

Investigating the Mediating Role of Mind-Wandering between Achievement Motivation and Perceived Academic Stress in Nursing Students

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Abstract

Background: Competition and stress drive youngsters positively for developing, but intensifying or continuing the stress can affect people's mental health.

Objective: This study aimed to investigate the mediating role of mind-wandering between achievement motivation and perceived academic stress in nursing students.

Methods: The study was conducted by descriptive correlation and structural equation modeling. The statistical population was all bachelor's nursing students of Islamic Azad University, Sari Branch Faculty of Medicine during the first semester of 2018-2019. Two hundred forty students were selected as a sample by the purposeful sampling method. Data were collected using achievement motivation questionnaire (1970), perceived academic stress (2005), and mind-wandering questionnaire (2013). Data were analyzed using SPSS.22 and Amos.22 software by employing Pearson correlation coefficient, fitness indices, maximum likelihood estimation, and bootstrap.

Results: The results indicated that mind-wandering played a mediating role in achievement motivation and perceived academic stress among nursing students ($P < 0.05$).

Conclusion: It can be concluded that mind-wandering has a mediating role between achievement motivation and perceived academic stress in nursing students.

Keywords: Achievement, Learning, Motivation, Nursing, Students.

Introduction

Competition and its resulting stress is generally a positive stimulus for youngsters' development. However, it can affect people's mental health if this stress is intensifying or continues (1). Considering educational activities in this regard are greatly important in most cultures (2). The findings of academic stress have shown that 67% of students bear educational pressures as the most significant stress in their lives (3). It is worth noting that academic achievement is widely related to such concepts as motivation and its high value in educational fields alongside intelligence (4).

There is a group of people who owns a positive motivation and struggle to achieve success (5), another one has a negative motivation, so they try to avoid failure. The expectation of failure or success ultimately leads to success or avoidance of failure (6). Students' behaviors also present that motivation greatly affects all their activities (7). Plancharde et al. (8) found a gap between the real motivation for progress and what they reported by considering the importance of motivation in students' activities. Students are motivated to perform better in their assignments when they are rewarded (9). There is a

positive relationship between the task which resulted in motivation and academic achievement (10).

Also, the benefits of mental focus and complete attention to important subjects, including job and educational duties, cannot be ignored (11). Kane and Engel (12) believed that the concept of mind-wandering has been adopted from executive control theories. It includes individuals' ability in controlling and regulating their cognitive or attentional resources to achieve their goals and complete their assignments, especially in the face of interference or distraction (13). Researches in this regard have proven that uninterrupted mind-wandering devastatingly affects main activities (including sustained attention, working memory, intelligence measurement, and reading performance) (14).

Also, one of the factors affecting mental governance is mindfulness which has been considered in recent studies (15). Mindfulness-based interventions reduce mind-wandering according to the assumptions of change theory (16): firstly, mindfulness directly strengthens the capacity to stay focused. Secondly, mindfulness reduces negative emotional states (17). Since negative affect is an excellent source of distraction considering the recent

points, its regulations are promoting mental focus and helping to reduce mind-wandering (18). A useful classroom includes all essential characteristics which affect the students' development and position as well as their stress and performance. Autonomous, task-oriented, mastery, and participatory classes increase between motivation, adaptation, and mental focus in perceived academic stress. Familiarizing with the factors affecting this relationship is essential for education practitioners and their families to promote

students' adaptability to treat more effectively with academic life barriers and improve self-regulation beliefs (19).

Additionally, one of the fruitful and successful factors in learners' academic life is the relationship

it. No study, to the best of our knowledge, has been represented as a model for perceived academic stress.

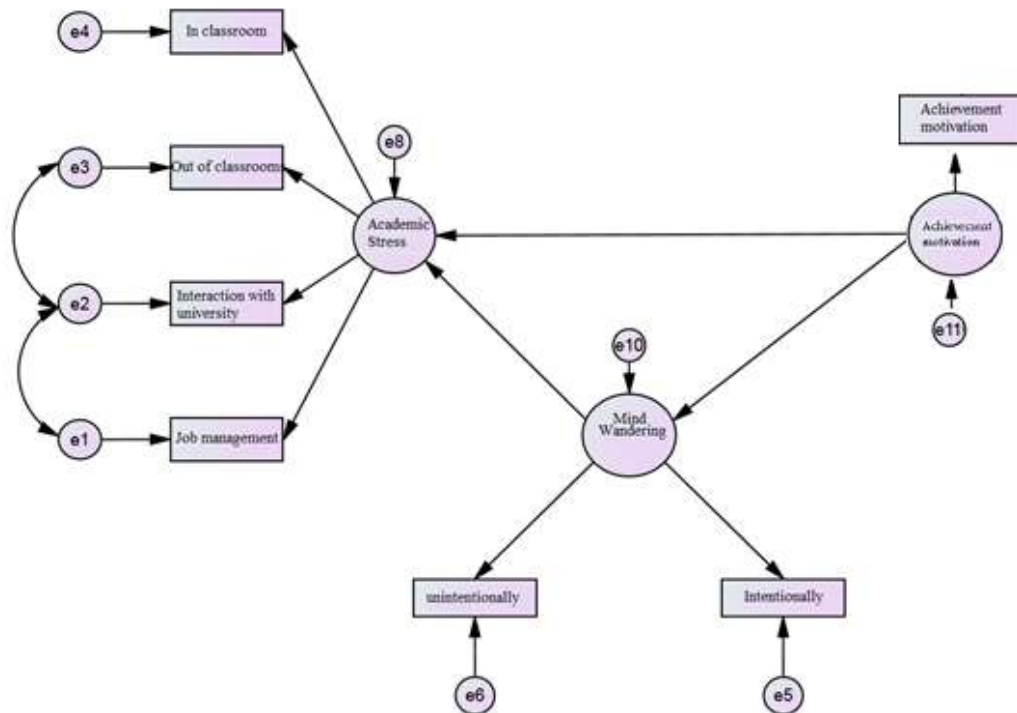


Figure 1. A proposed model on the mediating role of mind-wandering between achievement motivation and perceived academic stress

Objectives

Therefore, this study aimed to investigate the mediating role of mind-wandering between achievement motivation and perceived academic stress in nursing students to fill the gap between the studies.

Methods

The study was conducted by descriptive correlation and structural equation modeling. The statistical population was all bachelor's nursing students of Islamic Azad University, Sari Branch Faculty of Medicine during the first semester of 2018-2019. In total, 240 subjects were selected by convenience sampling method after obtaining legal permissions in 2019. They gathered in the university during the morning. At first, preliminary explanations about the research purpose and the needed cooperation, as well as the required time (half an hour) and necessary tools, were provided to the subjects, and then the questionnaires were given to

them in the sample group after obtaining informed consent.

The minimum sample size is determined based on hidden variables in a structural model. At least 200 samples are generally recommended (20). In total, 240 people were selected as the sample size of this study by the purposeful method considering the number of observed variables and allocation coefficient of 25 (9 variables observed in the model) (7 variables), and the probability of incomplete questionnaires. Similar studies suggest CDF formula for structural equation modeling as follows:

$$F(x; \mu, \sigma^2) = \frac{1}{2} \left[1 + \operatorname{erf} \left(\frac{x - \mu}{\sigma \sqrt{2}} \right) \right],$$

where μ is the mean, σ is the standard deviation, and the erf is the error function.

Inclusion criteria were being a nursing student, bachelor, female, resident of Sari, single, sophomore

or senior, willingness to cooperate, healthy both physically and psychologically. Exclusion criteria were incomplete questionnaires and unwillingness to cooperate in the study. This paper has been approved by the Specialized Research Council of Azad University, Sari branch, and the Committee on Biomedical Ethics with the code of ethics (IR.IAU.SARI.REC.1398.147) on 17/12/2019. All subjects received information about the research orally and participated if they wished to consider the ethical considerations of the research. All information was confidential and would be only used for research purposes, so the participants' full names were not registered.

A questionnaire measure of achievement motivation by Hermans (1970): A questionnaire measure of achievement motivation by Hermans (1970) was used to conduct this study (21). The questionnaire consisted of 29 incomplete sentences with four possible answer

choices and the scores range from 29 to 116. For measuring the internal consistency, the Cronbach's alpha was applied for this questionnaire and measured 0.89. Biabangard in his study conducted in Iran (21) confirmed the validity of the structure and the questionnaire simultaneously and estimated the reliability by using two methods of Cronbach's alpha and re-examination after three weeks which were 0.82 and 0.85, respectively.

Perceived Academic Stress Questionnaire (2005): Zajakova et al. developed a new version of the Perceived Academic Stress Questionnaire in 2005. Likert's eleven-degree items on this scale are ranging from "not stressful at all" (0) to "quite stressful" (10), and higher scores indicate higher levels of academic stress. The creators confirmed construct validity, and reliability was 0.84 obtained by Cronbach's Alpha method for the difficulty of academic performance in class. The difficulty of academic performance outside the classroom, interaction at the university, job management, family, and university and total were 0.86, 0.89, 0.83, 0.90, respectively. Shokri, Nouri, Farahani, and Moradi (22) stated that Cronbach's alpha coefficients were the general factors of perceived academic stress. They estimated that the difficulty of academic performance in the classroom,

outside the classroom, interaction at the university, job management, family, and university were 0.95, 0.85, 0.83, 0.82, 0.74, respectively.

Mind-Wandering Questionnaire of Carriere & Seli (2013): This questionnaire was developed and validated by Carriere & Seli in 2013. This scale consists of two subscales of intentional mind-wandering (4 articles) and spontaneous mind-wandering (4 articles). This subscale is scored by using a seven-point range which higher scores indicate more mind-wandering in an individual. Carriere and Sally (23) confirmed the reliability and validity of this scale. In the present study, this subscale's reliability was investigated by using Cronbach's alpha coefficient and its validity was examined by confirmatory factor analysis. Cronbach's alpha coefficient for spontaneous mind-wandering was 0.80, and its factor in confirmatory factor analysis was found to be sufficient (above 0.30). Construct and concurrent validity of the questionnaire were confirmed, and reliability for two dimensions was 0.81 and 0.78, and the total was 0.84 (24).

Primarily, students were informed about the purpose of the study and assured that their information would be kept confidential in the executive process. simultaneously, students were asked to consent before participating in the research, and then the questionnaires were presented to them. Pearson correlation test, fitness indices, maximum likelihood, and bootstrap were used for data analysis using SPSS.22 and Amos.22 software.

Results

In this study, the mean (SD) age of participants was 28.4 (6.3). The analysis process was confirmed firstly by examining statistical assumptions using Skewness and Kurtosis as well as Kolmogorov-Smirnov tests. The required information is presented primarily in Table 1 according to the two indicators of dispersion and the index of a tendency to the center including the average and standard deviation, as well as the minimum and maximum variables of achievement motivation, information processing styles, mind-wandering, and perceived academic stress.

Table 1. Variable used in Descriptive Statistics

Variables	Min	Max	M	SD
Motivation for progress	34	103	79.85	14.12
Difficulty in academic performance in the classroom	11	44	24.76	4.45
Difficulty in academic performance outside the classroom	9	57	19.19	5.15
Difficulty in interacting at the university	4	40	26.85	6.95
Difficulty in managing work, family, and university	4	52	28.67	5.86
Perceived academic stress	44	206	142.03	19.20
Rationalism	11	48	24.19	4.24
Empiricism	15	41	26.85	6.32
Deliberate	4	19	12.30	3.27
Spontaneous	7	25	15.17	4.31
Mind-wandering	15	38	27.47	5.08

It can be generally concluded that the data distribution is normal and the inferential analysis of the data by considering the reviews and corrections

can be made based on the normality of the data with Kolmogorov-Smirnov and the Mahalanobis distance.

Table 2. Correlation Matrix of Achievement Motivation and related variables, Information Processing Styles and Mind-Wandering with Perceived Academic Stress

Variables	1	2	3	4	5	6	7	8	9	10	11
Motivation for progress	1										
Difficulty in academic performance in classroom	.29	1									
Difficulty in academic performance outside the classroom	.32	.57	1								
Difficulty in interacting at the university	-.25	-.22	-.20	1							
Difficulty in managing work, family and university	-.21	-.19	-.24	.58	1						
Perceived academic stress	-.19	-.16	-.18	.71	.69	1					
Rationalism	-.23	-.29	-.21	.24	.19	.25	1				
Empiricism	-.21	-.22	-.20	.23	.20	.24	.51	1			
Deliberate	-.19	-.28	-.19	.18	.23	.28	.57	.54	1		
Spontaneous	-.17	-.27	-.21	.28	.21	.25	.54	.58	.60	1	
Mind-Wandering	-.25	-.31	-.24	.27	.31	.29	.61	.62	.71	.59	1

The initial model was analyzed in the research by predicting perceived academic stress directly and indirectly through achievement motivation,

information processing styles, and mind-wandering to investigate the presented conceptual model.

Table 3. Goodness-of-fit indices path analysis modeling

Goodness of Fit Indices	χ^2/df	RMSEA	AGFI	GFI	CFI
Path	1.90	0.067	0.98	0.98	0.95

Table 3 shows that the goodness of fit indices supports the optimal fit of the pattern with the collected data. In Table 4, the values obtained from weighted regression for determining the effect values (B) according to the significance level obtained from the critical ratio which indicates that the subscales

significantly affect the overall and exogenous variables (achievement motivation, information processing styles, and mind-wandering) and the final endogenous variable (perceived academic stress).

Table 4. The Statistics of Weighted Regression and Critical Ratios of Research Variables

Exogenous variable		Endogenous variable	b	β	t	P
Achievement motivation	←	perceived academic stress	-.52	-.41	6.20	0.001
Mind-Wandering	←	perceived academic stress	0.41	-.31	5.23	0.001

In Table 4, standardized and unstandardized values of predictive pathways show the relation of exogenous variables and endogenous variables according to the obtained T value in the model. Generally, all obtained values are significant which significantly indicates predictions. According to Table

5, indirect paths considered based on the standardized values (β), obtained indirect path also indicates that the achievement motivation on perceived academic stress through mediation have an indirect effect on mind-wandering in students. The bootstrap estimation method was confirmed.

Table 5. Indirect estimation of the model using the bootstrap method

Variable	B	Low	High	P
Achievement motivation on perceived academic stress through meditating the role of Mind-Wandering	0.40	0.22	0.45	0.001

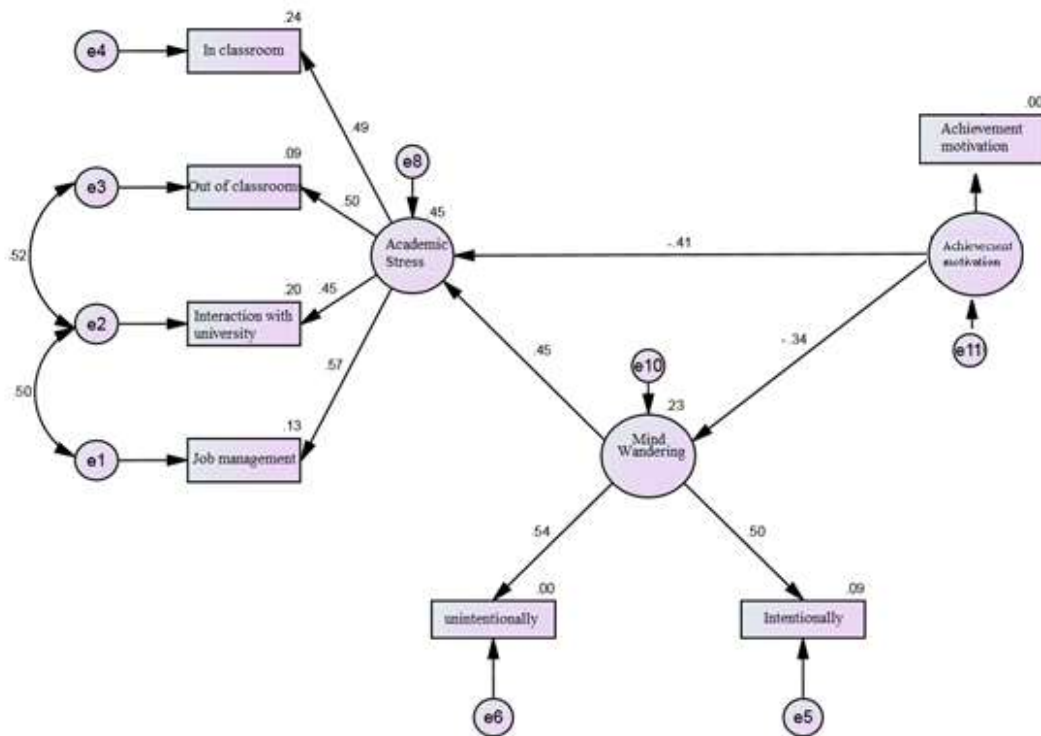


Figure 2. Achievement motivation on perceived academic stress through the mediation of the role of mind-wandering (standard model)

Discussion

This study aimed to investigate the mediating role of mind-wandering between achievement motivation and perceived academic stress in nursing students. The fifth hypothesis of progress motivation on perceived academic stress through mediation has an indirect effect on students' mind-wandering according to the results. The finding results of these variables were in line with the findings of Greene, Finn, and Nelson (25), Bank and Boal (26), Ralph, Vames, Barr & Smilk (27). The result of the present study was in contrast with the Wheeler's (28).

The motivation for progress was firstly introduced scientifically under the title of need. The motivation for progress is a social need to overcome obstacles, achieve excellent standards, compete with others and surpass them. Those who greatly develop tend to put themselves in a position to experience more success, mobility, and satisfaction on the academic path and act in a way (29) to avoid mind-wandering. Logically the person who wanders becomes anxious and stressed due to the ambiguity of the situation (30). People are motivated by the need for little progress to experience success, but those with little progress are motivated by fear of failure and become mentally confused. This tendency is the opposite of the behavior which peoples show for high progress. They also tend to avoid relatively complex assignments due to their existing stress and are more likely to participate in easier or very difficult assignments (31). Low homework achievers consider relatively stressful rather than problematic

unlike those in need of better progress. This perception of threat supports the success that can be achieved in easy assignments.

Uninvited thoughts are disturbing, intrusive, and repetitive which can cause serious problems in some people. Uninvited thoughts include rumination, obsessive-compulsive thinking, and anxiety play an essential role in developing and treating mood disorders, stress, and insomnia. Their common feature is being disturbing and repetitive (32). Mind-wandering is another form of uninvited thought that is being explored in the present research. Mind-Wandering was known as automated thinking in the past which is a fundamental factor of stress (33). Mind-Wandering defines as the rupture or disintegration of concentration on a task by irrelevant thoughts that directly conflict with the motivation of mental progression to avoid distraction. Mind-Wandering is reminiscent of stressful thoughts commonly seen in stress disorders. Mind-Wandering reflects unwanted (unintentional) thoughts (34). Intentional mind-wandering reflects the enthusiastic conflict of inner thinking. People who develop deliberate mental perplexity will voluntarily and deliberately recall thoughts unrelated to the primary task. In contrast, unintentional mind-wandering reflects the unintended conflict of inner thinking (35).

The geographical location of the research, the city of Sari, limited the results' pervasiveness. Researching by non-random sampling method increases the probability that the statistical

population of our research is not a comprehensive one. The questionnaire tool is not an accurate one which is limiting the research. It is suggested to consider the effects of information processing styles and mind-wandering on perceived academic stress in the applied field. It is worth mentioning that the educational system with more focus on strengthening the cognitive domain and teaching the effective use of cognitive patterns in higher education, pave the way for developing students and increasing their ability in the face of possible academic stresses. Promoting the academic motivation of officials and principals is also so essential. The school environment should be happy and friendly, so it decreases the students' academic stress. Students should be able to ask their teachers or peers about the issues they fail to understand.

Conclusion

It can be concluded that mind-wandering has a mediating role between achievement motivation and perceived academic stress in nursing students.

References

- Jeno LM, Grytnes JA, Vandvik V. The effect of a mobile-application tool on biology students' motivation and achievement in species identification: A Self-Determination Theory perspective. *Computers & Education*. 2017 Apr 1;107:1-2.
- Planchard M, Daniel KL, Maroo J, Mishra C, McLean T. Homework, Motivation, and Academic Achievement in a College Genetics Course. *Bioscene: Journal of College Biology Teaching*. 2015 Dec;41(2):11-8.
- Preiss DD, Cosmelli D, Grau V, Ortiz D. Examining the influence of mind wandering and metacognition on creativity in university and vocational students. *Learning and Individual Differences*. 2016 Oct 1;51:417-26.
- Ralph BC, Wammes JD, Barr N, Smilek D. Wandering minds and wavering goals: Examining the relation between mind wandering and grit in everyday life and the classroom. *Canadian Journal of Experimental Psychology/Revue canadienne de psychologie expérimentale*. 2017 Jun;71(2):120.
- Ramaprabou V, Dash SK. Effect of Academic Stress on Achievement Motivation among College Students. *Journal on Educational Psychology*. 2018;11(4):32-6.
- Randall JG, Beier ME, Villado AJ. Multiple routes to mind wandering: Predicting mind wandering with resource theories. *Consciousness and cognition*. 2019 Jan 1;67:26-43.
- Yogie Y, Suryadi S, Soefijanto TA. Contribution of Learning Motivation and Stress to Student's Academic Achievement in University of Indonesia Medical. *Journal of Education Research and Evaluation*. 2021 Mar 13;5(2).
- Lu A, Feng Y, Yu Z, Tian H, Hong X, Zheng D. Anxiety and mind wandering as independent consequences of stereotype threat. *Social Behavior and Personality: an international journal*. 2015 May 24;43(4):537-58.
- Lee WK, Kim M. Latent Profiles of Children's Relationships with Parents, Teachers, and Peers: Relations with Mental Health, Academic Stress, Academic Motivation, and Academic Achievement. *Korean Journal of Child Studies*. 2019 Jun 30;40(3):105-21.
- Tavakoli N, Hasanzadeh R, Emadian SO. Investigating the mediating role of information processing styles between achievement motivation and perceived academic stress in nursing students. *Research in Medical Education*. 2020 Jun 10;12(2):61-70.
- Gearin B, Fien H, Nelson NJ. Mind wandering: A potentially generative idea for understanding the socioeconomic status academic achievement gap. *Translational Issues in Psychological Science*. 2018 Jun;4(2):138.
- Goller H, Banks JB, Meier ME. An individual differences investigation of the relations among life event stress, working memory capacity, and mind wandering: A preregistered replication-extension study. *Memory & cognition*. 2020 Feb 21:1-3.
- Fazel M, Betancourt TS. Preventive mental health interventions for refugee children and adolescents in high-income settings. *The Lancet Child & Adolescent Health*. 2018 Feb 1;2(2):121-32.
- Fountain-Zaragoza S, Londerée A, Whitmoyer P, Prakash RS. Dispositional mindfulness and the wandering mind: implications for attentional control in older adults. *Consciousness and cognition*. 2016 Aug 1;44:193-204.
- Banks JB, Boals A. Understanding the role of mind wandering in stress-related working memory impairments. *Cognition and emotion*. 2017 Jul 4;31(5):1023-30.
- Bastais K, Pasteels I, Mortelmans D. How do post-divorce paternal and maternal family trajectories relate to adolescents' subjective well-being?. *Journal of adolescence*. 2018 Apr 1;64:98-108.
- Liu X, Zhao Y, Li J, Dai J, Wang X, Wang S. Factor structure of the 10-item perceived stress scale and measurement invariance across genders among Chinese adolescents. *Frontiers in psychology*. 2020;11.
- Shekhar C, Kumar R. Gender differences in achievement motivation, self-efficacy academic stress and academic achievement of secondary school students. *J. Appl. Soc. Sci*. 2016;3(5&6):117-24.
- Steinmayr R, Weidinger AF, Wigfield A. Does students' grit predict their school achievement above and beyond their personality, motivation, and engagement?. *Contemporary Educational*

- Psychology. 2018 Apr 1;53:106-22.
20. Kline RB. Response to leslie hayduk's review of principles and practice of structural equation modeling. *Canadian Studies in Population [ARCHIVES]*. 2018 Aug 30;45(3-4):188-95.
 21. Zhang L, Qin S, Yao Z, Zhang K, Wu J. Long-term academic stress enhances early processing of facial expressions. *International Journal of Psychophysiology* 2016; 109: 138-46.
 22. Takano KI, Reason J. 9 Modelling of human errors in cognitive processes observed in dynamic environments. *Engineering Psychology and Cognitive Ergonomics: Job Design and Product Design* 2017; 2: 1-9.
 23. Jaśko K, Czernatowicz-Kukuczka A, Kossowska M, Czarna AZ. Individual differences in response to uncertainty and decision making: The role of behavioral inhibition system and need for closure. *Motivation and Emotion* 2015; 39 (4): 541-52.
 25. Showkat D, Grimm C. Identifying gender differences in information processing style, self-efficacy, and tinkering for robot tele-operation. 15th International Conference on Ubiquitous Robots; 2018.
 26. Cassidy AR, White MT, DeMaso DR, Newburger JW, Bellinger DC. Processing speed, executive function, and academic achievement in children with dextro-transposition of the great arteries: Testing a longitudinal developmental cascade model. *Neuropsychology* 2016; 30(7): 874.
 27. Cardillo R, Mammarella IC, Garcia RB, Cornoldi C. Local and global processing in block design tasks in children with dyslexia or nonverbal learning disability. *Research in developmental disabilities* 2017; 64: 96-107.
 28. Wheeler L. The Association Among Mindfulness Levels and Self-esteem, Academic Motivation, Perceived Academic Stress, and Perceived Stress Among College Students of Color (Doctoral dissertation, North Carolina Central University). 2020.
 29. Nagahi M, Hossain NU, Jaradat RM. Gender differences in practitioners' preferences for systems-thinking skills. Inproceeding of American Society for Engineering Management 2019 International Annual Conference and 40th Annual Meeting 2019 Oct 10 (pp. 23-26).
 30. Tajri T. [The Relationship between Educational Stress and Motivational Beliefs in Educational Delay in Student Athletes: The Mediating Role of Cognitive Strategies]. *Sports Psychology Studies* 2020; 27(18) 193-210. [Persian]
 31. Shafiepour Motlagh F, Torabi Nahad M [Relationship Between Academic Stress, Educational Impulsivity and Negative Academic Self-Concept with Sense of Social Unconsciousness Based on the Mediation of Academic Frustration]. *Journal of Instruction and Evaluation*, 2018; 11(43): 45-68. [Persian]
 32. Lee WK, Kim M. Latent Profiles of Children's Relationships with Parents, Teachers, and Peers: Relations with Mental Health, Academic Stress, Academic Motivation, and Academic Achievement. *Korean Journal of Child Studies* 2019; 40 (3):105-21.
 33. Reddy KJ, Menon KR, Thattil A. Academic stress and its sources among University students. *Biomedical and Pharmacology Journal* 2018; 11 (1): 531-7.
 34. Rezaei A, Jeddi EM. Relationship between wisdom, perceived control of internal states, perceived stress, social intelligence, information processing styles and life satisfaction among college students. *Current Psychology* 2018: 1-7.
 35. Aloia LS, McTigue M. Buffering Against Sources Of Academic Stress: The Influence of Supportive Informational and Emotional Communication on Psychological Well-Being. *Communication Research Reports* 2019; 36 (2): 126-35.