hopeless	-0.07	-0.09	-0.07	0.40**	0.75**	1					
7- Shame	-0.16**	-0.07	-0.08	0.34**	0.81**	0.75**	1				
8- Boredom	-0.11*	-0.26**	-0.19**	0.41**	0.71**	0.89**	0.65**	1			
9- Ext Motiv	0.26**	0.311**	0.31**	-0.04	-0.09	-0.07	-0.16**	-0.11*	1		
10-Int Motiv	0.52**	0.38**	0.53**	-0.11*	-0.42*	-0.33**	-0.39**	-0.35**	0.27**	1	
11- GPA	0.37**	0.27**	0.39**	-0.15*	-0.24**	-0.23**	-0.215**	-0.21**	0.14*	0.63**	1

*p<0.05 **p<0.01

Table 2: Results of simultaneous multiple regression for predicting academic performance based on academic emotions and motivation

Model	Unstandardized coefficients		Standardized coefficients	F	R	R^2	T	p
	B	SE	β					
Constant	12.18	0.871		55.56	0.639	0.408	13.99	0.001
Extrinsic motivation	-0.238	0.185	-0.059				-1.287	0.199
Intrinsic motivation	1.154	0.124	0.563				9.287	0.001
Positive emotions	0.457	0.230	0.117				1.988	0.047
Negative emotions	-0.073	0.129	-0.027				-0.565	0.573

The results of one-way ANOVA (Table 3) showed a significant difference between basic sciences, externship and internship students in regards to academic emotions ($p \leq 0.05$). Basic sciences students obtained higher means for pride; also, they reported more boredom as negative emotions. However, externship students obtained higher means as to shame. There were no significant differences in intrinsic and extrinsic motivation among students at different levels of education ($p \geq 0.05$). There was no significant difference between the male and female students in terms of academic emotions and motivation ($p \geq 0.05$) based on independent t-test.

Discussion

The results of Pearson correlation test showed that there were positive and significant correlations

Table 3: The results of independent t-test and ANOVA tests showing the differences between various groups

	Educational level				Gender			
		Mean±SD	F	p	M/F	Mean±SD	T	p
Enjoyment	Bsc	3.64±0.64	0.56	0.56	Male	3.60±0.50	0.207	0.83
	Int	3.59±0.52			Female	3.62±0.49		
	Ext	3.58±0.51			Total	3.61±0.49		
Hope	Bsc	3.80±0.54	1.85	0.15	Male	3.72±0.57	-0.69	0.49
	Int	3.70±0.49			Female	3.76±0.48		
	Ext	3.68±0.58			Total	3.73±0.53		
Pride	Bsc	4.07±0.48	4.05	0.01	Male	4.03±0.47	0.64	0.51
	Int	4.05±0.43			Female	4.00±0.46		
	Ext	3.89±0.45			Total	4.02±0.46		
Anger	Bsc	3.32±0.98	0.56	0.56	Male	3.16±0.95	-0.10	0.92
	Int	3.15±0.97			Female	3.17±0.88		
	Ext	3.08±0.71			Total	3.16±0.91		
Anxiety	Bsc	2.73±0.73	2.35	0.09	Male	2.62±0.67	1.81	0.07
	Int	2.60±0.50			Female	2.72±0.65		
	Ext	2.81±0.75			Total	2.71±0.67		
Hopeless	Bsc	2.60±0.80	2.97	0.052	Male	2.56±0.71	-0.38	0.70
	Int	2.45±0.75			Female	2.59±0.70		
	Ext	2.70±0.71			Total	2.57±0.71		
Shame	Bsc	2.73±0.71	3.66	0.02	Male	2.78±0.68	1.48	0.13
	Int	2.65±0.49			Female	2.68±0.58		
	Ext	2.90±0.72			Total	2.75±0.65		
Boredom	Bsc	2.55±0.62	3.55	0.02	Male	2.51±0.38	-0.61	0.53
	Int	2.42±0.50			Female	2.55±0.43		
	Ext	2.64±0.59			Total	2.53±0.58		
Extrinsic motivation	Bsc	3.43±0.62	1.0	0.36	Male	3.45±0.39	0.50	0.61
	Int	3.49±0.41			Female	3.43±0.43		
	Ext	3.41±0.36			Total	3.44±0.40		
Intrinsic motivation	Bsc	3.55±0.83	2.99	0.10	Male	3.52±0.78	0.03	0.97
	Int	3.59±0.68			Female	3.53±0.77		
	Ext	3.35±0.83			Total	3.52±0.78		

Bsc: Basic sciences; Int: Internship; Ext: Externship

between positive emotions (Enjoyment, Hope, Pride,) and academic performance. These results are in line with those of preview studies (1, 3, 4, 7, 17, 29-31). For example, a longitudinal study on German students showed that positive emotions positively predicted subsequent learning achievement (30). According to the control value theory, academic emotions can profoundly affect the students' learning and performance. Several mediating mechanisms are suggested to be responsible for these effects including students' motivation, strategy, and self-regulated learning (22). Based on control value theory of Pekrun et al., academic emotions through some mediating factors including cognitive and metacognitive learning strategies, internal and external motivation, and self-regulated learning can strongly effect the students' achievement. In other words, positive learning-related emotions are able to incite high level cognitive processing (strategic thinking, problem solving), facilitate the use of cognitive (i.e. reversal, organization, elaboration, critical thinking) and metacognitive learning strategies (i.e. planning, regulation strategies, monitoring), and motivate the students to work hard and try to overcome tough challenges in academic context, which in turn might increase the students' achievement (15, 22, 31, 32).

Another mediating variable is motivation (4). Students' learning and performance can be influenced by emotions in various ways. Positive learning-related emotions like pride, hope, and enjoyment can enhance the students' both intrinsic and extrinsic motivation to learn, that is based on curiosity and attentiveness in learning that in turn facilitate the use of learning strategies and self-regulated learning. Therefore, it has a significant impact on students' academic achievement under different circumstances (3).

The other results showed that negative learning-related emotions (shame, anger, hopelessness, anxiety, boredom) were negatively correlated with academic performance. These findings are in line with prior researches (1, 3, 29). For example, the relationship between learning-related emotions and school performance among university students showed that negative emotions were related to performance. In general, some negative emotions like boredom and hopelessness were seen as harmful factors in learning and achievement because they can disturb information processing, decrease motivation and distract students from learning (4). In a longitudinal study, the results showed that negative emotions such as anger, anxiety, hopelessness, shame and boredom could predict final grades of the students (33). Pekrun et al. believed that some negative emotions like shame, anger and anxiety are presumed to enhance the use of more simple and rigid strategies of learning such as simple rehearsal (3). On the other hand, negative emotions can lead to reduced attention and facilitate the use of more superficial and rigid learning strategies such as simple rehearsal and repetition (15). Although negative or unpleasant emotions do not have similar effects on the students' learning, its negative effects on the academic achievement are more than any positive consequences for the majority of students (3).

The results indicated that the students' positive and negative emotions were positively and negatively linked to their intrinsic motivation, respectively. These findings are consistent with previous researches (1, 3, 4, 33). Positive emotions were positively correlated with extrinsic motivation, which are in line with previous studies' results (1, 3), but in contrast to a few other studies (34). In this respect, positive learning-related emotions (pride, hope, enjoyment) affect both kinds of motivation (intrinsic and extrinsic). Thus, positive learning-related emotions affect intrinsic motivation which is based on passion, interest and pleasure of learning as well as the extrinsic motivation that is based on trying to achieve positive consequences (e.g. good grades) or to prevent undesirable consequences (e.g. poor grades) (3).

In return, some negative learning-related emotions, like boredom and hopelessness, can decrease motivation and disrupt information processing and consequently have negative impacts on academic performance. On the other hand, in relation to learning related emotions like anxiety, sham and anger, some scholar believe that the relationships between these emotions and motivation are more complex, and especially, shame and anxiety can make the intrinsic motivation weaker (3).

Our results showed that the students' intrinsic and extrinsic motivations were significantly correlated with their academic performance. These findings are consistent with previous studies (35-37), but in contrast to another study (38). Motivation plays a key role in learning; it largely explains academic performance as it is a construct that integrates both thoughts and feelings. Intrinsic and extrinsic motivations affect the students' achievements and performance goals as set by them. Highly intrinsic motivated students indicate accomplishments in academic attempts and they are more persevering and struggling to overcome more challenges during their studies in comparison to those who have extrinsic motivation (39). Students with extrinsic motivation tend to focus on receiving rewards,

getting better scores and being accepted by their peers, while students with internal motivation have higher commitment toward learning, and are more satisfied with education.

However, regarding the higher education context, many studies showed that internalization of the students' motivation and changing towards an intrinsic type (or autonomous) can have lots of positive educational consequences such as creativity and using deep and flexible learning strategies. For example, in some studies on medical students (40), the results showed that autonomous form of students' motivation was significantly correlated with achievement and as students' motivation is influenced by external variables, their performance became weaker so that it became negative when linked with demotivation.

The results showed that there was a significant difference between academic emotions dimensions, pride, shame, and boredom in different levels of education (physiopathology, externship and internship). However, other results did not show a significant difference between male and female medical students in regard to academic emotions and motivation. These results are in line with those of previous studies, not showing significant differences in academic emotions (21) and motivation (41) between male and female students. As to gender roles, female students reported greater enjoyment, hope, anger, anxiety, hopelessness, boredom, intrinsic motivation, while male students reported greater pride, shame, and extrinsic motivation.

Considering the control-value theory, we can conclude that the women's competence pattern and value assessments would result in a weakening emotional profile. This profile may be described by much hopelessness and anxiety in the girls who show lower competence-related beliefs compared to boys. Some researchers believe that due to differences in the cognitive interpretation of events and circumstance, the interpersonal dissimilarities in emotion can be explained (42). In this regards, Stipek and Gralinsky (1991) believed that females attributed their defeat to low capability, but they don't attribute their achievement to high capability. Some scholars assume that females experience less positive emotions like pride after their success. To be more specific, value appraisals and control-related appraisals (like causal attributions, competence beliefs, and causal expectations) are the main contributing factors of emotions (43).

In Iran, probably because men have a primary responsibility for financing the family, and education can be a way of achieving money, it is possible that male students are influenced by external motives to study. However, these differences were insignificant as they failed to reach statistical significance for all emotions and motivations components. We can postulate that emotions and motivation components are not ultimately determined by gender.

Conclusion

The current study provided valuable contributions to the relationship between academic emotions, motivation and achievement. It helps to promote our knowledge about positive and negative emotions and intrinsic and extrinsic motivation of medical students, and how these variables have implications on their academic performance.

These findings are important for medical teachers to create learning environments to develop independence in students. This way, medical teachers may positively influence the students' academic emotions, as well as their future motivation, learning, and achievement. Also, this study shows that motivation is a critical factor contributing to desirable academic achievement among students in medical context through appropriate learning strategies and effort.

Suggestions and Limitations

The findings of the current study highlighted a few points: First, we need to increase internal motivation among medical students to inspire critical thinking and in-depth learning, which eventually results in a higher clinical performance. Second, clinical learning environment should be improved by enhancing the students' autonomy and supportive teaching style to foster intrinsic motivation. This is opposed to the traditional controlling style where punishments and rewards are the main mechanisms for controlling behaviors. Finally, further research is required to enhance our understanding of academic emotions in medical education context.

There were several limitations in this study. The major limitation was its focus on only medical students of Shiraz University of Medical Science, which may result in lack of generalization of the study to other universities. In addition, this study was carried out as a cross-sectional research which limited the cause-effect relationships. Finally, this study only focused on learning-related emotions, while there may be other emotions experienced by students in academic settings.

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References

1. Mega C, Ronconi L, De Beni R. What makes a good student? How emotions, self-regulated learning, and motivation contribute to academic achievement. Journal of Educational Psychology. 2014; 106(1):121.
2. Yavorsky K. Academic emotion and self-efficacy impacting sense of math class belonging in college students [Dissertation]. New Jersey: Rowan University; 2017.
3. Pekrun R, Goetz T, Frenzel AC, Barchfeld P, Perry RP. Measuring emotions in students' learning and performance: The Achievement Emotions Questionnaire (AEQ). Contemporary educational psychology. 2011; 36(1):36-48.
4. Pekrun R, Goetz T, Titz W, Perry RP. Academic emotions in students' self-regulated learning and achievement: A program of qualitative and quantitative research. Educational psychologist. 2002; 37(2):91-105.
5. Pekrun R, Frenzel AC, Goetz T, Perry RP. The control-value theory of achievement emotions: An integrative approach to emotions in education. New York: Elsevier; 2007. pp. 13-36.
6. Meinhardt J, Pekrun R. Attentional resource allocation to emotional events: An ERP study. Cognition & emotion. 2003; 17(3):477-500.
7. Valiente C, Swanson J, Eisenberg N. Linking students' emotions and academic achievement: When and why emotions matter. Child development perspectives. 2012; 6(2):129-35.
8. Kohoulat N, Dehghani MR, Kojuri J, Hayat AA. Achievement Goals and Achievement Emotions in Elementary School Students. International Journal of School Health. 2016; 3(2): e32193.
9. Kohoulat N, Hayat AA, Dehghani MR, Kojuri J, Amini M. Medical students' academic emotions: the role of perceived learning environment. Journal of advances in medical education & professionalism. 2017; 5(2):78.
10. Oriol X, Amutio A, Mendoza M, Da Costa S, Miranda R. Emotional creativity as predictor of intrinsic motivation and academic engagement in university students: the mediating role of positive emotions. Frontiers in psychology. 2016; 7: 1243.
11. Areepattamannil S, Freeman JG, Klinger DA. Intrinsic motivation, extrinsic motivation, and academic achievement among Indian adolescents in Canada and India. Social Psychology of Education. 2011; 14(3):427-39.
12. Kusurkar R, Ten Cate TJ, Van Asperen M, Croiset G. Motivation as an independent and a dependent variable in medical education: a review of the literature. Med Teach. 2011; 33(5):e242-e62.
13. Ryan RM, Deci EL. Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. American psychologist. 2000; 55(1):68.
14. Kusurkar R, Ten Cate TJ, Vos C, Westers P, Croiset G. How motivation affects academic performance: a structural equation modelling analysis. Advances in Health Sciences Education. 2013; 18(1):57-69.
15. Pekrun R. The control-value theory of achievement emotions: Assumptions, corollaries, and implications for educational research and practice. Educational psychology review. 2006;18(4):315-41.
16. Linnenbrink EA, Pintrich PR. Motivation as an enabler for academic success. School psychology review. 2002; 31(3):313.
17. Dietz SL. An exploration of the relationship between academic emotions and goal orientations in college students before and after academic outcomes. Atlanta: Georgia State University; 2014.
18. Artino AR, La Rochelle JS, Durning SJ. Second-year medical students' motivational beliefs, emotions, and achievement. Med Educ. 2010; 44(12):1203-12.
19. Chien C, Cherng B. The relation of environmental goal structure, self determined motivation and academic emotions. Bulletin of Educational Psychology. 2013; 44(3):733-49.
20. Kim C, Hodges CB. Effects of an emotion control treatment on academic emotions, motivation and achievement in an online mathematics course. Instructional Science. 2012; 40(1):173-92.
21. Peklaj C, Pečjak S. Emotions, motivation and self-regulation in boys' and girls' learning mathematics. Horizons of Psychology. 2011; 20(3):33-58.
22. Artino Jr AR, Holmboe ES, Durning SJ. Control-value theory: Using achievement emotions to improve understanding of motivation, learning, and performance in medical education: AMEE Guide No. 64. Med Teach. 2012; 34(3):e148-e60.
23. Govaerts S, Grégoire J. Development and construct validation of an academic emotions scale. International Journal of Testing. 2008; 8(1):34-54.
24. Henrich J, Heine SJ, Norenzayan A. Most people are not WEIRD. Nature. 2010;466(7302):29.
25. King RB, Areepattamannil S. What students feel in school influences the strategies they use for learning: Academic emotions and cognitive/meta-cognitive strategies. Journal of Pacific Rim Psychology. 2014; 8(1):18-27.
26. Krejcie RV, Morgan DW. Determining sample size for research activities. Educational and psychological measurement. 1970; 30(3):607-10.
27. Amabile TM, Hill KG, Hennessey BA, Tighe EM. The Work Preference Inventory: assessing intrinsic and extrinsic motivational orientations. Journal of personality and social psychology. 1994; 66(5): 950-67.
28. Hayat AA, Kohoulat N, Dehghani MR, Kojuri J, Amini M. Students' Perceived Learning Environment and Extrinsic and Intrinsic Motivation. International Journal of Humanities and Cultural Studies (IJHCS). 2016; 3(2):1000-11.
29. Cocoradă E. Achievement Emotions and Performance Among University Students. Social Sciences Law. 2016; 9(59): 119-28.
30. Pekrun R, Lichtenfeld S, Marsh HW, Murayama K, Goetz T. Achievement emotions and academic performance: Longitudinal models of reciprocal effects. Child development. 2017; 88(5):1653-70.
31. Pekrun R, Elliot AJ, Maier MA. Achievement goals and achievement emotions: Testing a model of their joint relations with academic performance. Journal of educational Psychology. 2009; 101(1):115.
32. Zhou Q, Main A, Wang Y. The relations of temperamental effortful control and anger/frustration to Chinese children's academic achievement and social adjustment: A longitudinal study. Journal of Educational Psychology. 2010; 102(1):180.
33. Pekrun R, Molfenter S, Titz W, Perry R, editors. Emotion, learning, and achievement in university students: Longitudinal studies. Annual meeting of the American Educational Research Association; 2000;

New Orleans, LA; 2000.
34. Vandercammen L, Hofmans J, Theuns P. Relating specific emotions to intrinsic motivation: On the moderating role of positive and negative emotion differentiation. PloS one. 2014; 9(12):e115396.
35. Ayub N. Effect of intrinsic and extrinsic motivation on academic performance. Pakistan business review. 2010; 8:363-72.
36. Sikhwari T. A study of the relationship between motivation, self-concept and academic achievement of students at a University in Limpopo Province, South Africa. International Journal of Educational Sciences. 2014; 6(1):19-25.
37. Bailey TH, Phillips LJ. The influence of motivation and adaptation on students' subjective well-being, meaning in life and academic performance. Higher education research & development. 2016; 35(2):201-16.
38. Baker SR. Intrinsic, extrinsic, and amotivational orientations: Their role in university adjustment, stress, well-being, and subsequent academic performance. Current Psychology. 2004; 23(3):189-202.
39. García T, Pintrich PR. Student Motivation and Self-Regulated Learning. Higher Education. 1991; 17: 55-128.
40. Kusurkar RA, Croiset G, Galindo-Garré F, Ten Cate O. Motivational profiles of medical students: association with study effort, academic performance and exhaustion. BMC medical education. 2013; 13(1):87.
41. Gbollie C, Keamu HP. Student academic performance: The role of motivation, strategies, and perceived factors hindering Liberian junior and senior high school students learning. Education Research International. 2017; 17: 1-11.
42. Scherer KR, Schorr A, Johnstone T. Appraisal processes in emotion: Theory, methods, research. UK: Oxford University Press; 2001.
43. Frenzel AC, Pekrun R, Goetz T. Girls and mathematics—A "hopeless" issue? A control-value approach to gender differences in emotions towards mathematics. European Journal of Psychology of Education. 2007; 22(4):497.