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# Perceived motivational climate as a predictor of intrinsic motivation in medical students

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## Abstract

**Introduction:** Motivational climate is the situational structure of goals through which success or failure is judged in the social environment. This study aimed at examining the relationship between perceived motivational climate and intrinsic motivation of medical students. It was hypothesized that perceived mastery climate predicted medical students' intrinsic motivation positively and perceived performance climate predicted it negatively.

**Methods:** The design was a cross-sectional study. The Iranian version of two instruments for measuring intrinsic motivation and perceived motivational climate were completed by 232 medical students. In order to identify the predictability relationship between the research variables, structure equation modeling was adopted.

**Results:** Investigations revealed that perceived mastery climate positively and meaningfully predicted medical students' intrinsic motivation (0.85). Perceived performance climate negatively predicted medical students' intrinsic motivation (-0.47).

**Conclusion:** Building mastery climate in a learning environment promotes medicine students' intrinsic motivation.

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## Introduction

Motivation is an inner aspect of humans that stimulates, leads and maintains attempts to carry out different tasks.<sup>1</sup> According to Chaudhary, motivation is "the psychological process that gives behaviour purpose and direction, a predisposition to behave in a purposive manner to achieve specific unmet needs, an unsatisfied need that will to achieve respectively."<sup>2</sup> The significance of motivation in general education has been researched extensively and proven, but much less research has been done in medical education.<sup>3</sup>

One of the most prominent theories proposed in the realm of motivation is self-determination theory (SDT). It is mainly based on the quality of motivation. According to SDT, even if a person is highly motivated, motivation will emerge with different qualities and therefore it will have different consequences.<sup>4</sup>

Intrinsic motivation is an instinctive tendency in dealing with and domineering on desires, using abilities in fulfilling desires and seeking better challenges.<sup>5</sup> People who are

intrinsically motivated feel enjoyment, interest in an activity and feelings of competence and control.<sup>6</sup> People with intrinsic motivation freely participate in an intriguing activity for the excitement and enjoyment it brings, rather than for a prize or to satisfy a limitation.<sup>7</sup>

In extrinsic motivation, an external factor prompts the person to do a specific thing. People do the activity because they value work-related output, not the activity itself.<sup>5,8</sup> One of the famous theories that investigates the effect of learning environment on students' motivation is achievement goal theory.<sup>9</sup> This theory investigates motivation in terms of the type of goal that the person chooses for his program.<sup>10</sup>

Nicholls states that there are two conceptions of ability, and he illustrates them in the achievement contexts:

1. The undifferentiated conception of ability in which the two conceptions of ability and effort are not distinguished and are called improvement.
2. The differentiated concept of ability in which ability is distinguished from effort and considered capacity.<sup>11</sup>

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In America's Got Talent (AGT), each of the conceptions of ability are stated with separate viewpoints in achievement goal perspectives, which are called task-involved and ego-involved.

Task-involved people use the distinguished concept of ability to judge their manifested ability.<sup>12</sup> These people consider their ability as improvement and emphasize learning and attaining skills in performing a task.<sup>13</sup> These people feel successful when making many attempts and improving on the task.<sup>14</sup>

On the other hand, ego-involved people use the distinguished concept of ability to judge their demonstrated competence.<sup>15</sup>

Ames and Archer use the term motivational climate in order to refer to the structure of effective situational factors on students' goal orientation.<sup>16,17</sup>

Therefore, motivational climate is the situational structure of goals through which the success or failure is judged in the social environment.<sup>17</sup> If the motivational climate of the learning environment is organized in a way that the student has a tendency toward task-involved goals, we use the term mastery climate, and if the motivational climate of the learning environment is organized in a way that the student has a tendency toward ego-involved goals, performance climate is used to describe it.<sup>18</sup>

Mastery climate emphasizes learning and skill development. Performance mistakes are considered a part of the learning process, and people are encouraged toward perseverance and solving problems.<sup>19</sup>

In performance climate, on the other hand, social comparison, norm-based evaluation and competition are emphasized instead of cooperation.<sup>20</sup> In such a climate, task completion is preferred over development or attempt, the mistakes are blamed and the participants are blamed for their mistakes or shortcomings.<sup>19</sup>

In many studies, it has been proven that mastery climate has highly positive effects on positive motivational outcomes of intrinsic motivation, while performance climate's effect on positive outcomes is low and negative, and its effect on negative outcomes is moderate and positive.<sup>6</sup>

Kusurkar et al emphasize that there is a small body of research on motivation as a dependent variable in the realm of medical education. Therefore, there is an immense need for further research in this area. However, considering the available research, it seems that the learning environment plays a key role in improving motivation. Learning environment can stimulate students' intrinsic motivation by effective factors on autonomy, competence and relatedness.<sup>3</sup>

Based on what has been said, it can be understood that there is a desperate need for conducting scientific research in the field of affective factors on medical students' intrinsic motivation. Of course the small number of studies done in this field is indicative of the effective role of learning environment. Achievement goal theory is one of the theories that deal with investigating the effect of learning environment on students' intrinsic motivation. Nevertheless, so far no researcher has investigated this theory and

the concept of motivational climate in scientific texts of medical education. Therefore, the aim of this study was determining the predictive relationship between perceived motivational climate and medical students' intrinsic motivation. In this study, it was assumed that perceived mastery climate predicts medical students' intrinsic motivation positively and perceived performance climate predicts it negatively.

## Materials and Methods

### Participants

The present research is a cross-sectional descriptive-analytical study, and its statistical population involves all male and female medical students studying in the 2013-2014 academic year at Tehran University of Medical Sciences. Samples were selected by the simple randomized method, and 232 students, including 123 male students (53%) and 109 female students (47%), participated in the study. In this study, the sample size was calculated based on structural equation modeling and was not based on a measurement model. There is no general agreement about sample size for factor analysis and structural models. However, according to many researchers, the minimum required sample size is 200. In fact, in this study, the number of samples based on the number of structures have structural model calculated not on the basis of the number of questions.

### Measuring tools

1- Intrinsic Motivation Inventory (IMI): Medical students' intrinsic motivation was measured by the Intrinsic Motivation Inventory. Ryan and Deci developed this instrument to measure intrinsic motivation.<sup>5</sup> In their study, Goudas and Biddle analyzed the instrument using the exploratory factor method and confirmed its structural validity.<sup>21</sup> Psychometric dimensions of the instrument were also investigated in a study by Soltani Arbshahi et al, and its 11-item version was confirmed in validity and reliability.<sup>22</sup> The present study used the Iranian 11-item version of IMI which had 3 subscales, including: interest-enjoyment, effort-importance and perceived competence. In this instrument, the participants were asked to show their level of agreement or disagreement with each item. The responding method was based on the Likert scale (i.e., completely agree, agree, neither agree nor disagree, disagree and completely disagree) and scoring was from 5 (completely agree) to 1 (completely disagree).

The alpha coefficient obtained by Soltani Arabshahi et al for subscales of the instrument were: interest-enjoyment ( $\alpha=0.828$ ), perceived competence ( $\alpha=0.700$ ) and effort-importance ( $\alpha=0.844$ ).<sup>22</sup>

2- Perceived Motivational Climate: Papaioannou (quoted by Sproule et al) developed LAPOPECQ (Learning and Performance Orientation in PE Classes Questionnaire) for the first time to measure perceived motivational climate in the field of physical education, but when it was used among English people, it showed weak psychiatric traits.<sup>23</sup>

Goudas and Biddle reviewed and adjusted the questionnaire and considered it appropriate for students aged 12-18.<sup>21</sup>

Gutiérrez et al analyzed the English translation of the EPCM (L'Echelle de Perception du Climat Motivation-al) questionnaire in the confirmatory factor method and confirmed its structural validity.<sup>6</sup> Soltani Arabshahi et al translated the EPCM questionnaire into Farsi and confirmed the validity and reliability of its 16-item version.<sup>22</sup> The Iranian version of "perceived motivation climate scale" was made of 4 subscales including "pursuit of progress by students," "promotion of learning by the teacher," "worries about mistakes" and "promotion of comparison by the teacher." In these instruments the two initial subscales were related to mastery climate, and the last two subclasses were related to performance climate.

Alpha coefficient obtained for each subscale in the study of Soltani Arabshahi et al were: pursuit of progress by students ( $\alpha=0.735$ ), promotion of learning by the teacher ( $\alpha=0.898$ ), worries about mistakes ( $\alpha=0.785$ ) and promotion of comparison by the teacher ( $\alpha=0.627$ ).<sup>22</sup>

There was a fundamental question at the beginning of the instrument (I think in my educational classes...), and then the participants were asked to answer each question on the Likert scale by choosing one of five items of completely agree, agree, neither agree nor disagree, disagree and completely disagree. The scoring method was determined from 5 (completely agree) to 1 (completely disagree). Doing so, each participant's score at each subscale was calculated from total scores obtained from questions of that subscale.

### Research procedure

Sample size of the study was estimated based on structural equation modeling assumptions. Although very little empirical evidence exists concerning what a large sample actually is in this context, one common rule is that, under normal distribution theory, "the ratio of sample size to the number of free parameters should be at least 5:1 to get trustworthy parameter estimates, and (...) higher (at least 10:1, say) to obtain appropriate significant tests."<sup>24</sup> The model used in the study required 16 free parameters and 80-160 participants was a sufficient sample size; thus, considering the probability of sample loss in the sampling process, the sample size was considered as 232 participants.

The participants were asked to fill both measurement instruments of the study at the same time. To observe ethics in sampling, first research purposes were explained to the participants and they were assured of collected data's confidentiality. After obtaining informed consent and completing the consent form for inclusion in the study, the participants filled out both measurement instruments. It was emphasized in the consent form that participant has the right to:

- 1-Leave the study any time he wanted
- 2- Answer just those questions that he wishes
- 3-Request the questionnaire if he regretted filling it out

4-Be informed of study results.

### Data analysis

Assuming normality of the data, we selected analysis with the LISREL. Data were analyzed using SPSS 15 and LISREL at two stages. First validity and reliability of the instruments was investigated by Cronbach alpha estimation and confirmatory factor analysis. Then structural equation modeling was used to analyze relations among variables. The maximum likelihood estimation method was used to estimate model parameters. Some of the best fitness indexes were used to evaluate model fitness. Goodness of fit index (GFI), adjusted goodness of fit index (AGFI) and comparative fit index (CFI) with values more than 0.9 were considered as appropriate. Hence, whenever root mean square error of approximation (RMSEA) and standardized mean square residual (SRMR) were less than 0.05 they were considered as good and whenever they were less than 0.08 they were evaluated as acceptable.<sup>25-27</sup>

## Results

### Validity and reliability of instruments

*IMI*: Confirmatory factor analysis indicated appropriate fit indices:  $\chi^2=77.29$ ,  $P<0.001$ , CFI=0.98, GFI=0.94, AGFI=0.91, SRMR=0.05, RMSEA=0.06.

RMSEA index is the mean squared error. The index is based on the model errors. Its extent permitted is 0.8. That is, it is acceptable if it is below 0.8, and if it is under 5.0 it is very good.<sup>28</sup>

Three subscales of the instruments were confirmed. Cronbach's alpha obtained for these subscales were: interest-enjoyment ( $\alpha=0.85$ ), perceived competence ( $\alpha=0.77$ ) and effort-importance ( $\alpha=0.81$ ).

*EPCM*: The CFA of perceived motivational climate scale indicated appropriate fit indices:  $\chi^2=202.47$ ,  $P<0.001$ , CFI=0.98, GFI=0.90, AGFI=0.86, SRMR=0.06, RMSEA=0.06

All four factors were confirmed. The alpha coefficient of these four subscales were at the appropriate limit: pursuit of progress by students ( $\alpha=0.78$ ), promotion of learning by the teacher ( $\alpha=0.90$ ), worries about mistakes ( $\alpha=0.83$ ) and promotion of comparison by the teacher ( $\alpha=0.66$ ).

### Descriptive statistics and correlational analyses

Table 1 shows the mean and standard deviation of responses to questions of each subscale, individually. As it can be seen, the mean response of all subscales is a normal limit (above 3).

### Structural equation modeling analyses

Structural equation modeling was used to achieve the research purpose and determine the predictive relation among perceived motivational climate dimensions and intrinsic motivation. In this model, intrinsic motivation was determined as an internal latent variable and mastery and performance climate were considered as external latent variables.

Results of SEM indicated that the model enjoys appropri-

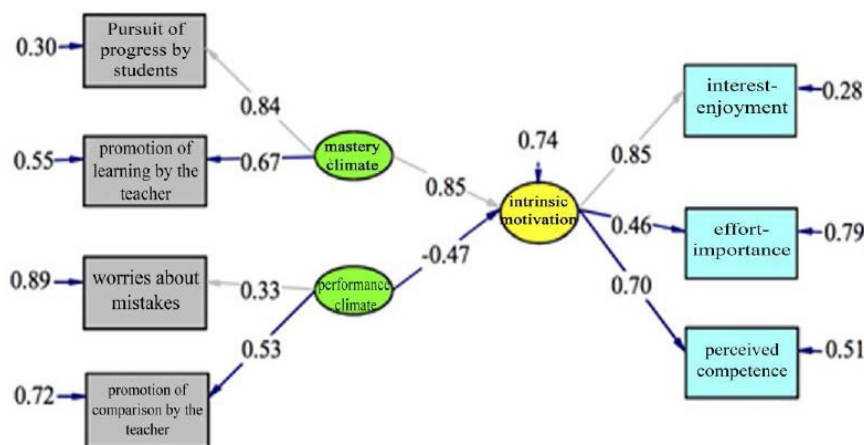


Figure 1. Structural model and relations between motivational climate dimensions and intrinsic motivation.

ate fit indices.  $\chi^2=25.03$ ,  $P<0.001$ , CFI=0.96, GFI=0.97, AGFI=0.93, SRMR=0.04, RMSEA=0.06. CN value was 231, which shows that the sample size was adequate.

In this structural model, all paths are significant at the level of 0.01 ( $t>2.56$ ). Standard error was low and measurement accuracy was high. Considering the obtained structural model, it can be understood that mastery climate has a strong and positive correlation (0.85) with intrinsic motivation, while performance climate has normal and, of course, negative correlation (-0.47) with intrinsic motivation (Table 2).

R2 of intrinsic motivation was 0.26 and value of standard error variance of intrinsic motivation was 0.74. This showed that 26% of variance of this latent variable was explained by significant variable of motivational climate and 74% of variance of intrinsic motivation was explained by variables other than motivational climate. In other words, the share of motivational climate was 26% in explaining intrinsic motivation variance of students of Tehran University of Medical Sciences. All of these values were significant, statistically.

Results obtained from the model test revealed that the two variables of “pursuit of progress by students” and “promotion of learning by the teacher” had a positive relationship with “mastery climate” and perceived mastery climate predicted intrinsic motivation of medical students positively and significantly.

The two variables of “worries about mistakes” and “promotion of comparison by the teacher” had a positive relationship with “performance climate” and perceived performance climate predicted medical students’ intrinsic motivation negatively (Figure 1).

**Discussion**

As was mentioned earlier in the paper, few studies have been produced on influential variables on motivation in the field of medical education. In his investigation, Kusurkar et al discusses the research gap in this field and concludes that the most important and influential factor on medical students’ intrinsic motivation is “learning environment.”<sup>3</sup> For this reason “achievement goal theory” was investigated in this study.

Structural equation modeling was used to investigate predictor relation among research variables. Results obtained from the present study were in complete balance with results of past studies.<sup>6,21</sup> In this study, perceived mastery climate was determined as a strong and positive predictor and perceived performance climate was determined as a negative predictor of medical students’ intrinsic motivation. Several researchers have found a meaningful relationship between intrinsic motivation and the motivational climate or learning environment in physical education. Goudas and Biddle reported that aspects of mastery climate were the main predictive factor of stu-

Table 1. Descriptive statistics, alpha reliabilities and bivariate correlations among motivational climate and intrinsic motivation

Variables	M	SD	$\alpha$	1	2	3	4	5	6	7
1. Interest-enjoyment	3.78	0.34	0.85	1.00						
2. Perceived competence	3.68	0.25	0.77	0.60**	1.00					
3. Effort-importance	3.40	0.13	0.81	0.36**	0.37**	1.00				
4. Pursuit of progress by students	3.58	0.27	0.78	0.38**	0.19**	0.21**	1.00			
5. Promotion of learning by teacher	3.50	0.03	0.90	0.25**	0.16*	0.25**	0.55**	1.00		
6. Worries about mistakes	3.57	0.10	0.83	-0.01	-0.07	0.10	0.24**	.25**	1.00	
7. Promotion comparison by teacher	3.17	0.08	0.66	0.13*	0.10	0.10	0.38**	.34**	.10	1.00

\* $P < 0.05$ ; \*\* $P < 0.01$ .



**Table 2.** Values obtained for parameters of all paths, individually

Paths	Unstandardized estimate	Standardized loading	Standard error	t	R <sup>2</sup>
INT/ENJ → INT.MOT	1.00	0.85	-	-	0.72
EFF/IMP → INT.MOT	0.41	0.46	0.072	5.74	0.21
PER/COM → INT.MOT	0.46	0.70	0.065	7.14	0.49
PPS → MAS.CLI	1.00	0.84	-	-	0.70
PLT → MAS.CLI	0.78	0.67	0.11	7.31	0.45
WaM → PER.CLI	1.00	0.33	-	-	0.11
PCT → PER.CLI	1.22	0.53	0.35	3.46	0.28
MAS.CLI → INT.MOT	1.00	0.85	-	-	0.26
PER.CLI → INT.MOT	-1.62	-0.47	0.57	2.86	

dents' intrinsic motivation in physical education classes.<sup>21</sup> In this investigation, the concept of "motivational climate" was applied to medical texts for the first time. Results obtained from the present study indicated that creating mastery climate in the class improves medical students' intrinsic motivation. Sproule et al indicated that there was a meaningful relationship between students' perceived motivational climate in physical education and setting goals, intrinsic motivation and plans to be active physically.<sup>23</sup> In Kavussanu and Robert's study, the relationship between motivational climate, intrinsic motivation and self-efficacy was investigated. The findings revealed that the perception of mastery climate had a positive relationship with the positive characteristics of intrinsic motivation (interest-enjoyment, effort-importance, perceived competence) and had a negative relationship with the negative aspects (pressure-tension).<sup>13</sup>

Hence, it seems necessary for teachers of medical education to get familiar with forming dimensions of mastery climate and trying to create such environments in their classes.

Mastery climate indicates an environment where learning and progress is encouraged, success can be measured beyond competitive results, people consider their own performance and they don't compare themselves with others and all participations are valuable. In the study of Gutiérrez et al, the perception of mastery climate and of teachers emphasizing intrinsic motives for maintaining discipline were known as the most significant predictors of students' intrinsic motivation.<sup>6</sup> As a result, professors of medical education can improve medical students' intrinsic motivation by creating a mastery climate. Under such conditions, students evaluate themselves based on personal progress and skill development. Performance mistakes are considered as one part of the learning process and individuals are encouraged to persevere and overcome difficulties. White and Gruppen stressed that in pertinent research on motivation there was an immense need for more emphasis in the realm of medical education.<sup>23</sup> Kusrkar et al mentioned a lack of research in scientific papers in this field in his research. He emphasized that identifying the affective factors on motivation can help medical teachers design a syllabus to improve the learning climate and the learning environment of medical faculties.<sup>3</sup>

### Limitations of study

Like every study, the present investigation had some limitations. The educational level of students was ignored in the process of sampling and all medical students were included in the study regardless of their educational level. It is proposed that future studies proceed on determination of effects of motivational climate on every academic level of medical courses (i.e., basic sciences, medical clerkship, intern, etc.) individually.

Another limitation of the present study was the data collection method, which was carried out based on self-reporting measurement instruments. It is proposed that future studies use observational methods of data collection to investigate the type of learning climate at the classes. Another limitation of the present study was its implementation on a wide level (i.e., Faculty of Medicine), and it is suggested that future studies investigate motivational climate of learning environments at limited levels (e.g., educational departments).

### Ethical approval

Informed consent was taken from the participants for the study.

### Competing interests

None to be declared.

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### References

1. Chang MM. Applying self-regulated learning strategies in a web-based instruction—an investigation of motivation perception. *Computer Assisted Language Learning* 2005;18(3):217-230.
2. Chaudhary N. Role of motivation in talent retention and increasing productivity. *Shodhganga: a reservoir of Indian theses @ INFLIBNET* [Internet]. [Cited 15 Sep 2014].
3. Kusrkar RA, 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):e242-62. doi:10.3109/0142159X.2011.558539
4. Williams GC, Deci EL. The importance of supporting autonomy in medical education. *Ann Intern Med* 1998;129(4):303-8.

5. Ryan RM, Deci EL. Intrinsic and extrinsic motivations: Classic definitions and new directions. *Contemp Educ Psychol* 2000;25(1):54-67. doi:10.1006/ceps.1999.1020
6. Gutiérrez M, Ruiz LM, López E. Perceptions of motivational climate and teachers' strategies to sustain discipline as predictors of intrinsic motivation in physical education. *Span J Psychol* 2010;13(2):597-608.
7. Taylor G, Jungert T, Mageau GA, Schattke K, Dedic H, Rosenfield S, et al. A self-determination theory approach to predicting school achievement over time: the unique role of intrinsic motivation. *Contemp Educ Psychol* 2014;39(4):342-58. doi:10.1016/j.cedpsych.2014.08.002
8. Kusrkar RA, Croiset G, Ten Cate TJ. Twelve tips to stimulate intrinsic motivation in students through autonomy-supportive classroom teaching derived from self-determination theory. *Med Teach* 2011;33(12):978-82. doi: 10.3109/0142159X.2011.599896.
9. Hackfort D, Papaioannou AG. Achievement motivation in sport settings. *Routledge Companion to Sport and Exercise Psychology: Global Perspectives and Fundamental Concepts (International Perspectives on Key Issues in Sport and Exercise Psychology)*. Routledge; 2014.
10. Isoard-Gautheur S, Guillet-Descas E, Duda JL. How to achieve in elite training centers without burning out? An achievement goal theory perspective. *Psychol Sport Exerc* 2013;14(1):72-83. doi:10.1016/j.psychsport.2012.08.001
11. Nicholls JG. Achievement motivation: Conceptions of ability, subjective experience, task choice, and performance. *Psychol Rev* 1984;91(3):328-346.
12. Bortoli L, Bertollo M, Vitali F, Filho E, Robazza C. The effects of motivational climate interventions on psychobiosocial states in high school physical education. *Res Q Exerc Sport* 2015;86(2):196-204. doi:10.1080/02701367.2014.999189
13. Kavussanu M, Roberts GC. Sport Psychology Motivation in physical activity contexts: The relationship of perceived motivational climate to intrinsic motivation and self-efficacy. *J Sport Exerc Psychol* 1996;18(3):264-280.
14. Quinlan M. Perceived motivational climate, need satisfaction, motivational regulation, and well-being in elite hurlers [Master's Thesis in Sport and Exercise Psychology]. Jyväskylä: University of Jyväskylä, Department of Sport Sciences; 2010.
15. Kassim RR, Haris NH, Kimik MA. Motivation, task orientation and ego orientation influence flow experience among golfer. *Full Paper Proceeding ETAR* 2014;1:441-450.
16. Ames C, Archer J. Achievement goals in the classroom: Students' learning strategies and motivation processes. *J Educ Psychol* 1988;80(3):260-7.
17. Ames C. Classrooms: goals, structures, and student motivation. *J Educ Psychol* 1992;84(3):261-271.
18. Senko C, Hulleman CS, Harackiewicz JM. Achievement goal theory at the crossroads: Old controversies, current challenges, and new directions. *Educ Psychol* 2011;46(1):26-47. doi: 10.1080/00461520.2011.538646.
19. Travers LV, Bohnert AM, Randall ET. Brief report: Adolescent adjustment in affluent communities: The role of motivational climate and goal orientation. *J Adolesc* 2013;36(2):423-8.
20. Holt RB. Influence of goal climate on student motivation in an elementary school physical education class: an evaluation of gender differences, individual goal orientations, climate perceptions, and satisfaction. Arizona State University, Digital Repository; 2014. Available from: <https://repository.asu.edu/items/22346>
21. Goudas M, Biddle S. Perceived motivational climate and intrinsic motivation in school physical education classes. *Eur J Psychol Educ* 1994;9(3):241-50.
22. Soltani Arabshahi K, Norouzi A, Norouzi S, Cid L. Examining the psychometric characteristics of tools for measuring intrinsic motivation inventory and perceived motivational climate scale among medical students. *Iranian Journal of Medical Education* 2014;13(12):1114-26. [In Persian].
23. Sproule J, Wang CKJ, Morgan K, McNeill M, McMorris T. Effects of motivational climate in Singaporean physical education lessons on intrinsic motivation and physical activity intention. *Pers Individ Dif*. 2007;43(5):1037-49. doi:10.1016/j.paid.2007.02.017
24. Baumgartner H, Homburg C. Applications of structural equation modeling in marketing and consumer research: a review. *Int J Res Mark* 1996;13:139-46.
25. Barbara G. *Tabachnick Using Multivariate Statistics*. 6th ed. Northridge: Fidell S. California State University ; 2013.
26. Kaplan D. *Structural Equation Modeling: Foundations and Extensions*. Thousand Oaks, CA: Sage Publications; 2009.
27. Hu Lt, Bentler PM. Cutoff criteria for fit indexes in covariance structure analysis: conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal* 1999;6(1):1-55. doi: 10.1080/10705519909540118.
28. Fornell C, Bookstein FL. Two structural equation models: LISREL and PLS applied to consumer exit-voice theory. *J Mark Res* 1982;19(4):440-52. doi: 10.2307/3151718.