Metacognitive Strategies and Logical/ Mathematical Intelligence in EFL Context: Investigating Possible Relationships

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Abstract—The current study aimed to investigate the possible relationship between logical/mathematical intelligence and metacognitive strategies Iranian EFL learners used in their reading comprehension process. To this end, 98 students (55 females and 43 males) who were all EFL learners participated in our study. We used MIDAS (multiple intelligences development assessment scales) in order to measure the students' logical/mathematical intelligence. Furthermore, to measure the metacognitive strategies they applied, MASRI (Metacognitive Awareness of Reading Strategies Inventory) was used. Using Pearson correlation, we analyzed the obtained data. Data analysis revealed that logical/mathematical intelligence had a significant relationship with metacognitive strategies in EFL context. Moreover, males and females, except for logical/mathematical intelligence usage, didn't have any significant difference in the application of metacognitive strategies.

Index Terms-logical/mathematical intelligence, metacognitive strategies, the MIDAS, MASRI

I. INTRODUCTION

A. Statement of the Problem

According to Brown (1978) and Flavell (1976), metacognition is one of the basic predicators of learning. In other word, metacognition plays a significant role in language learning process (Brown, 1978; Wang, Haertel & Walberg, 1990, 1993; Flavell, 1976). Furthermore, it's believed that metacognitive strategies applied by language learners are crucially influenced by intellectual skills in general and logical/mathematical intelligence in particular (Slife, B. D., Weiss, J., & Bell, T., 1985). The current study tries to investigate the possible relationship between metacognitive strategies and logical/mathematical intelligence. Moreover, it tries to investigate the possible effects of gender on the abovementioned relationship.

B. Significance of the Study

In the twentieth century where individual differences and values play a crucial role in language learning, it's extremely important to teach learners strategies in line with their characteristics (Akbari & Hosseini 2008). It's believed that logically and mathematically intelligent learners are better users of metacognitive strategies in problem-solving activities. Moreover, male-female differences are assumed to have a significant role in the learning process. Anyway, the current study investigates the extent to which Iranian EFL learners make use of logical/mathematical intelligence and metacognitive strategies in their reading comprehension process; it also tries to investigate sex differences regarding the abovementioned relationship.

C. Research Questions and Hypotheses

The present study will try to investigate the following research questions:

1. Is there any significant relationship between logical/mathematical intelligence and metacognitive strategies Iranian EFL learners apply in their reading comprehension process?

2. Does gender have any effect on the abovementioned relationship?

The abovementioned research questions are reworded to form the following null hypotheses:

1. There is no significant relationship between logical/mathematical intelligence and metacognitive strategies of Iranian EFL learners.

2. Gender doesn't have any effect on the abovementioned relationship.

II. REVIEW OF LITERATURE

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As the basic purpose of the current study is to investigate the possible relationship between logical/mathematical intelligence and metacognitive strategies and the effect of gender on them, in the following part of the review of literature, first of all, we focus on logical/mathematical intelligence, and then metacognitive strategies will be dealt with. The last part of this section will focus on the possible relationship between logical/mathematical intelligence and metacognitive strategies.

A. Intelligence, Multiple Intelligences, Logical/Mathematical Intelligence

According to Elshout (1983), Intelligence is the property of human cognitive toolbox which functions basic cognitive operations. If we look back in the history, we can easily notice that intelligence and IQ tests have always been used to classify people as intelligent or unintelligent or specifically to pass value judgments about their social status (Mensch, 1991). In other word, IQ tests were used to attribute the failure or success of a particular group or race to its low or high IQ scores. Consequently, it caused racial discrimination among different races. Those with high IQ scores were regarded as the noble race and those with low IQ scores were regarded as the mean race (Howe, 1997). However, as time passed, Gardner (1983) questioned the construct validity of general cognitive ability or intelligence (Visser, Ashton & Vernon, 2006). He critically questioned the idea that it was just the presence or absence of g (intelligence) that made a person intelligent or unintelligent (Akbari & Hosseini, 2008). According to Gardner (1983), intelligence is conceived as "the biopsychological potential to process information that can be activated in a cultural setting to solve problems or create products that are of value in a culture" (Kelly & Tangney, 2006). Finally, Gardner (1983) proposed the Multiple Intelligences Theory. According to his theory, intelligence is a module having got different components which are more or less independent of one another. Gardner believes that it's definitely incorrect to pass negative value judgment on a person and call him/her unintelligent just due to having a low score on IQ tests (Visser, Ashton & Vernon, 2006). He continues that each person possesses all eight intelligences: linguistic, logical/mathematical, spatial, musical, bodily/kinesthetic, interpersonal, intrapersonal & naturalistic intelligence. Below, we present a quick recapitulation of all eight intelligences as derived from Akbari & Hosseini (2008).

- 1. Linguistic intelligence: effective use of language and good knowledge of words.
- 2. Musical intelligence: sensitive to melody.
- 3. Logical intelligence: effective use of numbers; ability to deduce conclusion.
- 4. Spatial intelligence: sensitivity to color & design & graphic forms.
- **5. Bodily intelligence**: physical/ bodily coordination.
- 6. Interpersonal intelligence: ability to understand others, their intention and moods.
- 7. Intrapersonal intelligence: knowledge of the self.
- 8. Natural intelligence: knowing and caring about nature.

According to Kelley & Tangney (2006), the categories of multiple intelligences have got their own characteristics, tools and processes that represent different ways of thinking, solving problems and learning. According to Gardner (1983), each person possesses all eight intelligences to a certain degree. Moreover, each individual has the capacity to develop each intelligence to a certain degree; furthermore, as Armstrong (1994) points out, intelligences always interact with each other; in other word, in order to do something, let's say cooking, different intelligences come together (ex. Linguistic, bodily/kinesthetic,...), letting us cook. It's worth noticing to mention that Gardner (1983) believes that intelligences are not fixed and can be developed based on educational opportunities.

According to Veemana & Spaansa (2005), logical/ mathematical intelligence is the core of MI theory and can be regarded as the true manifestation of MI. According to Gardner (1983), logical/ mathematical intelligence is the ability to use numbers effectively, to reason well and to recognize and solve problems using logical patterns. Having logical/mathematical intelligence, a person is able to categorize, infer and make generalizations; Moreover, as Visser, Ashton & Vernon (2006) point out, numerical facility is included in logical/mathematical intelligence. According to Gardner (1983), logically and mathematically intelligent individuals work well with abstract symbols such as geometrical shapes. Furthermore, a person who is logically intelligent is able to apply knowledge in different contexts, thinks logically and asks surprising questions. (Adey, Caspo, Demetriou, Hautam & Shayer, 2007). Moreover, individuals benefiting from logical/mathematical intelligence are assumed to appreciate activities like strategy games, math activities, logic puzzles, planning and arranging (Visser, Ashton & Vernon, 2006). Furnham (2006), asserting the intelligences proposed by Gardner, points out that spatial, linguistic and logical/mathematical intelligences are actually the essence of Multiple Intelligences Theory. He continues that among the categories of MI, just the traditional ones including spatial, linguistic and logical intelligences are the best tools to assess an individual's overall intelligence.

B. Language Learning Strategies; Metacognitive Strategies

According to Akbari & Hosseini (2008), it was Rubin (1975) who got familiar the field of second/foreign language learning with the concept of language learning strategies. Moreover MacIntyre and Gardner (1994), as cited in Doughty & Long (2003), propose that language learning strategies are the most important and fertile areas in research. Oxford (1989) defined language learning strategies as "behaviors or actions which learners use to make language learning more successful, self-directed and enjoyable" (p.235). She later proposed six basic components for language learning strategies as cognitive, memory, metacognitive, social, affective and compensation strategies. However, O'Malley & Chamot

(1990) altered Oxford's taxonomy and shortened it to just three categories: cognitive, metacognitive and social/affective strategies.

Since metacognitive strategies are the basic focus of this section, we just try to concentrate on them and evaluate them in details.

It's believed that Flavell (1976) proposed the concept of metacognition for the first time (Memnun, D. S. & Akkaya, R., 2009). He defines metacognition as "individual's knowledge about his/her cognitive process, and employing this knowledge to inspect cognitive processes" (Flavell, 1976, p232). Schmitt (2002) refers to metacognitive strategies as those processes which language learners consciously use in order to monitor and manage their learning process. These strategies let language learners set goals for their learning, check how it's going on and furthermore, evaluate how they acted through the process of learning (Schimitt, 2002). Other researchers regarded metacognition as "thinking of thought" (Blakey, Spence, 1990; Livingston, 1997; Akin, Abaci & Cetin, 2007). As a matter of fact, they all considered regulation of cognition as the basic component of metacognition. According to Sanchez & Vovides (2007), those language learners who are aware of their metacognitive strategies are actually effective language learners and consequently succeed to promote their learning process. Cubukcu (2008) points out that the metacognitive strategies learners use consist of three basic parts, namely known as metacognitive knowledge, metacognitive monitoring and self-regulation and control. He continues that metacognitive knowledge is referred to cognitive strategies like memory strategies that language learners use to regulate their knowledge acquisition. The second group, metacognitive monitoring, refers to those activities language learners do to control and monitor their learning process; and finally, selfregulation, refers to activities used for managing the whole learning process. Other researchers summarized metacognitive strategies in the acronym CAPE; this specific acronym stands for centering, arranging, planning and evaluating the learning process (Birjandi, Abbasian & Mirhassani, 2005). They put emphasis on the metacognitive strategies used by language learners and further claim that individuals' success or failure in education is resulted from the presence or absence of these strategies. They continue that those language learners who are benefiting from metacognitive strategies can easily determine what they need to do and how to manage the situation; in other word, they have strategies to identify their needs and necessities in language learners who don't use metacognitive strategies are actually learners "without direction". He then continues that it's a little bit irritating for language learners to be controlled by others. So using metacognitive strategies, they can control and monitor their progress themselves (Wang, Spencer & Xing, 2009). Paris & Winogard (1990) believe that metacognitive strategies alter a passive learner to an active learner, helping him/her go beyond the limitations imposed by the instruction in order to control and manage their learning process through personal appraisal and management (Wang, Spencer & Xing, 2009). Senay (2009) asserts the crucial role of metacognitive strategies and further believes that using these strategies, language learners set goals for their own learning and consequently become effective and independent learners. He also claims that metacognitive strategies contain three basic skills, namely known as planning, monitoring and evaluation. As Visser, Ashton & Vernon (2006) point out, there is a close relationship between intrapersonal intelligence and metacognition. As they believe, individuals with high intrapersonal intelligence are aware of what they know and what they don't know. In other word, generally they are generally aware of their needs; using metacognitive strategies, they can easily self-direct their own learning and accurately judge their relative weakness and strength. Metacognitive strategies have the lion's share in the self-direction process which is an important process in problem-solving activities (Memnun, D. S. & Akkaya, R., 2009). It's claimed that strategic language learning which includes metacognitive strategies results in selfregulatory learning which is a desired goal for all language learners (Doughty & Long, 2003). As they point out, selfregulating learners are active participants of their learning process and can easily differentiate between what they know and what they don't know, resulting in the promotion of achievements. The last but not the least point in this section is that metacognitive strategies are recognized as the main predicators of academic performance. Cubukcu (2009) asserts that those language learners that consistently monitor, control and manage their learning, can easily review and retain new information.learning process so that they can control and monitor it effectively. Graham (1997) emphasizes the significant role metacognitive strategies play in individuals' educational progress, adding that those

C. Logical/Mathematical Intelligence & Metacognitive Strategies: Possible Relationship

As it was already mentioned, the basic focus of the current study is to investigate to what extent logical/mathematical intelligence and metacognitive strategies are related together. However, it's claimed that logical/mathematical intelligence is the true manifestation of the Multiple Intelligences theory; in other word, MI theory is represented mostly through the logical/mathematical intelligence (Veemana & Spaansa, 2005). So when we point to intellectual ability in this section, we mostly mean logical/ mathematical intelligence. Veeman & Verheij (2003) point out that there are three basic models to describe the possible relationship. The first model, namely known as "intelligence model", regards "metacognitive strategies as manifestation of intellectual ability". According to this model, intellectual ability and metacognitive strategies are cause and effect for each other and consequently can't stand freely as independent phenomena; this is in line with Sternberg's triarchaic theory of intelligence (Veeman & Verheij, 2003). According to the second model, "contrasting model", intellectual ability and metacognitive strategies are totally independent predicators of learning; as it's clear, the proponents of this model assume that logical/mathematical intelligence which is a true representative of the MI theory is not related to metacognitive strategies and consequently they function independently. The last model, namely known as "mixed model", assumes that metacognitive strategies and intellectual ability are

related together to a certain degree; later on metacognitive strategies occupy the top of intellectual ability. Therefore, metacognitive strategies are regarded as efficient tools for predicating the individuals' learning (Veeman & Verheij 2003). Other researchers, like Stankov (2000), believe that metacognitive strategies are functioning independently of intellectual ability (Veeman & Spaansa 2005).

However, as Gardner (1983) cautions the components of MI are culture-bound; so researchers are advised to be extremely cautious when generalizing the outcomes to different cultures (Almeida, Prieto, Ferreria, Bermejo, Ferrando & Ferrandiz, 2010). Moreover, as Bayer (1990, 1998, 1999) points out, sex differences have been observed in the self-evaluation tasks related to intelligence; so researchers are suggested to be extremely conservative when generalizing the outcomes of gender differences to different social and psychological realms (Furnham, 2001).

III. METHOD

A. Participants

Ninety eight EFL learners of English at Tarbiat Moallem University participated in this study; 55 females and 43 males were involved in our study. They aged within 18 to 23. They were all studying English at intermediate and upper-intermediate levels.

B. Instrumentation

In order to measure students' logical/mathematical intelligence, the Persian version of MIDAS (multiple intelligences development assessment scales) (See Appendix A) was utilized. To avoid the possible problems related to students' language proficiency, the Persian equivalent of the logical/mathematical intelligence was administered among the students. It contained 17 likert type questions. Moreover, we used the Persian version of MARSI (Metacognitive Awareness of Reading Strategies Inventory) (See Appendix C) to measure their metacognitive strategies. This questionnaire contained 30 questions which assessed students' global, supportive and problem solving strategies. Again, the Persian equivalent of the test was utilized to avoid any possible complexity on the part of students.

C. Procedure

We used two questionnaires to measure both logical/mathematical intelligence and metacognitive strategies Iranian EFL learners used in their reading comprehension process; first of all, all the 98 students were asked to answer the logical/mathematical intelligence test. The test contained likert-type questions and the subjects were assumed to choose the best answer based on their desire and interest. The questions were all related to problem-solving activities that measured the subjects' logics, planning, and mathematical ability. Furthermore, in order to investigate what sort of metacognitive strategies they used in their reading comprehension process, they were requested to answer a questionnaire of metacognitive strategies. This test, again, contained likert-type questions which primarily focused on three basic metacognitive strategies namely as global reading strategies, problem solving strategies and supportive reading strategies. Moreover, all of the subjects were asked to specify their gender because the effect of gender was under investigation and crucially influenced the outcomes of our study. Later, using Pearson correlation, we analyzed the data obtained from each individual participant; using Pearson correlation, we analyzed the obtained data and it was revealed that logical/mathematical intelligence had a significant relationship with all levels of metacognitive strategies students may apply in their reading comprehension process.

IV. RESULTS AND DISCUSSION

As table No.1 shows, logical/mathematical intelligence proved to have a significant relationship with metacognitive strategies Iranian EFL learners applied in their reading comprehension process. The above-mentioned relation is 0.596 which is significant (p<.001). In other words, those students who apply logical/mathematical intelligence do apply metacognitive strategies while reading and are regarded to be better problem solvers. Considering the relationship between logical/mathematical intelligence and each of the metacognitive strategies sub-skills, it's noteworthy to mention that logical/mathematical intelligence had a significant relationship with problem solving strategies (r=0. 428), global reading strategies (r=0.345) and supportive reading strategies (r=0.381). As the following table shows, regarding the correlation between logical/mathematical intelligence and each of the metacognitive strategies sub-skills, Pearson correlation can be summarized as p<.001, p<.01 and p<.001. Needless to mention, logical/mathematical intelligence had a stronger relationship with problem solving strategies (r=.428).

		LMI	PROB	GLOB	SUP	MCST
LMI	Pearson Correlation		.428**	.345**	.381**	.596**
	Sig. (2-tailed)		.000	.001	.000	.000
Prob	Pearson Correlation			.096	.264**	.699**
	Sig. (2-tailed)			.348	.009	.000
GLOBE	Pearson Correlation				.008	.619**
	Sig. (2-tailed)				.935	.000
SUP	Pearson Correlation					.610**
	Sig. (2-tailed)					.000
MCSt	Pearson Correlation					
	Sig. (2-tailed)					

 TABLE NO. 1:

 ON MATRIX FOR LOGICAL/MATHEMATICAL INTELLIGENCE AND

**. Correlation is significant at the 0.01 level (2-tailed).

Considering males vs. females' performance, it's worth to mention that males surpassed females in the application of logical/mathematical intelligence. To put it differently, males and females didn't show any significant difference regarding the application of metacognitive strategies while males had a better performance in the application of logical/mathematical intelligence. Taking into account the mean for each group (M=85.88 for males and M=78.00 for females), our males' better performance is vividly depicted in the following table (T=2.181, P<.05).

				IA	BLEZ:				
	Сом	IPARISON OF	LOGICAL/MA	ATHEMATIC	AL INTELLIGEN	CE IN MALES A	AND FEMA	LES	
	males			Female	s				
Variable	Ν	М	SD	Ν	М	SD	df	Т	Р
IMI	12	05 00	10.00	55	78.00	17 22	06	2 1 9 1	022

As Graph No.1 depicts clearly, males and females didn't show a sharp difference in the application of metacognitive strategies sub-skills namely global reading strategies, problem solving strategies and supportive reading strategies. However, regarding logical/mathematical intelligence, males' performance was better than females' performance.



Male and female comparison in logical/mathematical intelligence and metacognitive strategies usage

V. CONCLUSION

The present study tried to investigate the existing of any possible relationship between logical/mathematical intelligence and metacognitive strategies Iranian EFL learners used in their reading comprehension process. Moreover, it also investigated the effect of gender on the relationship. We used MIDAS (multiple intelligences development assessment scales) in order to measure students' logical mathematical intelligence. Furthermore, to measure the metacognitive strategies they used, MASRI (Metacognitive Awareness of Reading Strategies Inventory) was used. Using Pearson correlation, we analyzed the obtained data. Data analysis revealed that logical/ mathematical intelligence had a significant relationship with metacognitive strategies in EFL context. Moreover, males and females, except for logical/mathematical intelligence usage, didn't have any significant difference in the application of metacognitive strategies. Although we found a significant relationship, caution should be observed in generalizing the outcomes to other situations in other contexts. In other word, the results show that it's definitely necessary to conduct more studies with larger samples in order to make it possible to generalize our outcomes.

APPENDIX A. LOGICAL/MATHEMATICAL INTELLIGENCE QUESTIONNAIRE (THE PERSIAN EQUIVALENT) MODIFIED FORM THE MIDAS BY C. B. SHEARER (1996)

یرسشنامه هوش ریاضی- منطقی

جنسیت: مذکر مونث دانـشجوی محترم لـطفـا" پـس از خوانـدن سوالات زيـر، يـکی از شش گـزيـنه ی ذکـر شده را انتخاب نمایید. 1) در کودکی، آیا درس ریاضیات را مثلا جمع و تفریق و ضرب را زود و به راحتی فرا می گرفتید؟ 1) اصلا 2) نےسبتا مشکل بود 3) نےسبتا سادہ بود 4) خیلی سادہ بود 5)ازهمه بچه ها سریعتریاد میگرفتم 6)نمی دانم 2) در دوران مـدرسه آیا شما نـسبت بـه ریـاضیات علاقـه یـا مـهارت ویـژه ای داشتید؟ 1) خیلی کم یا ہیچی 2)شاید کمی 5)خیلی زیاد 6)نمی دانم 3)تا حدودی 4)بیش از حد متوسط 3)در مورد ریاضیات پیشرفته مانند جبر یا حساب دیفرانسیل و انتگرال چه طور؟ ا ھیچی یاد نگرفتم
) نہ خیلی خوب
) نسبتا خوب
) خوب 6)نمے دانم 4) آیا ^شما به مطالعه علوم یا حل مسائل مربوط به آن علاقه مند هستید؟ 2) کـمـی 2) کمی 3) در حد متوسط 4) بیش از حد 5) تا حد زیادی 6) نمی دانم 1) خير مـتـوسط 5) آیا شما شطرنج یا چکرز را خوب بازی می کنید؟ 2) نسبتا خوب 4) خيلی خوب 1) خير 3) خـو ب 6) نمے دانم 5) عالےی 6) آیا ^شما در انواع بازیهای کارتی و یا فکری *م*وفق هستید؟ در حد متوسط
 در حد بهتر از متوسط 5) در حد عالی 6) نمی دانم 7) آیا شما معمولا جدول حل می کنید و یا بازیهای شبیه به جدول را دوست دارید؟ 1) مرگز 2) بـه نـدرت 5) ^ممیشه 6) نمی دانم 3) گاھى 4) اغلب 8) آیا شما از سیستم خوبی برای تراز کردن حسابهای یک دسته چک و یا رسم یک طرح بودجة برخوردار هستيد؟ 1) اصلا 2)نسبتا خوب 3) خوب 5) عالى 6) نمى دانم 4)خيلى خوب 9) آیا شما حافظه خوبی در به خاطر سپردن اعداد مثلا شماره تلفن یا آدرس دارید؟ 1) نـه خيلی خوب 2) نـسبتا 5) عالی 6) نمی دانم 4) خیلی خوب 3) خوب 10) شما در محاسبه اعداد در ذهنتان (به طور ذهنی) چگونه هستید؟ 1) نمیتوانم انجام دهم 2) نه خیلی خوب 3) نسبتا 4) خوب 5) عالی 6) غی دانم 11) آیا شما کنجکاوید تا از علت و چگونگی هر چیزی سردر آورید؟ 1) به ندرت 2) گاهی 3 همیشه 5) شمیشه 6) نمی دانم 4) تقرىيا

12) شما در طرح روشهایی برای حل مشکلات طولانی مدت و پیچیده مثلا برنامه ریزی برای زندگیتان چگونه هستید؟ 1) اصلا خوب نیستم 2)نسبتا خوب 3) خوب 4) بهتر از حد معمول 5) عالی 6) نمی دانم 13) آیا شما نسبت به طبیعت مثلا ما هیها، حیوانات، گیاهان، ستارگان و سیارات كنجكاو مستيد؟ 1) به ندرت 2) گاهی 3) اغلب 4) تقریبا همیشه 5) همیشه 6) نمے دانم 14) آیا شما از تهیه کـلکسیون اشیا ازیافتن هرگونـه اطلاعات در مـورد مـوضوع خـاصی مانند عتیقه، اسبها ویا مثلا بیس بال لذت می برید؟ 1) اصلا 2) کمی 3) گاهی 4) اغلب همیشه 6) نمی دانم 5) تقریبا 15) شما نسبت به مشاغل وپروژه هایی که به کارگیری ریاضیات یا نظم دادن امور در آنها زیاد است، چگونه هستید؟ 1) اصلا خوب نیستم 2) نسبتا خوب 3) خوب 4) خیلی خوب 5) عالی 16) خارج از محیط مدرسه، آیا شما از کارکردن با اعداد مثلا محاسبه میانگین استیازات بازی بیس بال یا میزان مَصرفَ سَوَحْت در کیلومتر و یا نمودارهای بودجه و (4 17) آیا شما توانایی خوبی در طراحی فعالیتهای اجتماعی، کارهای تعمیراتی در منزل و یا تعمیرات مکانیکی دارید؟ 1) گاهی 2) معمولا 3) اغلب 4) تقریبا همیشه 5) همیشه

APPENDIX B. METACOGNITIVE AWARENESS OF READING STRATEGIES INVENTORY (MARSI) VERSION 1.0

_ Kouider Mokhtari and Carla Reichard © 2002 _

DIRECTIONS: Listed below are statements about what people do when they read academic or school-related materials such as textbooks, library books, etc. Five numbers follow each statement (1, 2, 3, 4, 5) and each number means the following:

- 1 means "I never or almost never do this."
- 2 means "I do this only occasionally."
- 3 means "I sometimes do this." (About 50% of the time.)
- 4 means "I usually do this."
- 5 means "I always or almost always do this."

After reading each statement, circle the number (1, 2, 3, 4, or 5) that applies to you using the scale provided. Please note that there is no right or wrong answer to the statements in this inventory.

TYPE	STRATEGIES	SC.				
GLOB	1. I have a purpose in mind when I read.	1	2	3	4	5
SUP	2. I take notes while reading to help me understand what I read.	1	2	3	4	5
GLOB	3. I think about what I know to help me understand what I read.	1	2	3	4	5
GLOB	4. I preview the text to see what it's about before reading it.	1	2	3	4	5
SUP	5. When text becomes difficult, I read aloud to help me understand what I read.	1	2	3	4	5
SUP	6. I summarize what I read to reflect on important information in the text.	1	2	3	4	5
GLOB	7. I think about whether the content of the text fits my reading purpose.	1	2	3	4	5
PROB	8. I read slowly but carefully to be sure I understand what I'm reading.	1	2	3	4	5
SUP	9. I discuss what I read with others to check my understanding.	1	2	3	4	5
GLOB	10. I skim the text first by noting characteristics like length and organization.	1	2	3	4	5
PROB	11. I try to get back on track when I lose concentration.	1	2	3	4	5
SUP	12. I underline or circle information in the text to help me remember it.	1	2	3	4	5

PROB	13. I adjust my reading speed according to what I'm reading.	1	2	3	4	5
GLOB	14. I decide what to read closely and what to ignore.	1	2	3	4	5
SUP	15. I use reference materials such as dictionaries to help me understand what I read.	1	2	3	4	5
PROB	16. When text becomes difficult, I pay closer attention to what I'm reading.	1	2	3	4	5
GLOB	17. I use tables, figures, and pictures in text to increase my understanding.	1	2	3	4	5
PROB	18. I stop from time to time and think about what I'm reading.	1	2	3	4	5
GLOB	19. I use context clues to help me better understand what I'm reading.	1	2	3	4	5
SUP	20. I paraphrase (restate ideas in my own words) to better understand what I read.	1	2	3	4	5
PROB	21. I try to picture or visualize information to help remember what I read.	1	2	3	4	5
GLOB	22. I use typographical aids like bold face and italics to identify key information.	1	2	3	4	5
GLOB	23. I critically analyze and evaluate the information presented in the text.	1	2	3	4	5
SUP	24. I go back and forth in the text to find relationships among ideas in it.	1	2	3	4	5
GLOB	25. I check my understanding when I come across conflicting information.	1	2	3	4	5
GLOB	26. I try to guess what the material is about when I read.	1	2	3	4	5
PROB	27. When text becomes difficult, I re-read to increase my understanding.	1	2	3	4	5
SUP	28. I ask myself questions I like to have answered in the text.	1	2	3	4	5
GLOB	29. I check to see if my guesses about the text are right or wrong.	1	2	3	4	5
PROB	30. I try to guess the meaning of unknown words or phrases.	1	2	3	4	5

APPENDIX C. THE PERSIAN VERSION OF MARSI ADAPTED BY SAJAD DAVOUDI

توضیحات: پرسشنامه زیر در رابطه با کارهایی است که افراد در هنگام خواندن صتون درسی یا دانشگاهی انجام می دهند. در مقابل هر جمله پنج گزینه وجود دارد. معنای عدد هر گزینه به ترتیب عبارت است از: = صن هرگز یا تقریبا هیچ گاه این کار را انجام نمی دهم. (1)= من فقط گا هی این کار را انجام می دهم. (2) = من بعضی اوقات این کار را انجام می دهم.(تقریبا نیمی از اوقات) (3) = منّ اغلبَ این کار را انجام می دهم. (4) = من همیشه یا تقریبا همیشه این کار را انجام می دهم. (5)

1	2	3	4	5	شرح گربه	رديف
					من هنگام خواندن هر متنی، هدفی ر ا دنبال می کنم.	1
					من با یادداشت بر داری هنگام خواندن به فهم متن کمک می کنم.	2
					من با رجوع به دانسته های قبلی ام به درک متن کمک می کنم.	3
					من بر ای آگاه شدن از کلیت مطلب قبل از خواندن دقیق متن، آن را به صورت اجمالی بر انداز می کنم.	4
					هنگامی که خواندن متنی مشکل است آن را بلند می خوانم تا بفهمم.	5
					من از أنچه مي خوانم خلاصه بر داري ميكنم تا بعدا به اطلاعات مهم أن فكر كنم.	6
					من به اينكه أيا مضمون متن با هدف من از خواندن أن مطابقت دار د فكر مي كنم.	7
					من بر اي اطمينان از فهم متنى كه مي خو انم أنر ا أهسته ولي با دقت مي خوانم.	8
					من بر اي سنجش فهم خود از متن در مورد آن با ديگران گفتگو مي کنم.	9
					منِ قبل از خواندن متن أن را از جهت ویژگی هایی مثل طول و ساختار برانداز می کنم.	10
					هنگامی که تمرکز م را از دست می دهم دوباره سعی می کنم حواسم را جمع کنم.	11
					من دور یا زیر مطالب مهم متن خط می کشم تا بعدا بهتر آنها را به یاد بیاورم.	12
					من سر عت خواندنم ر ا مطابق با متنی که می خوانم تنظیم می کنم.	13
					من تصميم مي گير م كدام قسمت ها را به دقت بخوانم و از كدام قسمت ها بي توجه بگدرٍم.	14
					منِ از کتاب های مرجع مانند دیکشنری ها بر ای فهمیدن متنی که می خوانم کمک می گیرم.	15
					هنگامی که متنی دشوار می شود بر ای فهم بهتر ، آن را با توجه بیشتری می خوانم	16
					برای فهم بهتر مطلب از جدول ها،امار و تصاویر موجود در متن استفاده می کنم	17
					هنگام خواندن متون گهگاه مکث می کنم و در مورد آنچه خوانده ام فکر می کنم.	18
					من از سرنخ های موجود در متن بر ای درک بهتر ان کمک می گیرم.	19
					برای فهم بهتر متن آن را به زبان ساده بر ای خودم تکرار می کنم.	20
					بر ای به خاطر سپردن مطالب سعی می کنم انها را در ذهنم تجسم کنم.	21
					هنگامی که قسمتی از متن پررنگ یا مایل نوشته شده است متوجه می شوم که ان قسمت حاوی اطلاعات مهمی می باشد.	22
					من اطلاعات موجود در متن را به صورت نقادانه تحلیل و بررسی می کنم.	23
					من هنگام خواندن متن به جلو و عقب می روم تا ارتباط بین مطالب ان را بفهم.	24
					هنگامی که احساس می کنم اطلاعات متناقضی در متن وجود دارد فهم خود را واررسی می کنم.	25
					هنگام خواندن سعی می کنم حدس بزنم متن در مورد چیست.	26
					وقتی فهم منتی دشوار است سعی میکنم ان را دوباره بخوانم.	27
					هنگام خواندن، از خودم سوالاتی می پر سم که احساس می کنم در متن به انها پاسخ داده شده است.	28
					من درست یا غلطی حدس هایم را درباره متن وارسی می کنم.	29
					من سعي مي كلم معناي لغات و عبارات نا اشنا را حدس بزنم.	30

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