

Investigating the Effectiveness of Teaching (Cognitive and Meta-Cognitive) Learning Strategies in the Enhancement of Academic Vitality amongst Pre-University Students and Applied Sciences and Technology University Students from Tehran

Fatemeh Farazandeh

PhD student, Department of Psychology central tehran branch, Islamic Azad University, Tehran, Iran
Email: Fatemeh.farazande@gmail.com

Jalal Younesi*

Clinical psychologist, Associate professor, Department of counselling university of social welfare and rehabilitation sciences, Tehran, Iran Email: jyounesi@uswr.ac.ir

Hajar Tarverdizadeh

Assistant Professor, Department of Psychology central tehran branch, Islamic Azad University, Tehran, Iran
Email: hajat.tarverdi@yahoo.com.

Abstract

The present study aims at investigating the effectiveness of cognitive and meta-cognitive learning strategies in the Academic Vitality of pre-university students schooling in various schools in Tehran and university students schooling in applied sciences and technology university of Tehran. The present study is applied research in terms of objectives, and it is interventional research in terms of the data gathering method. The study population included all the pre-university students schooling in Tehran's schools and university students studying a field in Tehran's applied sciences and technology universities. A sample was selected randomly and subjected to semi-experimental research using pretest, posttest and follow-up test with evidence and test groups. From amongst the applied sciences and technology universities and the schools in Tehran, four centers were chosen using the convenience sampling method. Ten students were selected from every four centers. The randomly selected sample includes three groups, each containing ten individuals also placed randomly into test and control (evidence) groups. The study instrument was Martin and Marsh (2008)'s academic vitality questionnaire; the extracted data were analyzed using SPSS software. In order to investigate the effectiveness of cognitive and meta-cognitive learning strategies in the academic vitality of the pre-university and university students, two-way repeated-measures ANOVA was applied. It was observed following a comparison of the scores' means in three stages that the academic vitality mean scores have undergone increases in the posttest and follow-up test in contrast to the pretest. This is reflective of the stability of the treatment's effects with the passing of time. The academic vitality's mean scores were found to increase for both of the groups trained with cognitive and meta-cognitive learning strategies in the course of the treatment, and this means that the cognitive and meta-cognitive strategies' training influences the academic vitality of the pre-university and university students.

Keywords: learning strategies, academic vitality, self-regulatory learning, university students, school students

INTRODUCTION

Academic vitality is among the competencies to which a lot of attention has been paid in regard to the academic consistency of school students

and university students. In fact, this variable has a marvelous effect on the enhancement of school students' and university students' coping abilities when faced with academic problems (Rodriguez

et al., 2017). Vitality is the energy stemming from an individual him or herself. This energy originates from internal sources. Individuals with high academic vitality feature more capability in using their own facilities or in actively taking part in health-related activities; hence they are better capable of taking advantage of more resources (Ryan and Fredrick, 2000). Prior research indicated that academic vitality could influence pre-university and university students' academic engagement (Moradi, Dehghanizadeh and Solaymani Khashab, 2016).

Moreover, academic achievement entails feeling energetic and vital. Paying attention to the subjects like correct learning methods amongst the school and university students and trying to improve them can end in positive outcomes. Academic vitality points, as opined by Martin and Marsh, to the students' ability to succeed in devising and using coping methods in the face of the academic barriers and challenges experienced in the course of life (Martin and Marsh, 2011). This novel concept refers to the positive, useful, constructive and adaptive way of responding to various kinds of challenges and barriers one may face in the constant and streaming arena of academic life (Collie et al., 2018 Tavarromi et al., 2015). Indeed, academic vitality is a simple and useful way by which school and university students perceive the concept of students' well-being in the academic context (Ellis and Hudson, 2014). Academic vitality is the prerequisite to a successful academic life and a factor resulting in positive academic consequences. Academic vitality is one of the important indices influenced by an individual's fruitful and successful learning; it is also influenced by the emotional grounds and emotional expressions of the individuals (Martin, 2014). Although academic vitality can be associated with academic achievement and academic success, some researches indicate that frustration can be correlated with low academic performance and negatively influence academic vitality (Resnick et al., 2016). On the other hand, amongst the distinct features of school and university students is the lack of tendency for learning. Training for learning strategies can be effective in this regard because learning strategies' training can lead to better learning and

eventually enhance academic vitality (Yarmohammadi et al., 2019).

Nowadays, studies have come to the belief that there are many factors capable of predicting and influencing academic vitality (Cerra et al., 2013). There are even many educational interventions identified for elevating the quality of academic life and academic vitality (Darben et al., 2016). One of the most important of these prerequisites with an effect on academic vitality is known as cognitive and meta-cognitive learning strategies (Zimmerman, 2000). Therefore, it is by teaching the learning strategies that the school and university students can recognize their learning and academic issues and problems, thereby gaining mastery in their learning skills or better learn the instructional materials and this can per se influence the academic vitality of the school and university students. So, learning strategies are necessary for bringing about enhancement in learning (Kim, 2015). Training the students for learning strategies helps them get used to better learning habits, improve their study skills and apply learning strategies for the corroboration of positive academic results (Kiarochi et al., 2015).

Amongst the various approaches that can be adopted for investigating the determinants of academic vitality, there are recently proposed two primary and significant approaches that emphasize the processes influencing vitality. In the first approach, the effect of the environmental processes on academic performance is the main subject (Fernandez and Blusky, 2016). In the second one, learner-specific learning processes and strategies are of great importance, such as cognitive and meta-cognitive learning strategies (Martin et al., 2013). One of the cognitive-social theorists defines self-regulatory learning strategies as a sort of learning wherein the learners personally start and guide their efforts in lieu of relying on the teachers, parents and/or other educational proctors for acquiring knowledge and skill. Put differently; the foresaid theorist considers self-regulation in learning as the learner's active participation in terms of behavior, motivation, cognition and metacognition in the learning process for maximizing the learning (cited in Dehghani Mofrad, 2012).

In addition to the processes and environment, there are also conditions influencing the students' learning, such as social climate and psychology governing the classroom with cognitive and meta-cognitive strategies setting the ground for better

learning under the positive types of such conditions. In fact, based on the theorists' perspectives in the area of psychology, alongside the cognitive and emotional requisites needed for accomplishing every learning assignment, the learner's domination over the proper learning strategies and timely use of them are among the essential preconditions of the learning process (Mesrabadi and Erfani, 2018). By cognitive strategies, the set of cognitive activities' planning, revising and correcting processes is intended with cognitive strategies, as well, referring to the solutions learners devise to better learn, memorize, recall and comprehend. Pintrich (2004) believes that autonomous school and university students capable of utilizing cognitive and meta-cognitive strategies are energetic in their academic performance and believe that they can overcome their problems and challenges. As shown by Mahbod and Yusefi (2018) in their studies, "meta-cognition is a predictor of self-efficacy."

Studies have shown that the teaching of the learning and studying methods and techniques (cognitive and metacognitive strategies) to school and university students can improve their performances in their doing their homework and enhance their academic achievement (Karami, 2013; Moradi and Cheraghi, 2013 and Ghanbaritalab and Fuladchang, 2015). The numerosity of the studies about working memory is reflective of the idea that the identification and discovery of the memory mechanisms as well as the cognitive and metacognitive strategies is per se of great importance and has reserved itself a particular stance in the advancing the knowledge and perception of various kinds of mental functions (Hwang et al., 2015). Furthermore, offering effective self-regulatory learning solutions by contemporary psychologists is expressive of the role played by instructing learning strategies in the facilitation of the learning process. Educational psychologists believe that the proper use of learning strategies in the instructional books in the course of schooling helps school and university students learn better and more. Considering the abovementioned materials, the present study's objective is to investigate the effectiveness of cognitive and meta-cognitive learning strategies in enhancing the academic vitality of school students and

applied sciences and technology university students in Tehran.

Study Method:

The present study is applied research in terms of objectives, and it is interventional research in terms of the data gathering method. The study population included the students of applied sciences and technology universities and schools in Tehran; a sample was selected randomly from the study population and subjected in a semi-experimental way to pretest, post-test and follow-up test within the format of evidence and test groups. After the sample was selected and the individuals were randomly placed in test and evidence groups, both of the groups' participants were seminally subjected to a pretest. Then, the test group was trained for learning strategies (cognitive and meta-cognitive) for eight sessions. Both of the groups were subjected in the end to a posttest.

In the present study, from amongst the applied sciences and technology universities and schools in Tehran, four centers were chosen using the convenience method. Ten individuals were randomly selected from each of the four centers. Random sampling was finished with three groups, each containing ten individuals.

Study Instrument:

Martin and Marsh's (2008) Academic Vitality Questionnaire:

In order to assess academic vitality, Hussein Chari and Dehghanizadeh's (2012) scale of academic vitality was utilized. This scale is based on the English version of the academic vitality questionnaire by Martin and Marsh (2008) and contains 4 items. The responses are scored in Martin and Marsh (2008)'s the inventory of academic vitality based on Likert's seven-point scale (from completely disagree to completely agree). Martin and Marsh's questionnaire was found authentic in terms of internal consistency and test-retest reliability (Cronbach's alpha=80% and retest score=67%). In order to be able to administer the questionnaire to a sample of individuals with Iranian culture, the scale's items were firstly translated; afterward, a number of items were written based on the items of the original questionnaire and provided to Iran's educational psychology professors and experts to acquire their notions about them. To preliminarily administer the constructed questionnaire and eradicate the flaws, the items were presented to a group of high school and university students (96

girls and 96 boys). Upon receiving their responses, the final version consisted of 86 items that were rewritten. Then, the aforementioned items were again presented in preliminary research to a sample comprised of 890 school and university students who had been selected based on a random cluster sampling method and the psychometric properties thereof were investigated. The results obtained from the investigation indicated that Cronbach's alpha coefficient is equal to 80% following the elimination of eight items, and their retest reliability coefficient was found to equal to 73%. In addition, the correlation between the item's individual scores and the total score was found in a range from 52% and 68%. The results are expressive of the idea that the items feature satisfactory internal consistency and stability. To investigate the factor structure (construct validity) of the questionnaire, principal components analysis with orthogonal varimax rotation in item level was applied. The results generally showcased that the elimination of eight questions caused the test's reliability coefficient to be increased to 75%. Therefore, the eight questions were omitted.

The results of Kaiser-Meyer-Olkin sampling adequacy tests and Bartlett's sphericity test are reflective of the idea that factor analysis can be performed. The scree plot and the specific values above unity indicate that a factor can be extracted. In sum, the eight plus one (nine) foresaid items could account for 37% of the variations. The Cronbach's alpha coefficient obtained in the study by Dehghanizadeh and

Hussein Chari is equal to 0.80, and the retest reliability coefficient is 0.73. Additionally, the correlation between the individual items' scores and the total score was found, ranging between 0.51 and 0.68 herein.

In this research and before subjecting the participants to the tests and starting the intervention, they were asked to express their satisfaction. They were told not to mention their names on the test papers so that they could be assured that their information would remain confidential. Then, cognitive and meta-cognitive strategies teaching was commenced by providing information about them at first. Next, the testees' working memory was evaluated in a pretest followed by tests of academic identification and academic vitality. Finally, the test group's participants were subjected altogether to cognitive and meta-cognitive learning strategies training, with the control group receiving no instruction. To train the test group's participants, a meta-cognitive strategies training package was utilized based on the model posited by Sexton et al. (1983) (cited in Brown et al., 1983). Both of the groups' participants were subjected to a post-test to evaluate their academic vitality levels. After the questionnaires were collected and the scores were calculated, SPSS software was used to analyze the data.

Findings:

To investigate the effectiveness of the cognitive and meta-cognitive learning strategies training on the academic vitality of the school and university students, two-way repeated-measures ANOVA was utilized. The results of this test and the hypotheses' test have been given below.

Table 1: results of Covariance Matrix Consistency Test (Box)

Box's test	F	DoF1	DoF2	Significance level
566.13	1.035	12	846.3532	0.618

As it is seen in Table (1), the significance level of Box's test is equal to 0.618, which is larger

than 0.05, so the assumption "consistency of covariance matrix is affirmed.

Table 2: results of Levene's test of variance homogeneity

Variable	F	DoF1	DoF2	Significance level
Academic vitality in pretest	0.862	2	27	0.434
Academic vitality in posttest	0.553	2	27	0.582

Academic vitality in follow-up test	1.074	2	27	0.356
--	-------	---	----	-------

As is seen in Table (2), the results of Levene’s test are not statistically significant, so the

assumption of “homogeneity of variables’ variance” is confirmed.

Table 3: results of Mauchly’s sphericity test

Variable	Mauchly’s statistic	Chi-square	DoF	Sig. level
Academic vitality	0.913	2.376	2	0.305

As it is observed, the results of Mauchly’s test of sphericity are not statistically significant

($P > 0.05$), indicating that the sphericity assumption holds true.

Table 4: Results of the multivariate within-testee effect test for comparing the control and test groups’ academic vitality

Effect		Val ues	F	Effec t’s DoF	Erro r’s DoF	Sig . lev el	Imp act size
Repetit ion	Pillai’s trace	0.77 0	43.5 99	2	26	0.0 01	0.77 0
	Wilks’s lambda	0.23 0	43.5 99	2	26	0.0 01	0.77 0
	Hotelli ng’s effect	3.35 4	43.5 99	2	26	0.0 01	0.77 0
	Roy’s largest effect	3.35 4	43.5 99	2	26	0.0 01	0.77 0
Repetit ion × Group	Pillai’s trace	0.53 9	4.98 2	4	54	0.0 01	0.27 0
	Wilks’s lambda	0.46 1	6.14 7	4	52	0.0 01	0.32 1
	Hotelli ng’s effect	1.16 9	7.30 8	4	50	0.0 01	0.36 9
	Roy’s largest effect	1.16 9	15.7 84	2	27	0.0 01	0.53 9

In Table (4), the results of multivariate tests have been presented for the investigation of the difference between the control group, meta-cognitive learning strategy group and cognitive learning strategy group’s academic vitality scores in the course of the treatment. The information mentioned in the above table shows

that all of the multivariate tests are significant, meaning that there is a primary effect related to the factor “repetition” (pretest, posttest and follow-up test) as well as an interactive effect by the groups and the repetitions (i.e., the presence of a difference between the groups in the measurement stages).

Table 5: Results of univariate within-testee effect test for comparing the academic vitality of the control and test groups

Source		Sum of squares	Do F	Mean squares	F	Sig. level	Impact size
Repetition	Assuming sphericity	82.924	2	41.462	32.772	0.001	0.548
	Greenhouse-Geisser Correction	82.924	1.839	45.084	32.772	0.001	0.548
	Heinfieldt	82.924	2	41.462	32.772	0.001	0.548
	Lower bound	82.924	1	82.924	32.772	0.001	0.548
Repetition × Group	Assuming sphericity	28.197	4	7.049	5.572	0.001	0.292
	Greenhouse-Geisser Correction	28.197	3.679	7.665	5.572	0.001	0.292
	Heinfieldt	28.197	4	7.049	5.572	0.001	0.292
	Lower bound	28.197	2	14.099	5.572	0.009	0.292
Error	Assuming sphericity	68.319	54	1.265			
	Greenhouse-Geisser Correction	68.319	49.662	1.376			
	Huynd-Feldt	68.319	54	1.265			
	Lower bound	68.319	27	2.530			

In Table (5), results of the univariate within-testee effect test have been shown for a comparison of the academic vitality amongst the control group and cognitive and meta-cognitive learning strategies' training groups. Considering the results, the amounts of F-value

related to the interactive effect by the group and the repetition (with the presence of a difference between the groups during the measurement stage) are statistically significant at a 0.01 alpha coefficient level ($p < 0.01$). The significance of the interactive effects is reflective of the existence of

a difference between the changes in the control groups' academic vitality scores in terms of the

cognitive and meta-cognitive learning strategies in the course of measurement stages.

Table 6: Bonferroni's follow-up test

Group	Stage	Stage	Mean difference	Standard error	Significance level
Control	Pretest	Posttest	-0.700	0.465	0.432
		Follow-up	-0.240	0.464	1
	Posttest	Follow-up	0.460	0.573	1
Cognitive learning strategies	Pretest	Posttest	-2.370	0.465	0.001
		Follow-up	-1.830	0.464	0.002
	Posttest	Follow-up	0.540	0.573	1
Meta-cognitive learning strategies	Pretest	Posttest	-3.700	0.465	0.001
		Follow-up	-3.030	0.464	0.001
	Posttest	Follow-up	0.670	0.573	0.756

In Table (6), pairwise comparisons have been made to investigate the academic vitality differences between each of the control group, cognitive and meta-cognitive learning strategies' training groups. Based on the results obtained for the cognitive and meta-cognitive learning strategies' training, the differences between the pretest, posttest and follow-up tests are statistically significant ($p < 0.01$). Comparing the mean scores obtained in all three stages, it is observed that the mean score of academic

vitality has been significantly increased in the posttest and follow-up test as compared to the pretest. The difference between the post-test and follow-up test scores is not significant ($p > 0.05$), and this is indicative of the treatment effect's stability in the course of time. In the control group, as well, there are no differences observable between the pretest and post-test and follow-up test scores as well as between the post-test and follow-up test scores ($p > 0.05$).

Table 7: Results of the between-testee effect test for a comparison between the groups' academic vitality mean scores

Change source	Sum of squares	DoF	Mean square	F	Sig. level
Group	77.010	2	38.505	1.217	0.312
Error	854.408	27	31.645		

In Table (7), the results of the between-testee effect test have been presented for an investigation of the academic vitality mean scores between the control group and cognitive

and meta-cognitive learning strategies' training groups. Based on the results, F-value is equal to 1.217, which is larger than the significance value ($p > 0.05$).

Table 8: Bonferroni's follow-up test

Dependent variable	Group 1	Group 2	Mean difference	Standard error	Significance level
Academic vitality	Control	Cognitive	-1.887	1.452	0.615

	strategie			
	Meta-cognitive strategie	-2.030	1.452	0.521
Cognitive strategie	Meta-cognitive strategie	-0.143	1.452	1

In Table (8), pairwise comparisons have been presented for an investigation of the academic vitality mean scores between the control group and cognitive and meta-cognitive learning strategies' training groups in the course of treatment. Based on the results, the difference between the control group, cognitive learning strategy group and meta-cognitive learning strategy group is not statistically significant ($p>0.05$).

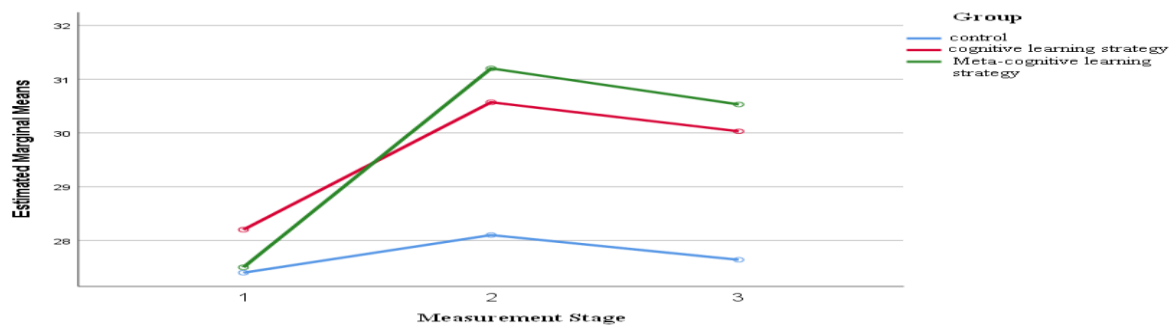


Diagram (1): academic vitality mean scores in three measurement stages in separate for each group

In diagram (1), the mean scores of the academic vitality have been exhibited in three measurement stages separate for each of the control, cognitive learning strategies' training group and meta-cognitive learning strategies' training group. As it is seen, the mean scores of academic vitality have undergone increases in the course of the treatment stages for both the cognitive and meta-cognitive learning strategies training.

Conclusion:

In order to investigate the effectiveness of training cognitive and meta-cognitive learning strategies in the enhancement of the school and university students' academic vitality, two-way repeated-measures ANOVA was utilized. The assumption of "homogeneity of covariances' matrix" has been affirmed. Comparing the mean scores in the three stages indicates that the mean academic vitality scores have undergone significant increases in the posttest and follow-up test stages in contrast to the pretest stage, and this is reflective of the effects' stability over the course of time. The mean academic vitality scores of both cognitive and meta-cognitive learning strategies' training groups were found to increase in the course of the treatment stages, and this means that training for the cognitive and meta-cognitive learning strategies influences the academic vitality of the school and university students. Although the study results have not been directly investigated in similar research, they are indirectly consistent with what has been found in the studies by Tekin (2017), Li (2012), Nelson (2005), Bern et al. (2014), Montigo (2008), Zimmerman and Stock (2008), Pintrich (2004), Javidan et al. (2018), Musavi et al. (2012), Parviz and Sharifi (2012), Dehghanizadeh and Hussein Chari (2012), Ghanbari and Fuladchang (2015), Jahtalab Vahedi (2015) and Fattahian (2012).

School and university students can enhance their academic achievement and successfully experience learning by facilitating successful experiences and acquiring the required

exercising opportunity through the use of self-regulatory learning strategies. This, per se, positively influences the growth in the individual's beliefs about his or her academic learning aptitude. The formation of such positive imaginations in the test group's school and university students not only influences their education but also becomes a positive factor resulting in the achievement of ultimate perfection in the learning processes hence followed by more positive outcomes. Resultantly, the application of these strategies ends in the emergence of positive beliefs, desire and interest in instructional materials accompanied by subsequent elevation of participation in the educational activities and acquisition of meaningful learning experiences, which are per se followed by success in academic learning and causing the formation of a sense of competence in learning activities.

The study participants were only from a single course school and university students. Therefore, care should be exercised in generalizing the results to the school and university students from the other education courses. It is suggested that the self-regulatory learning strategies should be taught as a practical, available, and less-costly method for enhancing the school and university students' deserved academic vitality. Such a method should also be taught to the teachers and other officials involved in education so that they can themselves try elevating academic vitality, working memory and academic identity of the school and university students within the format of certain activities. Additionally, the applied books on training for self-regulatory strategies should be codified in proportion to the readers' ages. Besides, the contents of the curricula should be in match the self-regulatory learning strategies (cognitive and meta-cognitive). The parents and teachers should be provided with the required information about the learning strategies and their effects on learning the instructional materials and their relationships with the working memory, academic vitality and academic identity of the school and university students.

REFERENCE

- “Differences in Working Memory and Reading,” (1980), *Journal of Verbal Learning and Verbal Behavior*, 19:450-466
- Brennan J.; Ryan S.; Ranga M.; Brae S.; Durazzi N. and Kammphuis B., (2014), “Study of innovation in education: Final Report”, Luxembourg: Publications of the European Union
- Brown, A. L.; Bransford, J. D.; Ferrara, R. A., & Campione, J. C., (1983), “Learning, remembering, and Understanding”, v.1 In JH Flavell & EM Markman (Eds.) Carmichael’s manual of child psychology, pp. 77-166
- Cera, R. Mancini and M. Antonietti, A., (2013), “Relationships between Meta-cognition, Self-efficacy and Self-regulation in Learning”, 7. 141-115
- Ciarrochi, J.; Parker, P.; Kashdan, T. B.; Heaven, P. C. & Barkus, E., (2015), “Hope and emotional well-being: A six-year study to distinguish antecedents, correlates, and consequences”, *The Journal of Positive Psychology*, 10 (6), 520-532
- Collie, R. J.; Martin, A. J.; Malmberg, L. E.; Hall, J., & Ginns, P., (2015), “Academic buoyancy, student's achievement, and the linking role of control: A cross lagged analysis of high school students”, *British Journal of Educational Psychology*, 85 (1), 113-130
- Comerford, J.; Batteson, T. & Tormey, R., (2015), “Academic Buoyancy In Second Level Schools: Insights From Ireland”, *Procedia-Social and Behavioral Sciences*, 197:98- 103
- Cowan ‘Nelson, (2005), “Working memory capacity”, New York: Psychology Press
- Darban F.; Balouchi A.; Narouipour A.; Safarzaei E. and Shahdadi H., (2016), “Effect of Communication Skills Training on the burnout of Nurses: A Cross-Sectional Study”, *Journal of clinical and diagnostic research, JCDR*; 10(4):1-4
- Dehghani Mofrad, Mustafa; Karimi, Narges; Taghipour Javan, Abbas Ali; Hassan Nattaj Jelodar, Fahimeh and Zaidabadi, Fatemeh, (2012), “the effectiveness of rhythmic motion (dancing) games on the amounts of the executive functions in the preschool children with developmental neuropsychological learning disabilities.”
- Dehghani, Y. And Hussein Chari, M., (2012), “predicting the academic procrastination based on self-regulatory strategies in learning,” MA dissertation, Shiraz University
- Ellis, D. M. & Hudson, J. L., (2014), “The meta-cognitive model of generalized anxiety disorder in children and adolescents”, *Journal of Clinical Child Fam Psychol Rev*, 13 (6):151-163
- Fattahian, P.; Hatami, H. And Taghavi Behbahani, A., (2013), “the correlation between self-efficacy and resilience in the university students,” second national conference on psychology, Payam-e-Noor University, Mahabad Branch
- Fernandez, A. S. & Bialowolski, P., (2016), “Factors and cognitions promoting academic resilience: A TIMSS-Based Analysis of five Asian education systems”, *Asia Pacific Edu. Rev* .17:511-520.DOI :10.1006/s 12564.016.9447.4
- Ghanbaritaleb, M. And Fuladchang, M., (2015), “the effectiveness of teaching cognitive learning strategies on the academic burnout and academic achievement,” bi-seasonal *Journal of cognitive strategies in learning*, (4): 2-22
- Hwang, J. H.; Cha, H. G.; Cho, Y. S.; Kim, T. S., & Cho, H. S., (2015), “The effects of computer-assisted cognitive rehabilitation on Alzheimer’s dementia patients memories”, *Journal of Physical Therapy Science*, 27: 2921–2923
- Jahtalab Ziabari, Mahshid and Ahadi, Hassan, (2015), “the effectiveness of teaching meta-cognitive learning strategies and creativity in the academic self-image’s enhancement,” *Journal of educational psychology*, no.36
- Javidan, Shahrbanou; Khanzadeh Abbas Ali, Hussein and Abolghasemi, Abbas, (2018), “the effect of teaching meta-cognitive skills on self-incapacitation and self-efficacy of the students”, MA dissertation, Gilan University
- Karami, Bakhtiar; Karami Azad, Elaheh and Hashemi, (2013), “the effectiveness of teaching the cognitive and meta-cognitive learning strategies in enhancing creativity, academic achievement motivation and

- academic self-image”, Tehran, Innovation and Creativity in Humanities Press
- Kim, S., (2015), “Cognitive rehabilitation for elderly people with early-stage”
- Li, J., & Chun, C. K. W., (2012), “Effects of learning strategies on student reading literacy performance”, *Reading*, 12(1)
- Mahbod, Mina and Yusefi, Farideh, (2015), “investigating the relationship between meta-cognition and self-incapacitation with the intermediary role of general self-efficacy”, *cognitive strategies in learning*, 10: 30-93
- Martin, A. J. & Marsh, H. W., (2008), “Academic buoyancy: Towards an understanding of studying of students’ everyday academic”, *Journal of Psychology*, 46 (1): 53-83
- Martin, A. J., & Marsh, H. W., (2008b), “Academic buoyancy: Towards an understanding of students’ everyday academic resilience”, *Journal of School Psychology*, 46 (1): 53-83
- Martin, A. J., (2014), “Academic buoyancy and academic outcomes: Towards a further understanding of students with attention deficit/hyperactivity disorder (ADHD), students without ADHD, and academic buoyancy itself”, *British Journal of educational psychology*, 84(1): 86-107
- Martin, A. J.; Ginns, P.; Brackett, M. A.; Malmberg, L. E., & Hall, J., (2013), “Academic buoyancy and psychological risk: Exploring reciprocal relationships. *Learning and Individual Differences*”, 27:128-133
- Montague, M., (2008), “Self-regulation strategies to improve mathematical problem solving for students with learning disabilities”, *Learning Disability Quarterly*, 31(1):37-44
- Moradi, Mortaza and Cheraghi, A’azam, (2013), “causal-experimental pattern drawn on the relationships between perception of the family communication patterns, class structure, academic motivation, academic autonomy and academic vitality amongst the high school adolescents”, *Journal of education and learning studies*, 6(1): 846-899
- Musavi, S.; Jabal Ameli, J. And Ali Bakhshi, F., (2012), “investigating the relationship between emotional intelligence and its indicators with motivational beliefs and self-regulatory learning strategies and their effects on the academic learning performance”, *journal of behavioural sciences research*, 11(3): 151-175, psychology and educational sciences faculty, Allameh Tabataba’ei University
- Parviz and Sharifi, M., (2012), “the relationship between the cognitive and meta-cognitive learning strategies with academic achievement of urban and rural areas’ high school students”, *seasonal Journal of education strategies*, 4(2): 2-4
- Pintrich, P. R., (2004), :A conceptual framework for assessing motivation and selfregulated learning in college students”, *Educational psychology review*, 16(4): 385-407 and 65: 529-565
- Resnick, B.; Beaupre, L.; McGilton, K. S.; Galik, E.; Liu, W.; Neuman, M. D., ... & Magaziner, J., (2016), “Rehabilitation interventions for older individuals with cognitive impairment post-hip fracture: a systematic review”, *Journal of the American Medical Directors Association*, 17(3): 200-205
- Rodriguez-Blanco, L.; Lubrini, G.; Vidal-Marino, C., & Rios-Lago, M., (2017), “Efficacy of cognitive rehabilitation of attention, executive functions, and working memory in psychotic disorders: A systematic review”, *Actas Esp Psiquiatr*, 45(4): 167
- Saif, Ali Akbar adn Mesrabadi, Ja’afar, (2013), “the effectiveness of teaching learning strategies on the speed of various texts’ reading, memorization and comprehension”, *seasonal journal of education*, 54(19): 2-37
- Tekin, E. E., (2017), “Do Learners Have Insight into the Levels of Processing Effect?”
- Weinstein, C. E., & Mayer, R. E., (1986), “The teaching of learning strategies”, in M. Wittrock (ed.), *Handbook of research on teaching*, New York, MacMillan, pp. 315-327

Yarmohammadian, Ahmad; Ghamarani, Amir; Saifi, Zahra and Arfa'a, Maryam, (2019), "the effectiveness of cognitive strategies in enhancing memorization, reading performance and information processing speed amongst the students with dyslexia", *learning disabilities*, 4(40): 868-881

Zimmerman, B. J., & Schunk, D. H., (2008), "An essential dimension of self-regulated learning", *Motivation and self-regulated learning: Theory, research, and applications*, no.1

Zimmerman, B. J., (2000), "Self-efficacy: An essential motive to learn", *Contemporary educational psychology*, 25(1): 82-19.