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Investigating the Relationships Among Metacognitive Strategy Training, Willingness to Read English Medical Texts, and Reading Comprehension Ability Using Structural Equation Modeling

Masoumeh Hassanpour

Mashhad University of Medical Sciences

Behzad Ghonsooly

Ferdowsi University of Mashhad

Mehdi Jabbari Nooghabi

Ferdowsi University of Mashhad

Mohammad Naser Shafiee

Mashhad University of Medical Sciences

ABSTRACT

This quasi-experimental study examined the relationship between students' metacognitive awareness and willingness to read English medical texts. So, a model was proposed and tested using structural equation modeling (SEM) with R software. Participants included 98 medical students of two classes. One class was assigned as the control group and the other class was assigned as the experimental group. At first, both groups were asked to complete the Metacognitive Awareness Inventory (MAI) and the Willingness to Communicate in English questionnaire (WTC). Students of the experimental group were provided with some reading strategies, including reading for main ideas and reading for organization. At the end of the semester, all participants again completed the two questionnaires, and took a final examination achievement test. The proposed model demonstrated the significant effect at the level of 5% for metacognitive awareness before the intervention (MA1) on metacognitive awareness after the intervention (MA2), willingness to read before the intervention (WTR1) on willingness to read after the intervention (WTR2), and MA1 on WTR2. It also indicated a mutual significant effect of MA1 and WTR1, and also MA2 and WTR2. However, no significant effect of WTR1 on MA2 was observed. Also, in the experimental group, the metacognitive strategy training significantly affected MA2. Thus, the proposed model reached the acceptable fit thresholds for most of the indices. Finally, the expansion of this study may be applied to curriculum development with metacognitive strategy in EAP context, also taking measures to promote students' willingness to read in English. Our study was limited to medical students.

INTRODUCTION

As a result of a shift in research and theory in second language, concerns have changed from examining the methods of teaching to investigating the process of learning. Such a shift has led to a burst of research aimed at exploring learners' characteristics and second language acquisition (SLA) (Purpura, 1997). The aim of the present study was to investigate the relationships among metacognitive strategy training, willingness to read, and reading comprehension ability of medical students in English for Academic Purposes (EAP).

Today, an important part of English teaching is concerned with teaching English for Specific Purposes (ESP) (Dudley-Evans & St John, 1998, as cited in Gatehouse, 2001, p. 3). According to Gatehouse (2001), John Swales (1985) determines ESP as a new development in teaching English as a second/foreign language.

Teaching ESP is a considerable subject in countries like Iran. Also, as a sort of ESP, EAP (English for Academic Purposes) is conducted in higher levels of education (Carver, 1983). Inclusion of the EAP curriculum into EFL programs in undergraduate levels can develop the young adults' competence in learning both general and ESP English (Fan, 2011).

As a developing worldwide trend, the concept of English for Specific/ Academic Purposes has been revealed to be in high demand for ESL/EFL learning. Thus, many scholars have been dealing with investigation of how incorporating metacognitive strategies training into EAP curriculum can enhance ESL/EFL learners' reading comprehension. However, there are limited research studies investigating both metacognitive strategies and ESP/EAP context reading in promoting ESL/EFL learners' effective learning (Fan, 2011). For instance, Dhieb-Henia (2003) investigated the effectiveness of metacognitive strategy training for developing reading in an ESP context. Her study provided both quantitative and qualitative evidence in support of metacognitive strategy training to promote the participants' awareness of and expertise in reading ESP texts.

There are also a few research studies of willingness to read in English among EFL non-English major students. In a study by Alemi (2012), willingness to communicate in English among Iranian EFL engineering students was studied. Alemi's (2012) findings suggest that among all skills, learners showed more interests in reading, and the unwillingness to communicate inside the classes might be related to their dread of being evaluated. To date, there is a growing interest in performing and exploring the metacognitive strategies in ESP/EAP curriculum, and also the willingness to communicate among students in such a context, although they remain very limited.

In Iran, many institutions are now conducting ESP/EAP courses in such a way that meets the students' needs in reading special texts. However, there are not many universities focusing on the "issued curriculum" and current situation which indicates a gap between the general English offered at secondary schools and the academic context at the universities (Baker & Boonkit, 2004). It is believed that we have to bridge the gap between general English at high school and the ESP contexts in the universities (Dhieb-Henia, 2003).

The Iranian first-year university students are also encountered with such a situation, and are not prepared to access the English language they need at undergraduate levels and to successfully achieve their academic goals (Fan, 2011). Thus, in this study the focus is on the EAP context learning, particularly the academic reading.

The major achievements of the EAP research are that it brings about awareness for EFL teachers, EFL learners, and also material providers in EAP context and that teaching metacognitive strategies may facilitate language learning and promote willingness to read inside or outside the classroom. In this regard, the positive findings of this study may encourage the EFL teachers to

instruct metacognitive strategies in EAP classes to enhance willingness to read in English inside and outside of the class, and also their reading comprehension ability. Also, the EFL learners' awareness of metacognitive knowledge would tempt them to seek for learning metacognitive strategies. In addition, course designers and material providers would be aware of the necessity of including metacognitive strategies in the EAP context.

While a few previous studies have focused on how metacognitive strategy training facilitates language comprehension in EAP context (Dhieb-Henia, 2003; Liao & Chiang, 2008; Martínez, 2008; Yüksel & Yüksel, 2012), this study would highlight its effect on language comprehension ability of medical students, and also their willingness to read in English inside or outside the classroom.

The aim of this study was to determine the relationships among metacognitive strategy training, willingness to read English medical texts and reading comprehension ability. The participants were provided with an intervention program on theoretical knowledge of metacognition to promote general awareness of the importance of metacognition, and language learning strategies of reading for main ideas and reading for organization of a paragraph to improve their performance on the EAP reading comprehension. Thus, the present research intended to test the effects of metacognitive strategies in enhancing medical students' reading comprehension ability and also to investigate its relation to willingness to read English medical texts at an Iranian medical sciences university.

Language Learning Strategies

Over the years, language learning strategies have been researched and defined in numerous ways. In one definition, language learning strategies is “thoughts and actions, consciously chosen and operationalized by language learners, to assist them in carrying out a multiplicity of tasks from the very onset of learning to the most advanced levels of target language performance” (Cohen, 2012, p. 136). Cohen's (2007) survey among strategy experts revealed “a lack of consensus as to a unified theory, with an agreement by learner strategy experts on some concepts and definitions and not on others” (as cited in Cohen 2011, p. 681). The lack of consensus was for instance regarding the extent to which learners need to be conscious of and attentive to their language behaviors in order for those behaviors to be considered strategies (Cohen, 2011). There was an agreement as the learners use strategies in sequence or cluster. However, there was a disagreement among strategy experts about the extent to which a behavior need to have a mental component, a goal, an action, a metacognitive component such as planning, monitoring and evaluation of the strategy. In a nut shell, here, two views emerged; strategies needed to be “specific, small, and most likely combined with other strategies” to complete a task and strategies needed to be kept. They agreed that strategies lead to an enhancement in performance in language learning and use not only in general tasks but also in specific ones. In addition, employing strategies help make language learning easier, faster and more enjoyable (Cohen, 2011, p. 681).

The experts did not consider using strategies as a way to compensate a deficit. Cohen (2011) defined language learning strategies as conscious thoughts and actions that learners select to assist them in learning and to use language in general and to accomplish specific language tasks.

Language learning strategies have been classified based on different ways. In one view, strategies are classified into learning strategies and language use strategies. They can also be categorized based on skill area i.e., listening, reading, speaking, and writing strategies. From a functional view, they consist of four categories: metacognitive, cognitive, effective, and social.

Metacognition

Metacognition relates to awareness of one's own knowledge—what one does and does not know—and one's ability to understand, control, and manipulate one's cognitive processes (Meichenbaum, 1985 as cited in Woolfolk, Winne, & Perry, 2004, p. 252). Metacognition literally means cognition about cognition – or knowledge about knowledge. This knowledge is used to monitor and regulate cognitive processes such as comprehension, learning, problem solving, and reasoning (Metcalf & Shimamura, 1994). Since people are different regarding metacognitive knowledge and skills, they vary in how well and how quickly they learn (Brown, Bransford, Ferrara, & Campione, 1983; Morris, 1990 as cited in Woolfolk, et al., 2004, p. 252). On the basis of educational psychology, metacognition allows individuals to arrange goals, systematize their activities, and monitor their progress. This is very influential to the students because if they are simply aware of their learning purposes, they can recognize their own strategies that promote their understanding, skills, and performance (Woolfolk, et al., 2004). According to Anderson (2008), metacognition is the ability to reflect on what is known, and does not merely involve thinking back on an event, giving an account of what happened, and the feelings associated with it. Metacognition leads to critical but healthy reflection and evaluation of thinking that may consequently make particular changes in how learning is managed, and in the strategies selected for this purpose.

Bruning, Schraw, and Ronning (1999) as cited in Woolfolk et al. (2004), hold that metacognition includes three kinds of knowledge of declarative, procedural and conditional.

“First, declarative knowledge describes yourself as a learner; factors that influence your learning and memory; and skills, strategies and resources you believe are needed to perform a task. Second, knowledge what to do- procedural knowledge- is knowing how to use the strategies. Third, conditional knowledge is critical to complete the task because it concerns knowing when and why to apply the strategies” (p. 252).

In other words, metacognition includes knowing when and where to use specific strategies for learning and problem solving as well as how and why to use specific strategies. It is the ability to use prior knowledge to plan a strategy for approaching a learning task, undertake necessary steps to solve problems, contemplate on and evaluate results, and modify individual's approach as required (Woolfolk et al., 2004).

According to Flavell (1979 & 1987), researchers differentiate between metacognitive knowledge and metacognitive regulation. The elements of metacognition are:

- Metacognitive knowledge which refers to what we know about ourselves as cognitive processors, about different approaches that can be applied in learning and problem solving, and about the requirements of a specific learning task.
- Metacognitive regulation which refers to adjustments we make to our processes to help control our learning, such as planning, information management strategies, comprehension monitoring, debugging strategies, and evaluation of progress and goals.

Moreover, Flavell (1979) considers metacognitive knowledge in three categories of variables: First, person variables which include what individuals recognize about their strengths and weaknesses in learning and processing information; Second, task variables which comprise what individuals know or can discover about the nature of a task and the processing demands indispensable to accomplish the task—for instance, knowing how much time it will take to read and comprehend a technical article compared to a similar-length passage from a novel; And third, strategy variables which comprise the strategies an individual has available to make use of in a

flexible manner to successfully complete a task; for instance, knowledge of activating prior knowledge before reading a technical article, and using a glossary to look up strange words.

Woolfolk et al. (2004) mentioned planning, monitoring, and evaluation as the three essential skills which allow us to regulate thinking and learning. The planning involves deciding how much time to allocate to a task, which strategies to apply, how to initiate, what resources to collect, what order to follow, what to skim and what to study intensely, and so on. Monitoring is the online awareness of how I'm doing." Monitoring involves asking, "is this making sense? Am I trying to go too fast? Have I studied enough?" Evaluation involves making judgments about the processes and outcome of thinking and learning. Should I change strategies? Get help? Give up for now? Is this paper (painting, model, poem, plan, etc.) finished?, The major characteristics of metacognitive strategy use problem identification and problem solving, namely self-regulation (also referred to as monitoring) at word, clause, and text-level (p. 252).

Certainly, we do not have to be always metacognitive. Some activities become routine. Metacognition is most advantageous for challenging tasks, but not too difficult ones. Then planning, monitoring and evaluation can be useful. And even as we are planning, monitoring, and evaluating, these processes are not inevitably conscious. Especially in adults, these processes can be done automatically or implicitly. Experts in a field may plan, monitor and evaluate may have difficulty describing their metacognitive knowledge and skills (Bargh & Chartrand, 1999; Reder, 1996 as cited in Woolfolk et al., 2004, p: 253).

It is argued that successful reading strategy use depends on whether a strategy is made use of metacognitively. This to some extent justifies the fact that poor readers usually do not lack cognitive strategies but metacognitively fail to access them (Carrell, Gajdusek, & Wise, 1998). Carrell (1989) additionally demonstrated that to successfully use reading strategies was, mainly, relied on "awareness" of, and flexibility in, the use of these strategies based on the aim of the task or the problem to be solved. In second language reading programs, students who receive instruction solely in the skills or strategies, mostly fail to use them willingly and intelligently because they do not recognize the reasons why such strategies are beneficial nor do they understand where and when to use them. He maintained that to add instruction in "awareness" or knowledge about strategies' evaluation, rationale, and usefulness may largely increase the advantages of the instruction.

Poole (2012) considering metacognitive strategic knowledge as one of the issues which has received a lot of attention during the last three decades focuses on how second language (L2) learners use reading strategies, which some scholars identify as the "deliberate, goal-directed attempts to control and modify the reader's efforts to decode text, understand words, and construct meaning out of text" (Afflerbach, Pearson, & Paris 2008, as cited in Poole 2012). Furthermore, Wenden (1998) holds that successful readers have knowledge of a variety of strategies which can use them flexibly; in contrast, struggling readers are mostly aware of few strategies, which they often apply inaccurately. In a nutshell, successful readers have general knowledge about what strategies are, why they are useful, and specific knowledge about when and how to use these strategies.

To measure adult's metacognitive awareness, Schraw and Dennison (1994) devised a 52-item inventory. Items are categorized into eight subcomponents included two broader categories, knowledge of cognition and regulation of cognition.

Three subprocesses of declarative knowledge (i.e., knowledge about self and about strategies), procedural knowledge (i.e., knowledge about how to use strategies), and conditional knowledge (i.e., knowledge about when and why to use strategies) that assist the progress of the

reflective aspect of metacognition comprise the knowledge about cognition. A number of subprocesses that help the control aspect of learning comprise regulation of cognition. Planning, information management strategies, comprehension monitoring, debugging strategies, and evaluation are five component skills of regulation (Artzt & Armour-Thomas, 1992; Baker, 1989 as cited in Schraw & Dennison, 1994).

There are numerous language learning strategies which can be taught to promote students' language learning. These strategies may target any of the four language skills of reading, writing, listening, and speaking.

Utilizing two strategies of reading for main ideas and reading to discover organization, this study focused on reading comprehension ability of medical students and investigated its relation to willingness to read in English.

During the reading process, the individual dynamically integrate skills, which have been combined and recombined for each new reading task. To read effectively the purpose, comprehension, speed, vocabulary, and vision, as well as background and previous experience are involved. College students are required to read so much material that they cannot possibly remember more than a portion of what was read. When you know what you wish to gain from your reading, you will be able to decide which type of comprehension you want to work toward (University of Minnesota, 2003).

Main Idea Comprehension

As stated by University of Minnesota (2003), when it comes to comprehension skills, selecting the main idea of a given text is of high value, which includes the ability of extracting important ideas among many minor and major ideas. This type of reading can be utilized when a given text is going to be covered for the first time.

A single main idea is expounded in a given paragraph in most textbooks. These ideas may range from describing a painting, listing the symptoms of a disease, discussing the benefits of teaching machines or illustrating how to seed the clouds to introducing a subject matter or providing a conclusion. But all of the sentences in the paragraph follow a common purpose, which is developing the main idea. Although, this is not correct in all occasions, in most cases the main thought can be found in the beginning of the paragraph (University of Minnesota, 2003).

Reading to Discover Organization

University of Minnesota (2003) defined reading for organization as a tool to recognize how the author has designed his/her material. If we do not get how an idea is organized and how its constituent parts are related to each other, it becomes very difficult to grasp and remember the idea. In order to understand and remember the ideas of a new and difficult task, an individual must practice to improve his/her fundamental skills in finding the organizational patterns of the reading text.

When the reader has to associate individual ideas to larger ones, the case of grasping written materials becomes more obvious. In fact a reader will be able to organize a lot of sentences into a whole idea if s/he understands the reading deeply, which depends on his/her skills of understanding.

Understanding and remembering a reading material can be improved through some practices like organizing different ideas into larger meaningful units. Five parts of organization are enumerated here: 1) introduction, 2) problem, 3) body, 4) transitions, and 5) summary.

The introduction is the first part of each reading material. It may be in the preface of the book, in the beginning of the first chapter and/or in the first paragraphs of each chapter. The problem, goal, or argument is usually discussed in the preface of the book and the beginning of the chapters. The body of the book and the chapter usually contains the most part of the material, i.e., nine-tenths of the whole. It consists of the accurate data presentation or description of the steps by which the author explains a problem. After grasping the problem, goal, or argument, the reader must try to find out how the author has developed and supported it. To remember the ideas, we need to group the facts and data in a meaningful way. Transitions or guideposts are appropriate tools for organizing the facts. They show the relationship among ideas and imply that the author is going through different ideas. Transitions can be scrutinized and detailed. For example: "Having discussed five causes for the flooding of our farm land, I would now like to turn to a consideration of ways to avoid such catastrophes in the future." Or they may be very simple and contain a mere phrase: "In contrast to," "on the other hand," "at the other extreme," "what was the result?" In most cases, a detailed transition is used when the author wants to take the reader from one main part to another part with the same importance. In order to take the readers from a main_idea to a subordinate idea or to indicate the relationship between two ideas in the same paragraph shorter transitions are used. At last, the author uses summary or conclusion to consolidate and recite the main points which were already discussed in the previous parts. In many cases, an internal summary is used by the author to repeat the essential aspects of a small part of a chapter. We should be aware of the amount and significance of the material which has been summarized, no matter where it is; within the chapter or at the end (University of Minnesota, 2003).

Willingness to Read in English

Willingness to communicate (WTC) has been defined as the intention to initiate communication, providing an opportunity to (MacIntyre, Baker, Clément, & Conrod, 2001).

WTC was originally developed to describe individual differences in L1 communication. The origin of WTC can be seen in a number of related constructs. Burgoon (1976) as cited in MacIntyre et al. (2001) defined the construct "unwillingness to communicate" as a predisposition to persistently beware of oral communication based upon some factors for instance introversion, lack of communicative competence, estrangement, anomy, and fear of communication.

As a slightly more specific construct, McCroskey and Baer (1985) described WTC as the "intention to initiate communication given the opportunity". This delicate change in definition allows for obvious links to the extensive behavioral-oriented studies and concentrates research on the plurality of factors that lead to such an intent as communication in a second language (as cited in MacIntyre et al., 2001).

MacIntyre et al. (2001) studied the willingness to communicate, social support, and language-learning orientations of immersion students. They examined five orientations or reasons for studying an L2 including travel, job related, friendship with Francophones, personal knowledge, and school achievement. Their results showed that confirmation of all five orientations for language learning was favourably correlated with WTC both inside and outside the classroom. The findings also indicated a higher association between social support, especially from friends, and levels of WTC outside the class but a less effect on levels of WTC inside the class. It also

showed that the support of friends was associated with greater orientations for travel and for friendship with Francophones.

The results of a study of willingness to communicate in English among Iranian non-English major university students by Author (2012) showed that L2 self-confidence and attitudes toward international community were two predictors of L2 WTC in Iranian context.

In this study, the willingness to read in English as one of the four components of willingness to communicate was addressed.

English for Specific/Academic Purposes

ESP/EAP, as suggested by Ajideh (2009), is a movement based on the idea that all language teaching programs should be devised for a specific domain of learning. Real communication and learners' particular needs and interests are the main goals of ESP/EAP. Hutchinson and Waters (1987) discussed that language learners use English as a language for their "authentic application purposes, rather than focusing on the features of language".

EAP particularly concerns students' academic needs along with their future occupational needs in the academic context. It is essential for students to improve in their majors and to gain academic achievements. EAP tries to fulfill this end through presenting different ways of language learning using various learning methods and strategies. Thus, applying meta-cognitive strategies in EAP is, "the right tool for the right task" (Balota, Paul, & Spieler, 1999).

Fan (2011) described how we can incorporate the meta-cognitive strategies into EAP in the following three sections:

English for Academic Purposes (EAP)

University students in Iran learn English language not just for learning general English but also for academic purposes. They have to relate English language to their majors such as medicine, engineering, economics, business, etc. In academic settings, reading is apparently the most beneficial skill. Through reading the students can get new information and other interpretations about their majors. Whether the students' goal of language learning is to improve knowledge of their majors or their general English skills, reading is an important means for self-learning. Thus, the EAP curriculum should "account for how students learn to read for multiple purposes, including at least the reading 1) to search for information, 2) for general comprehension, 3) to learn new information, and 4) to synthesize and evaluate information" (Grabe & Stoller, 1997). In other words, students should be able to understand academic textbooks, academic papers and journals, book reviews, literature reviews, research proposals to fulfill "specific needs of the learner...use of the underlying methodology and activities of the disciplines it serves"... and be related to [their] specific disciplines" (Dudley-Evans & StJohn, 1998a, as cited in Gatehouse, 2001, p. 3). Therefore, various goals in reading play an important role in both their content curriculum and their academic achievement.

The Distinction between General English and Academic English

Since in recent eras, the students' inclination for studying abroad especially in English speaking countries has increased, ESL programs has been improved at secondary and undergraduate levels. However, mostly the ESL programs which are aimed at teaching general language skills cannot fulfill the students' academic ends. In most cases, ESL students are facing

with hardship in learning different genres and kinds of academic writing, authoritative lecture discourse, reading for pleasure, and most importantly, analytical information processing which are particularly related to the subject matter (Sager, 2002).

As a whole, Iranian university students mostly consider English language as a means for their academic purposes rather than as an end in itself.

The Advantages of Employing Metacognitive Strategies in Academic Reading

Many institutes in the U.S have been searching for appropriate teaching methods to help the students adapt themselves to the academic culture and educational curriculum. In this way, they make connection between students' English proficiency at the secondary and undergraduate levels (Sager, 2002). As well, some universities in Iran have also been implementing some teaching programs to assist their students to improve their English proficiency levels and also adapt to their academic studies. This suggests that employing meta-cognitive strategies including planning, monitoring, and self-regulation is favorable in Iranian educational institutions.

Mere understanding of the meaning and structure of sentences is not enough for academic purposes; besides, a learner need to be able to conform to academic expectations. Students who have a "command of [academic] language" will be able to express their ideas concisely and reflectively and have "fully functioning communication skills" (Hughes, 1989, p. 11). Therefore, EAP can improve English language undergraduate students' levels of proficiency. Due to this fact, if Iranian teachers adapt learning strategies to the students' specific needs and facilitate academic learning, the students' language proficiency will improve along with their academic achievement. There are many research studies applying meta-cognitive strategies to ESL/EFL students' reading comprehension. As an instance, in order to examine how reading strategies can be taught efficiently and to understand the impact of reading strategies on the process of learning, Carrell (1989) employed semantic mapping and experience-text-relationship training in second language reading as meta-cognitive strategies. The results of the study showed that meta-cognitive strategy training is an influential factor in later improvement of ESL reading in contrast to the control group which had no strategy training. Wenden (1998) also conducted a study to find out the use of meta-cognitive knowledge in learning. The findings revealed that meta-cognitive knowledge needs to be considered as a need for self-regulation in learning. Hence, when learning starts, decisions should be made and afterwards processes need to be monitored in order to regulate the accomplishment of a learning task. In other words, the evaluation of progress and problems and self-observation need to be used. These findings support the "practice-based intuition" of both English as foreign and second language teachers and researchers who justify the important role of meta-cognitive knowledge and strategies in language learning.

Bromeley and Tan (2006) performed a study of metacognitive strategy instruction (MSI) for reading to show how a teacher and ESL learners can successfully involve in mutual regulation of strategy use when they co-construct meaning from the reading material. Their study found that both the high-proficient and low-proficient learners profited fairly well from the metacognitive strategy training sessions. The learners acknowledged the effect of these strategies in facilitating their reading process. Additionally, the major issue revealed in the study is that these sessions at least have the advantages to "prepare if not transform the learners into becoming metacognitively sophisticated readers". In another study conducted by Boulware-Gooden, Carreker, Thornhill, and Joshi (2007), the metacognitive reading comprehension instruction significantly improved the academic achievement of third-grade students in the areas of reading comprehension and vocabulary compared to the other instruction provided to the students in another school. They

found that the study's intensity and the systematic instruction of metacognitive strategies resulted in "positive effects for understanding written text, which is the reason for reading". Rahimi and Katal (2012) in their overview of the result of scholarly work on metacognitive strategies awareness and success in learning English as a foreign language showed that those learners who take conscious measures to apprehend what they are doing and make use of a higher variety of strategies are inclined to be the most successful learners. Also, their work evidently demonstrated that employing metacognitive strategies permits learners to plan, control, and evaluate their learning that finally helps them attain higher achievement and better learning outcome in either face to face or virtual learning methods. Rahimi and Katal (2012) concluded that more research is needed to discover the role of metacognitive knowledge in delineating the effectiveness of individuals' efforts to learn another language, specifying the characteristics of good language learners, and the kind of strategies they employ in a given language task. Another study determined the Turkish university students' metacognitive awareness of academic reading strategies. In this study, the students' metacognitive awareness of global, problem-solving and support reading strategies employed in academic reading were investigated through the survey of reading strategies. Results of the study demonstrated that the students usually used academic reading strategies; therefore they were mostly conscious about these strategies. In addition, they often employed and were aware of problem-solving strategies but the supporting strategies was least used in academic reading (Yüksel & Yüksel, 2012).

Many research studies are also available which investigate learning strategies either in reading or writing in ESP/EAP context. Hudson (1991) study is an instance of ESP project planned for and integrated with the student's reading comprehension strategies and motivation to learn contents via the reading process for Science and Technology at the Universidad de Guadalajara in Mexico. The finding indicated significant improvement by the learners after the strategy instructions. In order to determine to what the extent of improvement in the learners' writing ability in an ESP context by genre-based instruction, another study was conducted in which 34 participants were randomly assigned to two groups: the genre group and the non-genre group. The former group used genre-based ESP materials, and the latter used more traditional approach materials. The findings indicated that the genre group had significant improvement on two scales, and the nongenre group did not demonstrate improvement. So, the content comprehension assisted students to improve their ESP/EAP reading comprehension and also their general language reading ability (Ellis, Johnson, Henry, & Rosenberry, 1998).

In an ESP context study, Dhieb-Henia (2003) also evaluated the effectiveness of metacognitive strategy training for reading research articles. The study provided evidence of the benefits of metacognitive strategy instruction in improving the participants' familiarity with and proficiency in reading research articles. Comments of Basturkmen (2006) who investigated the ideas and options in English for specific purposes on review of Dhieb-Henia (2003) work indicated that although learners in second-language reading programs may be provided with training in reading strategies, they may fail to employ such strategies because of a lack of awareness about why the strategies are required, and where and when to use these strategies.

In spite of a good deal of research studies on effective learning in reading or writing either with metacognitive strategies or EAP context, there has been few research combining both concepts together. A few research studies are described below:

Employing Oxford's (1990) categorization of six classes of learning strategies of memory strategies, cognitive strategies, compensation strategies, metacognitive strategies, affective strategies and social strategies, Baker and Boonkit (2004) investigated the effect of such learning

strategies on Thai learners' EAP context in reading and writing. They used the text structure to investigate EAP related to the Thai context. Their finding demonstrated metacognitive, cognitive and compensation strategies were in overall the most commonly used strategies. Two particular problems faced with by second language university students participating courses in EAP are expository texts and reading-to-write tasks (Evans, 2011). Exploring these two problems, Evans (2011) used the reading reaction journal to activate different reading strategies such as metacognitive reading strategies, note taking from a text, and ongoing major reactions to promote students' reading and writing abilities by EAP students. The findings confirmed that the journals can really accomplish such a task. The results of another study of the effects of metacognitive strategy instruction on reading comprehension of English for Science and Technology (EST) indicated that in comparison to standard reading instruction, the metacognitive strategy instruction was significantly more effective in advancing learners' EST reading comprehension. In this study, administration of subsequent open-ended questionnaire to the experimental group indicated affirmative perceptions of the training usefulness, and the responses indicated varying views regarding the three metacognitive strategies (Liao & Chiang, 2008). Martínez's (2008) study of ESP university students' reading strategy awareness demonstrated a moderate to high total use of reading strategies and showed higher reports of problem-solving and global reading strategies use by the learners. It was further observed that females report significantly greater frequency of strategy use and have a tendency to use support reading strategies more than males. In a comparative analysis of reading strategies across ESP students of humanities and engineering by Vaez Dalili and Tavakoli (2013), 70 lower-intermediate students (35 engineering students and 35 students of humanities) were investigated. Their findings indicated that despite the fact that the two groups were majoring different fields of study, they reported reading strategy awareness with remarkably similar patterns and acknowledged having employed nearly all of the strategies while reading ESP materials. However, in this study, as compared to the humanities students, the engineering students reported more common use of some types of reading strategies. Accordingly, they concluded that findings of the research will not only account for the differences and similarities between engineering and humanities students, but also help to question the simply theoretical assumption in respect of the humanities students' weaknesses in strategy-based ESP reading comprehension.

Review of the literature regarding the effect of reading strategy training on main idea identification shows a few studies focused on this comprehension skill. The effects of strategy training on the identification of the main idea of expository passages were investigated by Stevens (1988). His results suggested that both comprehension strategies and metacognitive strategies can efficiently promote remedial ability of the readers to recognize the main idea of the paragraphs. Another study by Stevens, Slavin, and Farnish (1991) on the effects of cooperative learning and direct instruction in reading comprehension strategies on main idea identification showed that students in the two treatment programs which included direct instruction of strategies for main idea identification performed significantly more desirable than students of control group in recognizing main ideas of passages. The research outcomes of Wilawan (2007) showed that participants receiving instructional treatment which consisted of lexical cohesion and metacognitive strategies performed better than students in the other two groups on the main idea construction post-test though the results were statistically insignificant. The findings of Wilawan (2007) were suggestive of the learner's improvement in main idea construction as related to bottom-up, top-down, and metacognitive strategic processes applied interactively by them. The results also suggested that the use of lexical relations had a significant effect on establishment of

EFL students' mental representations of English reading texts. In his next study, Wilawan (2012) concentrated on the combined use of cognitive and metacognitive processing strategies to advance main idea construction by EFL readers. Building on his previous study, Wilawan (2012) argues that, in the process of constructing main ideas by the EFL learners, further support in knowledge and skills in the fundamental elements of text understanding at the lower level is usually required. He acknowledges that both higher-level cognitive processes and metacognitive strategies are of equal importance. His work suggests some possible guidelines for teaching main idea identification at each level of processing. It also provides EFL readers with some modifications to strategy instruction to fit their needs (Wilawan, 2012).

Metacognitive strategies have a major effect on students' EAP context learning. However, still there are limited literature reviews by the authors in this area and the research questions posed in these studies have not been good enough. Besides, since EAP classes aim to empower students with willingness to read and to our knowledge there is no study to explore the relation between metacognitive strategy training and willingness to read, so there was a need for the researchers to conduct a study to explore whether there are relationships among metacognitive strategy training, willingness to read English, and reading comprehension ability of the Iranian medical students.

METHODOLOGY

Participants

The study participants were 98 medical students of Mashhad University of Medical Sciences, Mashhad, Iran. The first language of all students was Persian, except for one Arab student in the study group. The number of female students amounted to 43 (43.9%) and that of the male participants corresponded to 55 (56.1%). Females constituted 21 (42.9%) in the experimental group and 22 (44.9%) in the control group. The mean age was 18.85 years. All of them had successfully passed the Iranian University Entrance Exam (Konkur) and were able to attend the language course of the semester. The study was conducted with students who formed two classes, each with an equal number. All of the students were studying in their first year (second semester) and were taught medical English in their educational programs. Students in class one were randomly assigned to the experimental group with metacognitive strategy training and students of the other class were assigned to the control group with no metacognitive strategy training. The teacher of the control group was recommended not to teach metacognitive strategy in the class.

Instrument

Three instruments were administered: (a) two Likert rating-scale questionnaires including metacognitive awareness inventory and willingness to communicate questionnaire; (b) their medical textbook, English for the students of medicine; and (c) a multiple-choice test for the purpose of final examination. Likert rating-scale questionnaire included metacognitive awareness inventory which was adopted from Schraw and Dennison (1994). This questionnaire includes 52 statements investigating two categories of metacognition; knowledge of cognition and regulation of cognition with their subcomponents. Items are mixed and not divided into these categories (Schraw, 1998). All the items are in five-point Likert scale, ranging from 'strongly agree' to 'strongly disagree'. Numbers of statements dealing with each category are shown in Table 1.

Table 1. Number of Factors and Their Relevant Minimum and Maximum Scores in the Metacognitive Awareness Inventory

Factors	Statements in the Inventory	Number of Items	Minimum Score	Maximum Score
DK	5, 10, 12, 16, 17, 20, 32, and 46	8	1	5
PK	3, 14, 27, and 33	4	1	5
CK	15, 18, 26, 29, and 35	5	1	5
P	4, 6, 8, 22, 23, 42, and 45	7	1	5
IMS	9, 13, 30, 31, 37, 39, 41, 43, 47, and 48	10	1	5
M	1, 2, 11, 21, 28, 34, and 49	7	1	5
DS	25, 40, 44, 51, and 52	5	1	5
E	7, 19, 24, 36, 38, and 50	6	1	5

Note: DK: Declarative Knowledge, PK: Procedural Knowledge, CK: Conditional Knowledge, P: Planning, IMS: Information Management Strategies, M: Monitoring, DS: Debugging Strategies, E: Evaluation.

The other Likert rating-scale questionnaire was willingness to communicate questionnaire which was adopted from MacIntyre et al (2001). It measures each of four skill areas of speaking, writing, reading, and comprehension inside and outside the classroom. This questionnaire comprises two parts of willingness to communicate in English inside and outside the classroom. Part one includes four components of speaking inside the class, in English; reading inside the class (to yourself, not out loud); writing inside the class, in English; and comprehension inside the class. Part two comprises four components of speaking outside the class, in English; reading outside the class, in English; writing outside the class, in English; and comprehension outside the class. Each component is composed of statements concerning respondents' feelings about communication with other people, in English. The data gathered using this questionnaire which was considered in this study was related to the reading component of each part i.e., the students' willingness to read inside and outside the classroom. All the items are in five-point Likert scale, ranging from 'almost never willing' to 'almost always willing'. We used a Persian version of the questionnaire. The achievement of learners was investigated through their performance on final examination of that semester. Their scores were used as a criterion for their achievement and effectiveness of metacognitive strategies they used to complete their test. And finally, the scores of reading comprehension and cloze tests were considered as observational variables for metacognitive awareness and willingness to read after the intervention. Intervention instructional materials were the textbook, English for the students of medicine II (Deedari & Ziahosseini, 2009) and some parts of the book Effective reading: Improving reading rates and comprehension (Raygor & Raygor, 1985). In the sessions of strategy training, the students were instructed how to use the metacognitive strategies for reading for main ideas and reading for organization of a paragraph. These strategies were exercised throughout the semester. The exercises were selected from both the textbook itself, and Raygor and Raygor's (1985) book.

Procedure

This study was conducted from February to July 2014. The study is a quasi-experimental study. In the study, the students were randomly divided into two groups of control and experimental. There was no sample size estimation because all the students were selected and assigned to the study. A census method was used for collecting the statistical units. Both groups were asked to complete the metacognitive awareness inventory constructed by Schraw and Dennison (1994). Simultaneously, they were given the willingness to communicate in English questionnaire which was adopted from McIntyre et al. (2001). Since the questionnaires were designed for the native speakers, to avoid any misunderstanding in part of cultural differences and not having enough knowledge of some of the participants in vocabulary and grammar, the researcher used the Persian translated version of the two questionnaires. The MAI's reliability and validity were previously ensured in different Iranian studies (Shahniyeilagh, Boostani, Alipoor, & Hajiyakhchali, 2012; Hamzah & Hambali, 2013). Because the Persian version of the WTC questionnaire was not available, the researcher used a team approach to survey translation. Two translators produced draft translation, reviewers reviewed translations with the translators, and one adjudicator decided when the translation can be considered to be finalized and ready for fielding.

Participants voluntarily took part in the present study and before initiating the project, the necessary measures were taken to have the permission of collecting data from the Faculty of Medicine of Mashhad University of Medical Sciences.

In the experimental group, the teacher provided the students with the metacognitive knowledge and the students were informed of the importance of 'planning', 'monitoring', and 'evaluation' in the process of studying especially reading English. Then, the teacher taught some reading strategies, including reading for main ideas and reading for organization. The teacher firstly asked the students to construct the main idea after reading a paragraph. If they were not able to construct the main idea or had difficulty in forming that, the teacher would teach the four steps in constructing the main idea. The teacher gave some exercises for main idea construction to the students. For the next session these exercises were continued throughout the class. Meanwhile, the teacher reviewed the metacognitive knowledge. The second reading strategy taught was reading for organization. In this regard, the teacher asked the students to recognize how parts of a paragraph were related, that is, the reader would be aware of the organization of a reading passage. If they were not able or had difficulty in recognition of the organization of the passage, the instructor would teach them the four steps in reading for organization. Teaching of this strategy was also followed by some exercises for reading for organization by the students. The succeeding sessions were allocated to doing additional exercises on reading for organization. At the end of semester, all participants again completed the two questionnaires, and took a final examination achievement test. Then, the collected data from both questionnaires before and after the intervention, and results of achievement test were imported into the software to find possible relationships.

Statistical Package for Social Sciences (SPSS 21.0) was used for inputting data and computing descriptive statistics, reliability analysis of questionnaires, and correlational analysis. R software was used to perform Structural Equation Modeling (SEM). Descriptive Statistics were used to summarize the characteristics of data set. For the reliability Cronbach's alpha was used (Dörnyei, 2007).

At first, we separately measured the latent variables based on the measurement models. According to these results, only the significant variables at the level of 5% which affected the corresponding latent variables were included in the model. Next, the SEM (Figure 1) was fitted on the data.

RESULTS

The descriptive statistics for the two scales of metacognitive awareness and willingness to read in English before and after the intervention in the two control and experimental groups are shown in Table 2.

Table 2. Descriptive Statistics for "Metacognitive Awareness" and "Willingness to Read" Scales before and after the Intervention

Group		MA1	MA2	WTR1	WTR2
Control	Number	39	37	39	37
	Mean	3.7478	3.6516	3.2286	3.5428
	Median	3.8077	3.6346	3.2500	3.5833
	Std. Deviation	0.32734	0.45909	0.98540	1.03575
Experimental	N	32	31	32	31
	Mean	3.7798	3.7556	3.3802	3.4435
	Median	3.7596	3.7308	3.3750	3.5000
	Std. Deviation	0.43629	0.36340	1.17316	0.99196

Note: MA1: Metacognitive Awareness before the Intervention, MA2: Metacognitive Awareness after the Intervention, MTR1: Willingness to Read in English before the Intervention, WTR2: Willingness to Read in English after the Intervention

In the control group, the mean scores for total metacognitive awareness were 3.7478 ± 0.32734 and 3.6516 ± 0.45909 , respectively before and after the intervention. In this group, the mean scores for total willingness to read before and after the intervention were respectively 3.2286 ± 0.98540 and 3.5428 ± 1.03575 . In the experimental group, the mean scores for total metacognitive awareness were 3.7798 ± 0.43629 and 3.7556 ± 0.36340 , respectively before and after the intervention. In this group, the mean scores for total willingness to read before and after the intervention were respectively 3.3802 ± 1.17316 and 3.4435 ± 0.99196 .

Table 3 represented the descriptive statistics for metacognitive awareness subscales in the two control and experimental groups before and after the intervention. The mean score for DK was 3.83 ± 0.464 in the control group and 3.89 ± 0.657 in the experimental group. The mean score for CK was equal to 3.95 ± 0.705 in the control group and 4.00 ± 0.577 in the experimental group. In the control group, the mean score for DS was 3.89 ± 0.936 , and it was 4.10 ± 0.396 in the experimental group.

The descriptive statistics for metacognitive awareness subscales in the two control and experimental groups after the intervention are shown in Table 3. The mean score for DK was 3.57 ± 0.668 in the control group and 3.81 ± 0.527 in the experimental group. The mean score for CK was equal to 3.74 ± 0.677 in the control group and 3.75 ± 0.672 in the experimental group. In the control group, the mean score for DS was 3.53 ± 0.816 , and it was 3.47 ± 0.618 in the experimental group.

Table 3. Descriptive Statistics for Metacognitive Awareness Subscales in Two Groups before and after the Intervention

Intervention	Group	Statistics	DK	PK	CK	P	IMS	M	DS	E
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Before	Control	N	39	39	37	37	37	39	37	37
		Mean	3.83	3.718	3.95	3.43	3.96	4.18	3.89	3.53
		Std. Deviation	0.464	0.5712	0.705	0.689	0.811	0.756	0.936	0.816
	Experimental	N	32	32	31	31	31	32	31	31
		Mean	3.89	3.734	4.00	3.65	4.02	4.16	4.10	3.47
		Std. Deviation	0.657	0.4916	0.577	0.551	0.491	0.723	0.396	0.618
After	Control	N	37	37	39	39	39	37	37	39
		Mean	3.57	3.70	3.74	3.92	3.90	3.89	3.53	3.82
		Std. Deviation	0.668	0.692	0.677	0.757	0.718	0.936	0.816	0.644
	Experimental	N	31	31	32	32	32	31	31	32
		Mean	3.81	3.76	3.75	4.17	3.78	4.10	3.47	3.88
		Std. Deviation	0.527	0.694	0.672	0.590	0.608	0.396	0.618	0.871

Note: DK: Declarative Knowledge, PK: Procedural Knowledge, CK: Conditional Knowledge, P: Planning, IMS: Information Management Strategies, M: Monitoring, DS: Debugging Strategies, E: Evaluation.

Table 4 represents the descriptive statistics calculated for the willingness to read questionnaire subscales, in the two groups before and after the intervention, and for the achievement test after the intervention.

The mean score for WTR inside the class before the intervention was 3.28 ± 1.255 in the control group and 3.23 ± 1.408 in the experimental group. The mean score for WTR outside the class before the intervention was 3.35 ± 1.391 in the control group and 3.67 ± 1.324 in the experimental group.

The mean score for the willingness to read inside the class after the intervention was calculated to be 3.31 ± 1.416 in the control group and 3.21 ± 1.153 in the experimental group. Regarding willingness to read outside the class after the intervention, the mean score was 3.83 ± 1.218 in the control group and 3.78 ± 1.165 in the experimental group.

The descriptive statistics for the achievement test subscales are presented in Table 4. The mean score for reading comprehension tests was 14.35 ± 3.321 in the control group and 12.92 ± 4.734 in the experimental group. The mean score for cloze tests was 12.69 ± 4.482 in the control group and 10.45 ± 3.900 in the experimental group.

Table 4. Descriptive Statistics for the Willingness to Read Subscales before and after the Intervention, and for the Achievement Test after the Intervention in the Two Groups

Group	Statistics	before the Intervention		after the Intervention		Achievement Test	
		WTRI	WTRO	WTRI	WTRO	RC	Cloze
Control	N	39	39	37	35	46	46
	Mean	3.28	3.35	3.31	3.83	14.35	13.52
	Std. Deviation	1.255	1.391	1.416	1.218	3.321	3.160
Experimental	N	32	32	31	30	49	49
	Mean	3.23	3.67	3.21	3.78	12.92	10.45
	Std. Deviation	1.408	1.324	1.153	1.165	4.734	3.900

Note: WTRI: Willingness to Read Inside the Class, WTRO: Willingness To Read Outside the Class, RC: Reading Comprehension Test Results

Metacognitive awareness inventory showed a satisfactory reliability coefficient (Cronbach's Alpha) of 0.863 for the control group and 0.927 for the experimental group before the intervention. The inventory showed a satisfactory reliability coefficient of 0.941 for the control group and 0.915 for the experimental group after the intervention. Goudarzi and Ghonsooly's (2014) study showed a reliability of 0.92 for this scale. This is in complete agreement with the definition of reliability and shows that metacognitive awareness inventory leads to similar results on repeated administrations.

Willingness to read part of the questionnaire had a reliability of 0.895 for the control group and 0.873 for the experimental group before the intervention. The inventory showed a satisfactory reliability coefficient of 0.922 for the control group and 0.926 for the experimental group after the intervention.

Assessment of the model demonstrated an acceptable fit to the data for most of the indices (Table 5).

A number of fit indices were examined to evaluate the model: the χ^2/df magnitude, which should be less than three, the Goodness-of-Fit Index (GFI), the Adjusted Goodness-of-Fit Index (AGFI), the Bentler Comparative Fit Index (CFI), the Bentler-Bonnett Normed Fit Index (NFI), and the Tucker-Lewis Non-normed Fit Index (NNFI) or TLI with a cut value greater than 0.80, and a Root Mean Square Error of Approximation (RMSEA) of less than 0.10 (Sharma, 1996). The acceptable criteria for fit indices are presented in Table 5.

Table 5. Goodness-of-fit Indices of the Structural Model

	$\frac{\chi^2}{df}$	GFI ^a	AGFI ^b	CFI ^c	NFI ^d	TLI ^e	RMSEA ^f
Acceptable fit	<3	≥0.80	≥0.80	≥0.80	≥0.80	≥0.80	≤0.10
Structural model	1.4122	0.8179962	0.7428207	0.9151913	0.7709332	0.8893799	0.06519147

Note: GFI: Goodness-of-fit index, AGFI: Adjusted goodness-of-fit index, CFI: Bentler Comparative Fit Index, NFI: Bentler-Bonnett Normed Fit Index, TLI: Tucker-Lewis Non-normed Fit Index (NNFI), RMSEA: Root Mean Square Error of Approximation

Based on the proposed model, the relationships among all variables, and also between all variables and metacognitive awareness after the intervention was explored. Table 6 represented coefficient estimates of SEM. Accordingly, the model demonstrated a significant effect at the level of 5 percent for all metacognitive awareness subscales before the intervention (except for DK1 and P1) on MA1 (DK1 was removed because in the measurement for MA1 the variable was not measured the MA1 and we did not insert it in the SEM model).

It also showed a significant effect for all metacognitive awareness subscales after the intervention (except for DK2) on MA2 (DK2 was removed because in the measurement for MA2 the variable was not measured the MA2 and we did not insert it in the SEM model).

There was a significant effect of willingness to read in English inside the class before the intervention on willingness to read in English outside the class before the intervention.

It indicated a mutual significant effect of MA1 and WTR1 and also MA2 and WTR2.

The model showed a significant effect of MA1 on MA2 and WTR1 on WTR2.

However, WTR1 and MA1 had respectively a reverse effect on MA2 and WTR2.

Regarding reading comprehension ability, it demonstrated a significant effect of reading comprehension and cloze tests results on WTR2.

While, reading comprehension and cloze tests results had a reverse effect on MA2.

By the way, there was a mutual significant effect between reading comprehension and cloze tests results.

In the experimental group, the metacognitive strategy training significantly affected MA2.

Meanwhile, there was a reverse effect of age on MA2, and male gender had a significant effect on MA2.

Table 6. The Coefficient Estimates of SEM

Relation	Estimate	Std. Error	z-value	p-value
PK1 ← MA1	0.220309757	0.050866777	4.3311129	1.483576e-05*
CK1 ← MA1	0.094877118	0.077772089	1.2199379	2.224884e-01
P1 ← MA1	0.023893403	0.055936846	0.4271496	6.692704e-01
IMS1 ← MA1	0.700348316	0.046930158	14.9232038	2.328207e-50
M1 ← MA1	1.593420579	0.301068562	5.2925505	1.206221e-07
DS1 ← MA1	0.573252940	0.064854115	8.8391143	9.648035e-19
E1 ← MA1	0.155095088	0.073065170	2.1226952	3.377940e-02
PK2 ← MA2	0.977674758	0.146398425	6.6781781	2.419309e-11
CK2 ← MA2	1.087444079	0.137969297	7.8817831	3.227418e-15
P2 ← MA2	0.629774653	0.131449461	4.7910022	1.659503e-06
IMS2 ← MA2	0.562195167	0.108475729	5.1826816	2.187182e-07
M2 ← MA2	0.865270391	0.122634306	7.0556961	1.717388e-12
DS2 ← MA2	1.186408592	0.245444574	4.8337129	1.340098e-06
E2 ← MA2	0.983919039	0.145533256	6.7607849	1.372462e-11
WTR01 ← WTR1	1.249549565	0.098769886	12.6511189	1.102929e-36
WTR02 ← WTR2	0.246234756	0.057143145	4.3090865	1.639302e-05
MA1 ↔ WTR1	0.661499212	0.061030627	10.8388074	2.253900e-27
MA2 ← MA1	0.558751374	0.167894551	3.3279899	8.747503e-04
MA2 ← WTR1	-0.515937888	0.181320217	-2.8454515	4.434851e-03
WTR2 ← WTR1	3.529659622	0.795182751	4.4388031	9.046055e-06
MA2 ↔ WTR2	0.536908849	0.142294529	3.7732220	1.611528e-04
WTR2 ← MA1	-0.410106151	0.202657395	-2.0236427	4.300693e-02
RC ← WTR2	0.297468148	0.157355709	1.8904185	5.870201e-02
Cloze ← WTR2	0.896943412	0.378647200	2.3688104	1.784540e-02

RC ← MA2	-3.721049057	2.192790110	-1.6969472	8.970664e-02
Cloze ← MA2	-16.229634993	5.135552588	-3.1602510	1.576333e-03
Cloze ↔ RC	17.377555384	9.986570302	1.7400924	8.184279e-02
Sex ← MA2	-0.090209627	0.103787387	-0.8691772	3.847502e-01
Age ← MA2	-3.211792812	1.993882931	-1.6108232	1.072183e-01
Group ← MA2	0.143524232	0.103780750	1.3829562	1.666783e-01

Note: PK: Procedural Knowledge; MA: Metacognitive Awareness; 1 stands for before the intervention (i.e., MA1 is the notation for metacognitive awareness before the intervention); 2 stands for after the intervention (i.e., MA2 is the notation for metacognitive awareness after the intervention); ← stands for the effect on (i.e., PK1 ← MA1 is the notation for the effect of PK1 on MA1); CK: Conditional Knowledge; P: Planning; IMS: Information Management Strategies; M: Monitoring; DS: Debugging Strategies; E: Evaluation; WTRI: Willingness to Read in English inside the Class; WTRO: Willingness to Read in English outside the Class; RC: Reading Comprehension test results; 1.483576e-05 is a scientific notation for 1.483576×10^{-5}

CONCLUSION

So many studies have investigated the effect of metacognitive awareness on learners' language achievement (Carrell, 1989; Carrell, Gajdusek, & Wise, 1998; Dhieb-Henia, 2003;

Boulware-Gooden, Carreker, Thornhill, & Joshi, 2007; Ajideh, 2009; Fan, 2011; Hamzah, & Hambali, 2013). Schraw (1998) stated that learners who are metacognitively aware, perform better than unaware learners. Metacognitive awareness is a necessary step in learning to regulate learning (Williams & Burden, 1997).

From another point of view, Han (2011) found a slightly higher correlation between strategy use and the intrinsic motivations (Han, 2011).

With regard to our findings, through a sequential equation structural model, the present study considered a mutual relationship between metacognitive awareness and willingness to read in English. Also, the effect of MA2 on reading comprehension tests results and also the effects of WTR2 on reading comprehension and cloze tests results were taken into consideration.

The aim of the present study was to investigate the above-mentioned factors through a hypothesized model in an EAP reading context among Iranian medical students. For this purpose, two research questions were posited, and then were addressed by examining the proposed model of SEM.

Q1: Based on the proposed model, does metacognitive knowledge enhance ESP reading comprehension ability of medical students?

Q2: Based on the proposed model, does metacognitive knowledge enhance willingness to read English medical texts?

As Table 2 demonstrated, the mean scores for total metacognitive awareness of medical students before the intervention were respectively 3.748 ± 0.327 and 3.779 ± 0.436 in the control and experimental groups. It also indicates the mean scores for total metacognitive awareness after the intervention were respectively 3.652 ± 0.459 and 3.756 ± 0.363 in the control and experimental groups. The final model showed a significant relationship between metacognitive awareness after the intervention and teaching metacognitive strategies. This finding indicates that teaching metacognitive strategies can promote students' level of metacognition. This is consistent with the

results of the studies by Dheib-Henia (2003) and Wilawan (2007). The research outcomes of Wilawan's (2007) study indicated that students receiving instructional treatment which incorporated lexical cohesion and metacognitive strategies (Lexical Cohesion plus Reciprocal Teaching) performed better than participants in the other two groups (Skill-Based Teaching and Reciprocal Teaching) on the main idea comprehension post-test, though the results were not statistically significant.

Based on Table 3, the mean of metacognitive awareness subscales in the control group before the intervention ranged from $3.43 \pm .689$ (assessing planning) to $4.18 \pm .756$ (assessing monitoring). Goudarzi and Ghonsooly's (2014) study demonstrated that the mean score of metacognitive awareness subscales ranged from procedural knowledge to information management strategies. In our study, after the intervention, the mean of metacognitive awareness subscales in the control group ranged from $3.53 \pm .816$ (assessing debugging strategies) to $3.92 \pm .757$ (assessing planning). In the experimental group, the mean of metacognitive awareness subscales before the intervention ranged from $3.47 \pm .618$ (assessing evaluation) to $4.16 \pm .723$ (assessing monitoring). After the intervention, it ranged from $3.47 \pm .618$ (assessing debugging strategies) to $4.17 \pm .590$ (assessing planning).

Before the intervention, among all metacognitive awareness subscales, monitoring showed the most level of usage. Monitoring is used for assessment of one's learning or strategy use (Schraw, 1998). Learners at this level usually know that they need to check their understanding and through terms of learning English they may find out that this is an important step towards improving their English and they have learnt how to do it (Goudarzi & Ghonsooly, 2014). The results of the investigation by Yüksel and Yüksel (2012) indicated that the participants usually used academic reading strategies so they were often aware of these strategies. They maintained that, most often, the students used and became aware of problem-solving strategies but the supporting strategies were leastly used in academic reading.). Martínez's (2008) study demonstrated that females report significantly greater frequency of strategy use and have a tendency to use support reading strategies more than males.

In our study, after the intervention, among all metacognitive awareness subscales, planning showed the most level of usage. Planning is used for goal setting, and allocating resources before learning (Schraw, 1998). On the whole, it may be inferred that teaching reading strategies can improve students' metacognitive awareness through influencing its different variables.

According to our findings, the mean scores for total willingness to read in English before the intervention were respectively 3.2286 ± 0.98540 and 3.3802 ± 1.17316 in the control and experimental groups. The mean scores for total willingness to read in English after the intervention were respectively 3.5428 ± 1.03575 and 3.4435 ± 0.99196 in the control and the experimental groups.

The mean score for WTR inside the class before the intervention was 3.28 ± 1.255 in the control group and 3.23 ± 1.408 in the experimental group. The mean score for the willingness to read inside the class after the intervention was calculated 3.31 ± 1.416 in the control group and 3.21 ± 1.153 in the experimental group.

Regarding willingness to read outside the class before the intervention, the mean score was 3.35 ± 1.391 in the control group and 3.67 ± 1.324 in the experimental group. The mean score of willingness to read outside the class after the intervention was 3.83 ± 1.218 in the control group and 3.78 ± 1.165 in the experimental group.

In our study, only one of the willingness to read component of WTC was explored.

Alemi (2012) claimed that university students' WTC functions as a trait, and because the students do not need to communicate in English for their basic needs so it is low both inside and outside the class. Her results also revealed that, among all skills, learners were more interested in reading, and the reason they were not willing to communicate in classes was that they might fear of evaluation. Ghonsooly, Khajavy, and Asadpour (2012) reported their results of study were not consistent with MacIntyre and Clément (1996) who found a significant path between motivation and L2WTC. However, it was in agreement with other studies (Yashima, 2002; Kim, 2004; & Peng and Woodrow, 2010) which found an insignificant path from motivation to L2WTC. Ghonsooly, Khajavy, and Asadpour (2012) maintain that Iranian students with motivation to learn English are not necessarily willing to communicate in English, and acknowledged it because of the fact that Iran is an EFL context. In this context, students do not need to speak English to meet their everyday life needs, so learning English for speaking seems useless to them. Mostly, students study English for academic purposes at the university level, where the focus is on reading skill and structure (Noora, 2008 as cited in Ghonsooly, Khajavy, & Asadpour, 2012). University students do not have enough opportunity to speak English in their classrooms, and therefore they do not develop necessary communicative competence.

According to our results, the mean score for reading comprehension tests was 14.35 ± 3.321 in the control group and 12.92 ± 4.734 in the experimental group. The mean score for cloze tests was 13.52 ± 3.160 in the control group and 10.45 ± 3.900 in the experimental group.

Wilawan (2012) in his study focusing mainly on the combined application of cognitive and metacognitive processing strategies to improve EFL readers' main idea comprehension maintained that in order to be competent and more successful in deriving the central theme of a text, EFL students need help in promoting both categories of reading processes, namely higher-level cognitive processes and metacognitive strategies.

Although our results (see Tables 2 and 4) may indicate less changes (or an unexpectedly decrease in the mean scores) in the variables of metacognitive awareness and willingness to read in pre-test and post-test and between the two groups, and also in the results of final examination achievement test, this is because different variables may influence metacognitive awareness, so in this study we must consider a number of factors (multidimensional and multivariable) which influence metacognitive awareness and willingness to read, namely, fitness of the structural models should be considered.

Based on our proposed model, the relationship among three variables of metacognitive awareness, willingness to read, and reading comprehension ability were discussed.

According to Hartman & Sternberg (1993, as cited in Schraw, 1998) there are four general ways to increase metacognition in classroom settings. These include promoting general awareness of the importance of metacognition, and improving knowledge of cognition, improving regulation of cognition, and fostering environments that promote metacognitive awareness. Extended practice and reflection play crucial roles in the construction of metacognitive knowledge and regulatory skills (Schraw, 1998, p. 118). This is especially true when students are provided with regular opportunities to reflect on one's successes and failures (Kuhn, Schauble, and Garcia-Mila, 1992; Siegler & Jenkins, 1989, as cited in Schraw, 1998). Metacognitive training would be helpful for learners. It includes "heightening awareness of the feeling involved in different aspects of language learning, and of individuals' own personalities and strengths and how these could best employed in language learning" (Williams & Burden, 1997, p. 156).

Results of the final SEM model indicated a mutual relationship between metacognitive awareness and willingness to read in English. It shows that when EFL learners think about their

learning and try to regulate and control their acquisition, it consequently promotes their willingness to read and vice versa. To the best of our knowledge there is no study to deal with the relationship between metacognitive awareness and willingness to read in English. However, a study by Vandergrift (2005) who explored the relationships among motivation orientations, metacognitive awareness and proficiency in L2 listening indicated that students reporting a greater use of metacognitive strategies also reported more motivational intensity, with some evidence of a self-determination continuum evident in the response patterns. He maintained that listening proficiency correlated negatively with amotivation; however, correlations with intrinsic and extrinsic motivation were not as high as anticipated.

According to Han (2011), three motivational subcomponents were identified. First, the intrinsic motivation which reflects Chinese EFL learners' willingness to read in English due to their personal interest in the topic, enjoy challenges, and more self-confident [sic]. Second, the utility value which drives students to read to broaden views, to get information, and to seek for a suitable job. And third, the academic value which motivates students to read English to excel in English classes and tests, and as a means to learn English learners. Her study of relations among motivation, reading amount, awareness of strategy use and achievement in foreign language reading revealed that:

Although the three scales of motivation all positively and moderately associated with reading amount, only intrinsic motivation appeared to be related to reading achievement, and such relation was positive. In terms of relations between motivation and awareness of reading strategy use, both metacognitive and cognitive strategy use positively correlated with the three motivation scales. The correlations between strategy use and intrinsic motivation appeared to be slightly higher than the ones between strategy use and the two extrinsic motivations. (p. 232)

Also, Sani, Chik, Nik, and Raslee's (2011) study showed that the undergraduates' reading motivation was of moderate level and they mostly use the cognitive reading strategy instead of the metacognitive reading strategy. Sani et al. (2011) stated that there seemed to be a connection between the undergraduates' reading motivation and the reading strategy used. Their results indicated that students' motivation to read had an influence on the use of the reading strategy. They maintained that although female students had higher reading motivation compared to male students, both groups only use the cognitive reading strategy. Therefore, the results showed that the students having moderate reading motivation tend to use only cognitive reading strategy. Sani et al. (2011) stated that reading motivation, thus, does influence the acquisition of reading skills and there is a possibility that the higher reading motivation, the higher the tendency to use high level reading skills such as metacognitive which is a necessity for students' effective reading. According to them, instructors should motivate students to become active readers by improving students' intrinsic motivation and decreasing their extrinsic motivation.

The current study investigated the relationships among medical students' metacognitive awareness, willingness to read English texts inside and outside the class, and their reading comprehension ability.

The model proposed in this study investigated the relationship among the above mentioned variables in an EAP context. Therefore, the results of this study might be helpful in EAP context. The results showed a mutual relationship of metacognitive awareness and willingness to read in English. These findings emphasized the importance of metacognitive awareness and teaching reading strategies in their willingness to read in English. It seems that an attempt to enhance learners' metacognitive awareness can improve learners' willingness to read in English. Also, promotion of the students' willingness to read in English can positively affect their level of

metacognition. In addition, these findings put emphasis on promotion of student's metacognitive awareness and willingness to read in English to improve their reading comprehension ability.

According to Goudarzi and Ghonsooly (2014), it will be useful to make learners familiar with language learning strategies especially reading strategies in order to improve learners' willingness to read in English inside and outside the class, and help them to take control of their learning and lead it toward achieving desired goals. Since language teachers are the most reliable sources for learners, this might be possible by making them familiar with this concept. Some courses covering this concept would be beneficial as well. Teachers can teach learners what these strategies are, how they can be used, what their advantages and disadvantages are, and when they are effective.

Finally, the expansion of this study can be applied to curriculum development with metacognitive strategy in EAP context, also taking measures to promote students' willingness to read in English inside and outside the class. In this way, it will improve Iranian medical students' special area reading comprehension so as to increase our competition with the world in medical sciences.

The participants of this study were medical students. It might be useful to conduct further studies that include different ESP contexts and learners with different proficiency levels to check whether these factors play a role in alterations of attributions considered as variables in this study. The method of data gathering used in this study was through questionnaires. It will be useful to use other methods proposed by researchers such as the interviews. Also, replicating this study in which the students of both groups are taught by the same teacher may further improve the results. In addition, proposing and testing different models with different hypothesized paths between variables specially in foreign language context will help researchers to investigate the relationship between variables more deeply and have a better understanding of how they work.

Masoumeh Hassanpour has an MA degree in Teaching English as a Foreign Language. She is a lecturer in the Department of English Language of Mashhad University of Medical Sciences, Mashhad, Iran. She also works as a research administrative assistant at the Surgical Oncology Research Center, Mashhad University of Medical Sciences. Her main research interests are introspection in reading, psycholinguistics, cultural studies and English for specific purposes.

Email: hassanpourm1@mums.ac.ir

Behzad Ghonsooly is a full professor in Applied Linguistics at Ferdowsi University of Mashhad, Iran. He received his PhD from Stirling University, UK. He has published more than 80 articles at national and international level. His main research interests are language testing, introspection in reading, psycholinguistics, and English for specific purposes.

Email: ghonsooly@um.ac.ir

Mehdi Jabbari Nooghabi is an Assistant Professor in Statistics at the Department of Statistics of Ferdowsi University of Mashhad. He has published around 55 articles at national and international journals. His main researches are applied statistics, statistical inference, and outliers.

Email: jabbarinm@um.ac.ir

Mohammad Naser Shafiee has an MA degree in Linguistics. He is a lecturer of English Department in Mashhad University of Medical Sciences. He has a great deal of experience in teaching English for academic purposes.

Email: shafieemn@mums.ac.ir

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