



An Evolutionary Study of Meta Cognition Components in Adolescence and Young

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ABSTRACT: The meaning of Meta cognition is the awareness of and individual about cognitive processes and adjusting and controlling their recognition. The aim of this research is considering the student Meta cognition at guidance and high school and Islamic Azad University of Tehran. The statistics groups include students from guidance and high school of Tehran from the second district and students of Islamic Azad University of north branch. Among them the school students were selected by stage cluster random method and university student were selected by simple random method which includes a total of 221 students. For collecting data the questioner for Meta cognition awareness was selected. Finding shows that the university and school students have different Meta cognition average. Students and school pupils have significant Meta cognition control and it was shown that by going to upper grade the main Meta cognition parameter of people develop. The acquired data from Meta cognition awareness of students showed that there is a difference between the Meta cognition parameters scores in different grade of schools and the least score is related to guidance school and the most difference is related to university students.

Key words: Meta Cognition, Meta Cognition Awareness, University Students, School Pupils

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INTRODUCTION

First time Flavell used the term of Meta cognition. In view of Flavell, Meta cognition means knowledge about cognition, Cognitive processes or anything related to it, and also means the review, Setting and actively evaluation of cognitive activities. He considered Meta-cognitive including both of Meta cognitive knowledge and experience, regulating or controlling Meta cognitive. Poushard et al. Bouchard " from University of Montreal, Canada defines Meta cognition in this form: a form of thinking that its topic is cognitive activity of self-test. In their opinion Meta cognition has two main aspects: a person's cognitive from own cognitive performance and factors effective on it and a person's control on own style of cognitive and also people are different in terms of Meta cognitive knowledge and the Meta cognitive skills make them different in terms of process of learning and anamnesis. The Meta cognition beliefs refer to the beliefs and opinions which people believe about thinking and processes and their cognitive experiences. There are two types of Meta cognitive beliefs based on theory of the Meta cognitive: revealed beliefs (news) and (2) implicit beliefs (procedural). Revealed beliefs are a knowledge that is verbally expressible. The examples of this kind of knowledge are: "the worries can cause a heart attack" and "If I focus on the risk, I'll be protected from possible damage". It cannot be directly described implicit beliefs verbally. This knowledge includes ideas, rules or programs, such as controller factors of the allocation of attention, the search of memory, and use discovery patterns of the judgment that can drive thinking. Davnink et al., argue that the Meta cognitive

also includes cognition of how analysis of thinking, how be analyzed the results of these thinking how to analyze the results and how well is put into practice what has been learned. In order to solve problems effectively, students need to understand how their minds work. In other words, they need to understand how important cognitive tasks, such as to remember, learning and problem solving is done. Dembo says the knowledge of Meta cognitive refers to three things: 1) knowledge related to self-learner (such as knowledge of the preferences, interests, the strengths, the weakness and habits of the study). 2) Knowledge related to task of learning (Including information related to the difficulty of task and amount of the needed effort for performance of academic assignments). 3) Knowledge related to guidelines and strategies to learning and how use of them. Nancy (2006) describes thought of self-reflection and self-regulatory as a component of met cognition. He argues this kind of thinking as an individual's ability to plan, monitor and evaluate its performance. Haji Alizadeh et al. (2010) introduce dimensions of Meta cognition including four factors of cognitive confidence, cognitive self-awareness, positive attitudes and beliefs about the uncontrollability of thoughts. Concerning Meta cognition have been proposed many different theories that one of the most important proposed viewpoint is Sheraw and Dennison theory of cognitive awareness. The theory proposes two parts of Meta cognition namely knowledge and regulation of cognition and eight subsidiary processes of Meta cognition. The factor of cognitive knowledge included three subsidiary processes of declarative knowledge

(DK) (refers to the knowledge of a person about himself as a learner, factors affecting learning and its memory and skills, strategies, and resources that are required to perform a task,), procedural knowledge (PK) (contains knowledge about activities should be carried out when working) and positional knowledge (CK) (the knowledge of why and when the specific cognitive activities should be related to work) and regulation of cognition includes five subsidiary processes: planning (p) (Select appropriate strategies and resource allocation that will affect the performance). The information management strategies (IM) (including staging and classification of skills and strategies that are steadily used to become more effective for information processing). Checkout Perception (CM) refers to continuous knowledge of performance one action or assignment. Ability to self-test moment by moment is a good example for checkout a); Debugging strategies (DS) (the strategies that are used for correction of operation and perception errors) and evaluation of the learning process (EL) evaluation of products and learning processes about a person and assignment). Meta cognition is information that a person has about his cognitive system. With the growth and development of the human cognitive system, a set of cognitive and regulatory processes are formed. Meta Cognitive includes ideas and beliefs that people have about their own cognitive processes and leads to choose strategy of thinking and Meta cognitive control points to executive function domains such as an amount of attention which is assigned to awareness, monitoring, Checking, planning and error detection of function (Barati and Arizi, 2010).

Middle school and high school courses are critical courses that according to many experts, it is considered as the most appropriate course for learners to develop Meta cognitive awareness (Block, 2004).

Darkin found that Meta cognitive awareness in high school and college courses grows less because of too much focus on learning content and lack of training in Meta cognitive strategies. Block (2004) concluded that the delay in learning cognitive knowledge creates new challenges for learners.

In this regard, Blackwood examined the relationship between Meta cognitive skills and student success in 43 countries concluded that these skills help useful and lifelong decision-making for students while increases the chances of success in their education field.

Desoete (2007) in a longitudinal study was studied 32 third and fourth grade students about skills of Meta cognitive and learning mathematics. This study showed that training of Meta cognitive skills can to create added value in mathematics problems solving than students who are not taught these skills.

In other words, students who received the Meta cognitive training had a greater ability to solve problems when compared to the other students.

Meta cognitive skills act as informant skills that are used for the mind through learning and information processing and facilitate progress of the process. Overall, quality of learning and memory is related to Meta cognition. Chen (2010) investigated the role of Meta cognition in students learning and found that Meta cognition improves learning with helping to complete the tasks and to carry out problem solving activities.

Many studies believe that age and experience is effective on the development of Meta cognition. For example, Hennessy (1993) and Gans (1990) in separate studies found that learners with time and more experience in Meta cognitive skills show better performance than novice learners. Javadi et al. (2011) also found that a score of Meta cognitive knowledge is linked with students' performance and degree.

The term of Meta cognition refers to our knowledge of our own cognitive processes and how to utilize them to achieve the learning objectives. Some research also suggests that environmental and educational status affects the development of Meta cognition. Motahedi showed that students gain higher scores of Meta cognitive awareness in urban than rural students. Some studies show that classroom and school induce different perceptions to the students and this is different depending on that classroom atmosphere is dominate-oriented or performance-oriented, and may be effective on individuals' goal orientation and their knowledge of Meta cognitive ability.

MATERIAL AND METHODS

Population is middle and secondary school students in district 2 of Tehran and students Islamic Azad University of North Tehran. Of which, were selected 221 subjects of the school students and university students using the phased cluster random sampling method and a simple random method, respectively. The Meta cognition awareness questionnaire (MAI) was used for data collection.

Research Tools:

Research a tool was evaluation questionnaires of Meta cognitive awareness. The questionnaire first was used by Shraw and Dennison. The questionnaire contains 52 items that measure the dimensions of Meta cognitive awareness. Shraw and Dennison (1994) coefficient of internal consistency of the scale have been reported between 0.88 to 0.93 and the questionnaire reliability coefficient of Cronbach's alpha 0.93. In internal investigations, Delawar Poor calculated correlation coefficients between

components for the total scale 0.95 and the reliability coefficient for the entire scale 0.90. Motahedi also calculated the correlation coefficient between the two general Meta cognitive and Meta cognitive control 0.91 and 0.89, respectively, and the reported reliability coefficient for the questionnaire 0.82. In this study, the correlation coefficient between the components and reliability coefficient using Cronbach's alpha were gained 0.87 and 0.85, respectively.

RESULTS

Research question: how much the Meta cognitive components of middle and secondary school students with college students? Research findings showed that the middle school students are with mean 36.48 and Standard Deviation 7.35 of Meta cognitive knowledge, 50.48 and standard deviation 9.96 of Meta cognitive controlling and with averages 86.97 and standard deviation 16.84 of Meta cognitive awareness. And high school students for the components of Meta cognitive of Meta cognitive knowledge have an average 37.91 with a Standard Deviation of 7.72 and for Meta cognitive controlling have an average 51.87 with a Standard Deviation of 9.64 and for the components of general Meta cognitive awareness have average 89.79 and a standard deviation of 16.82, and the college students for the components of Meta cognitive knowledge have

an average of 47.00 and a standard deviation of 9.63 and Meta cognition control has an average of 65.54 and a standard deviation of 12.11 and general Meta cognitive awareness have an average of 112.54 and a standard deviation of 21.36, that the results are listed in Table 1.

These findings Divided into sub-components of Meta cognition are listed in Table 2. Hypothesis: There a significant difference between Meta cognitive components of guidance school and high-school students and university students. The collected data about students' Meta cognitive components in terms of degree and the students showed that there are significant differences between the averages of the Meta cognitive knowledge scores at the various educational degrees so that the most average was related to the students and the least average was related to the guidance school degree. These findings are listed in Table 1. Data were analyzed using ANOVA. The results showed that there are significant differences between the students' scores of Meta cognitive control component according to different levels. The results showed that for all three components of Meta cognition (Meta cognitive knowledge, Meta cognitive controlling, and Meta cognitive awareness) there are significant differences between students' scores of different degree and the students in terms of statistics. The results are listed in Table 3.

Table 1. Mean and standard deviation of the overall index

Degree	Indicators	Number	Meta Cognitive knowledge	Meta cognitive control	General awareness of Meta cognitive
Guidance school	Average	67	36.47	50.47	86.98
	SD	67	7.36	9.98	16.87
High school	Average	74	91.37	51.89	89.75
	SD	74	7.73	9.36	16.81
University	Average	79	00.48	54.67	112.56
	SD	77	0.936	12.14	36.22

Table 2. Mean and standard deviation of the sub-index of Meta cognition Knowledge

Degree	Abundance	Indicators	Display Knowledge	Knowledge of procedures	Conditional knowledge
Guidance school	68	Average	12.33	11.97	12:18
		SD	2.344	2.495	2.942
High School	75	Average	12.81	12.60	12.18
		SD	2.498	2.644	2.945
University	78	Average	15.91	15:37	15.71
		SD	2.923	3.213	3.765

Table 3. Mean and standard deviation of the sub-index of Meta cognition Knowledge

Degree	Abundance	Indicators	planning	monitoring	Review	Evaluation
Guidance school	68	Average	12.50	12.54	13.14	12.31
		SD	2.748	2.778	2.795	2.516
High School	75	Average	12.64	13:05	13:51	12.67
		SD	2.684	2.650	2.684	2.630
University	78	Average	16:09	16:46	16.71	16:29
		SD	3.844	3.039	2.865	3.311

Table 4.

Variables	Sources of change	SS	df	MS	F ratio	Sign.
Meta Cognitive knowledge	Inter-group	4601.901	2	2300.950	33.54	0
	in-group	14537.45	213	68.58		
	Total	19139.398	212			
Meta cognitive control	Inter-group	9800.567	3	4900.286	43.56	0
	In-group	23895.249	214	112.574		
	Total	33668.817	214			
Meta cognitive awareness	Inter-group	27821.696	2	13910.847	40.941	0
	In-group	72035.2345	212	339.784		
	Total	99856.931	215			

DISCUSSION

Students in middle school and high school and college students have acquired different Meta cognitive averages, overall (Table 1). These findings suggest that despite the lack of sufficient attention to the cognitive components in the school curriculum (Safari and Marzoghi, 2009) of intermediate and high school students and college schools with acceptable Meta cognitive awareness, with rising educational levels also increased their Meta cognition. Reder is on the claim that many cognitive functions grows untutored and due to interact with the environment.

Findings related to the difference between the main components of the middle school and high school students Meta cognitive with college students according to the different educational levels, suggesting with raising levels of school, the components average of Meta cognition (Meta cognitive knowledge, Meta cognitive monitoring, and Meta cognitive awareness), also grows out. These findings are consistent with Darkin studies, Ordan Walters based on that the experienced learners have higher Meta cognitive skills than novices. Javadi et al. (2011) also in direction of the findings concluded that there is a significant relationship between the learners' Meta cognitive components and the course of study.

It seems that the environments with the educational facilities and different teacher have different effects in the development of students' Meta cognitive components.

Given that many learners' learning problems rise from weaknesses in their Meta cognitive components and the lack of using of components in practical situations (Sifert), and the school period in the most suitable to growth the Meta cognitive components (Block , 2004). And delays in its training create problems for learners. Also, given the lack of attention to the Meta cognitive components of the school curriculum, it is necessary to the planners and authors of textbooks consider the Meta cognitive approach about instructional content based on the Meta cognition components (Meta cognitive knowledge, Meta cognitive monitoring and Meta cognitive awareness) in the curriculum. Training of

teachers to teach with Meta cognitive approach seems necessary, because teachers play a vital role in the development of students' Meta cognitive components.

According to the results of this study, unfortunately, what is being implemented in the current educational system is providing a bit of information, regardless of learners' skills in accepting the presented concepts, that leads to a lack of students understanding of Meta cognitive components and apathy of them. So, it is a respected university official, especially the respectable authorities of counseling center to hold educational classes on Meta cognitive strategies, and in the meantime, certainly consider the training and individual needs of contacts community and held training courses in accordance with their needs.

REFERENCES

- Barati, H., Arizi, HR (2010), a comparison between the cognitive impairments and Meta cognition components according to the modificatory variables of occupational accidents. *Journal of Behavioral Sciences*, 4 (2): 115-121.
- Block, C.C. (2004.) *Teaching comprehension: The Comprehension process Approach*. Boston: Pearson Education, Inc
- Chen, L.H. (2010). Web-based learning programs: Use by learners with various cognitive styles. *Coputers & Education*, 54:1028-1035. -
- Desoete, A. (2007). Evaluating and improving the mathematics teaching - learning process through Meta cognition. *Electronic Journal of Research in Educational psychology*, 5:705-730
- Haji Alizadeh, K., Bahrainian, A.H., NAziri, G. & Modares Gharavi, M. (2010). The role of cognitive variables, Meta cognitive aspects and emotional of substance abuse treatment, *Journal of Cognitive Science*, 11 (3): 143-153.
- Hennessy, M.G. (1993). Students ideas about their conceptualization: their elicitation through instruction. ERIC Document service No: ED361209.
- Javadi, M., Keyvan Ara M., Yaghoubi, M., Hassanzadeh, A. & Ebadi, Z. (2011).the relationship between Meta

cognitive awareness from strategies of the study and students' academic achievement of Isfahan medical science. *Iranian Journal of Medical Education*, 10 (3):42-52.

Nancy, J. (2006). Strategies For success: Teaching Meta cognitive skills to adolescent learners. *New England Reading Association Journal*, 42:33-41

Safari, Y. & Marzoghi, R. (2009). Evaluation of curriculum books, teaching guide, educational goals of empirical science guidance curriculum for guidance school, in terms of the amount of attention to the components of Meta cognition and Meta cognitive awareness of students. *Journal of Learning*, 59 (2): 177-100.