Syntactic Knowledge, Vocabulary Breadth, and Metacognitive Awareness of Reading Strategies in Reading Comprehension in Self-Regulated vs. Non-Self-Regulated Readers

Parviz Maftoon *
Associate Professor, Islamic Azad University, Science and Research Branch
Mahshad Tasnimi
Associate Professor, Islamic Azad University, Science and Research Branch

Absract

This study was conducted to probe the predictive power of syntactic knowledge, vocabulary breadth, and metacognitive awareness of reading strategies in reading comprehension in self-regulated vs. non self-regulated EFL readers. A sample of Iranian EFL learners (N = 149) served as the participants who were divided into an experimental (self-regulated) group and a control (non-self-regulated) group. The experimental group received direct teaching of self-regulation strategies in reading accompanied by task-based instruction in ten sessions. We taught self-regulation strategies to the learners in the experimental group directly before the students performed the tasks that were designed based on self-regulation strategies proposed by Zimmerman (1989). The control group did not receive any treatment on self-regulation neither directly nor indirectly through tasks. Control group classes were conducted in traditional way, in a sense that they were only required to read the reading texts and do the follow-up activities of the book without any reference to self-regulation strategies. Regression analysis results showed the superiority of syntactic knowledge over vocabulary breadth, and metacognitive awareness of reading strategies in both groups. However, the findings illustrated that syntactic knowledge was a better predictor of reading comprehension in self-regulated group. Moreover, congruent with the interactive model of reading, the results suggest that both linguistic (lower-level) and non linguistic (higher-level) processes contributed significantly to reading comprehension. This investigation may offer useful perspectives on L2 reading comprehension, test score predictability, and test content validation.

Keywords: reading comprehension, syntactic knowledge, vocabulary breadth, metacognitive awareness of reading strategies, self-regulation

---

1. Introduction

Reading is a multidimensional skill involving a variety of cognitive, linguistic, and non-linguistic factors (Grabe & Stroller, 2002). The combination and integration of these factors form a set of underlying processes that are activated while reading. Generally, these processes are categorized into two levels: lower-level and higher-level (Grabe, 1991; Grabe & Stroller, 2002; Nassaji, 2003).

The lower-level processes are automatic and linguistic processes that involve identification skills, such as word recognition and syntactic decoding. They employ minimal cognitive effort without directional attention. Identifying vocabulary and structural knowledge are examples of lower-level processing which are said to be extremely important for fluent reading comprehension (Grabe & Stroller, 2002). On the other hand, the higher-level processes are non-automatic comprehension processes. They include aspects of deliberation, attention, and problem solving. Using background knowledge and employing reading strategies are among higher-level processes that are activated when a reader comprehends and interprets a text (Grabe, 1991; Grabe & Stroller, 2002).

Different models of reading have been presented to elaborate on these processes. They can mainly be placed into one of these main categories: bottom-up, top-down, and interactive (Grabe, 1991; Grabe & Stroller, 2002).

In bottom-up models, the reading process is considered a text driven decoding process in which the role of the reader is to reconstruct the text meaning. This process of reading involves lower-level skills, such as vocabulary and structure knowledge (Grabe, 1991). The reader needs to gather visual information from the letters and words, identify the meaning of words, and then move forward to the processing of the structure and meaning of larger syntactic units (Hinkel, 2006). These models do not take into account the effect of higher-level processes on lower-level processes (Grabe & Stroller, 2002).

Like bottom-up models, top-down process models are sequential, in that the reading process involves a series of stages. However, top-down models take the opposite position, giving priority to higher-level skills, such as reading strategies and background knowledge (Liu, 2010). The reader is seen as one who formulates hypotheses and uses the text data to confirm or reject the hypotheses while reading. Therefore, these models consider an interaction between the reader and the text (Grabe & Stroller, 2002; Urquhart & Weir, 1998).

Since neither the bottom-up nor top-down models entirely explain the processes of reading, interactive models have been proposed (Konza, 2003). The most frequently cited example of these models has been that of Rumelhart (1977, cited in Grabe, 1991) whose model was an alternative to serial processing mechanisms. This model is based on the assumption that information processing in reading consists of different levels of processing. In other words, if both higher-level and lower-level processes work independently in parallel, the problem of unidirectionality may be avoided.

There has been an ongoing debate in reading research over the relative importance of these processes in reading comprehension. Some assign slight importance to top-down factors and higher-level processes (e.g., Lahuerta, 2011; Nuttall, 1996; Stanovich, 2000). They believe that readers start first by using a top-down approach, activating all the prior knowledge. If this processing does not shed enough light on the meaning, as Nuttall states, readers resort to bottom-up processing and employ lower-level skills, such as vocabulary or syntactic knowledge. In contrast, other researchers believe that efficient bottom-up processing are important components of fluent reading, and less successful readers are more deficient at processing lower-level identification skills (Grabe, 1991). Yet there are some other studies finding out that both higher-level and lower-level processes contribute significantly to reading (Nassaji, 2003).

Therefore, the significance of this study lies primarily in considering not only the lower-level or linguistic processes, but also the higher-level or non linguistic ones. Consequently, carrying out a piece of research which lends itself to reading comprehension through analyzing its contributing factors in self-regulated and non-self-regulated readers can have both theoretical and pedagogical implications for the field of language teaching, as well as for language testing.

2. Literature Review

Reading comprehension involves different aspects, namely cognitive, linguistic, and social (Chun, 1997). Instruction also adds a pedagogical dimension to it, accompanied by the related assessment issues. These different aspects of reading comprehension have inevitably triggered the curiosity of researchers in different scientific fields. In this part, attempts are made to review the role of syntactic knowledge, vocabulary breadth

and metacognitive awareness of reading strategies on reading comprehension. Then the concept of self-regulated learning is presented.

2.1 Reading Comprehension and Syntactic Knowledge

Reading comprehension is closely associated with syntactic knowledge (Jung, 2010; Lefrancois & Armand, 2003; Nuttall, 1996; Shiotsu & Weir, 2007; Urquhart & Weir, 1998). Therefore, learners must know how phrases are structured, and cases are assigned to the constructed phrases (Koda, 2007). However, the role of grammar in L2 reading has not received much attention by researchers (Jung, 2010). Jung (2010) mentions two reasons for this underestimation. On the one hand, reading was considered a receptive language skill for comprehending the messages of the text. Therefore, syntactic knowledge was regarded to have less to do with comprehension than such other components as vocabulary, background knowledge, and reading strategies. On the other hand, the dominance of Communicative Language Teaching (CLT) for about 30 years put a huge emphasis on macro language skills and communication functions.

Nevertheless, current research has led to a reconsideration of the role of grammar indicating that "learners need opportunities to both encounter and produce structures which have been introduced either explicitly through grammar lesson or implicitly, through frequent exposure" (Nassaji & Fotos, 2004, p. 130).

2.2 Reading Comprehension and Vocabulary

Considering the relationship between vocabulary knowledge and reading comprehension, research consistently shows that vocabulary knowledge correlates highly with reading comprehension (e.g., Qian, 1999, 2002). Research further shows that reading and vocabulary knowledge affect each other in a reciprocal and causal way (Koda, 2005). Koda (2005) states that in the early stages, it is the vocabulary knowledge that facilitates reading comprehension, while in later stages vocabulary learning involves conceptual expansion. Therefore, reading is considered as a path to vocabulary learning.

Vocabulary knowledge is many faceted (Richards, 1976). In this regard, recognition of the depth and breadth as two paramount dimensions of vocabulary knowledge is necessary to understanding the relationship between vocabulary knowledge and reading comprehension (Qian, 1999). Vocabulary breadth refers to vocabulary size, or the

number of words a learner knows. On the other hand, vocabulary depth is defined as how well a learner knows a given word.

2.3 Reading Comprehension and Metacognitive Learning Strategies

The effect of metacognitive awareness of reading strategies on language learning in general and reading comprehension in particular has been always a matter of concern. Metacognitive learning strategies have been included in almost all typology of language learning strategies (such as O'Malley & Chamot, 1990).

Research findings indicate that skilled reading requires the ongoing monitoring of comprehension and regulation according to the goals of reading. That is the learners who are skilled in employing metacognitive strategies and, therefore, are aware of their abilities are more strategic and perform better than those who lack awareness of monitoring and regulation (Block, 1992; Kolic-Vehovec, 2006; Schoonen, Hulstijn, & Bossers, 1998; Singhal, 2001).

2.4 Reading comprehension and Self-regulated Learning

The concept of learning strategy has been influential in both language learning and teaching. Learners with strategic knowledge of language learning become more efficient and flexible, thus they can acquire a language more easily. However, learning strategies are not theoretically and operationally well-defined. Theoretically, various terminology and classifications have been used to refer to learning strategies (such as O'mally & Chamot, 1990). Operationally, the psychometric properties of the assessment instruments measuring learning strategies are in question (Dornyei, 2005). To overcome some weaknesses, scholars turned to a related and new concept, self-regulation. However, according to Dornyei (2005), this does not mean that scholars have developed second thoughts about the benefits of learning strategies. The effectiveness of one's own learning is seen as more important than ever before. The new concept of self-regulation "offered a broader perspective than the previous focus on learning strategies" (p. 190). That is, there is a shift from "the product (strategies) to the process (self-regulation)" (p. 191). In addition, self-regulation is a more dynamic concept than learning strategy.

The most referred definition of self-regulated learning is proposed by Zimmerman (1989), who states that "students can be described as self-regulated to the degrees that they are metacognitively, motivationally and behaviorally active participants in their own learning process" (p. 1). According to Zimmerman (1989), this definition assumes reciprocal

causation among three processes: personal, behavioral and environmental. In other words, there are three general classes of strategies for increasing self-regulation: strategies to control person, behavior and the environment.

Zimmerman (2002) explains that self-regulated learning is not only a simple personal trait that learners either posses or lack, but it consists of the selective use of specific processes personally adapted to each learning task. He adds that self-regulated component skills are as follows:

(a) setting specific proximal goals for oneself, (b) adopting powerful strategies for attaining the goals, (c) monitoring one's performance selectively for signs of progress, (d) restructuring one's physical and social context to make it compatible with one's goals, (e) managing one's time use efficiently, (f) self-evaluating one's methods, (g) attributing causation to results, and (h) adapting future methods. (p. 66)

Self-regulated learners are not only supposed to succeed academically, but to develop long-life learning skills. Enhancing these skills is seen as a major function of education (Zimmerman, 2002). Studies show that learners do not learn self-regulated strategies automatically and that the development of self-regulated strategies does not develop with age (Orhan, 2007). On the other hand, research shows that self-regulated learning is teachable and can lead to increase in students' achievement (Mirhassani, Akbari, & Dehghan, 2007; Orhan, 2007). However, Zimmerman (2002) states that learners are rarely given choices to practice self-regulation in academic settings. A self-regulated learning perspective has implications for the ways teachers should interact with students. Different studies investigated the role of self-regulated strategies and language learning and found a positive relationship between application of self-regulated learning strategies and success in language learning (Mirhassani, Akbari, & Dehghan, 2007; Orhan, 2007). Research has also depicted that self-regulation facilitates reading comprehension in particular (Nash-Ditzel, 2013; Swalander & Taube, 2007).

According to Nash-Ditzel's (2013) study, teaching techniques based on self-regulation and reading strategies could significantly promote improved reading abilities in college students. Using interviews, think-aloud protocols, informal observations, and document analysis, Nash-Ditzel found that the knowledge and ability to use reading strategies contributed to the students' ability to self-regulate while reading.

Swalander and Taube (2007) investigated the effect of self-regulated learning on reading comprehension. The results showed that family-based prerequisites, academic self-concept, and reading attitude significantly influenced reading comprehension. Academic self-concept showed a direct and strong influence on goal-oriented strategies and on reading comprehension in the eighth grade Swedish students.

In this study, self-regulation strategies were defined and specified in the form of tasks for reading comprehension (Maftoon & Tasnimi, 2014). The tasks were based on the self-regulation strategies proposed by Zimmerman (1989), the researchers designed some tasks for ten reading passages, and then the self-regulation reading tasks were delivered to the experimental group in ten sessions for investigation.

3. Method

Since reading in L2 depends on a number of linguistic and nonlinguistic factors, the main purpose of the present study is evaluating the predictive power of syntactic knowledge, vocabulary breadth, and metacognitive awareness of reading strategies in self-regulated vs. non self-regulated EFL readers.

In other words, the contributing factors in reading which were investigated in his study were both linguistic and non-linguistic. Syntactic knowledge and vocabulary breadth are among linguistic or lower-level processes, while metacognitive awareness of reading strategies is included in non-linguistic or higher-level ones. Furthermore, self-regulation, which is the dependent variable in this study, is a non-linguistic process as well. Therefore, this study takes an interactive approach into account.

To meet the purpose of this study, the researchers attempted to find the most predictive factor (syntactic knowledge, vocabulary breadth, and metacognitive awareness of reading strategies) in reading comprehension in self-regulated vs. non self-regulated readers. More specifically, the following questions guide the current research:

What is the most predictive factor (syntactic knowledge, vocabulary breadth, and metacognitive awareness of reading strategies) in reading comprehension in self-regulated EFL readers?

What is the most predictive factor (syntactic knowledge, vocabulary breadth, and metacognitive awareness of reading strategies) in reading comprehension in non-self-regulated EFL readers?

3.1 Participants

The participants in the study were 149 female and male Iranian EFL language learners studying at Islamic Azad Universities of Qazvin and Tehran (North, and Science and Research Branches). Gender was excluded from the analysis because the ratio of males to females could not be constant. To ascertain the homogeneity of the groups, prior to treatment in terms of their level of language proficiency, paper-based TOEFL (PBT) was administered to 200 EFL learners and 149 learners whose scores were within plus and mines one standard deviation were considered in this study. The participants were randomly assigned to experimental and control groups.

3.2 Instruments

The instruments which were utilized in the present study were as follows:

3.2.1 The TOEFL PBT:

It is a paper-based test that assesses the English language proficiency of L2 learners.
Generally, there are three sections on the paper-based TOEFL: Listening Comprehension, Structure and Written Expression, and Reading Comprehension. However, due to the objectives of this study, only two sections were utilized: Structure and Written Expression, and Reading Comprehension. The reliability of the test, as established against the KR-21 measure of internal consistency, turned out as.71.

The TOEFL PBT was administered as a standardized measure to check the homogeneity of subjects in terms of language. It was also used as a means for assessing the students' syntactic knowledge and reading comprehension. The test was administered in 50 minutes.

3.2.2 The Vocabulary Levels Test

This test is the second version of the Vocabulary Levels Test revised and validated by Schmitt et al. (2001). It was originally made by Nation (1983) and was later revised by him in 1990. It provides an estimate of vocabulary size for language learners. This test measures learners' knowledge of vocabulary from a number of distinct frequency levels. All word-frequency levels, namely the first 2000 words, 3000 words, 5000 words, and 10,000words were considered in this study. In addition, there is a section for academic vocabulary. The test consists of 150 items. At each vocabulary size level are 10 clusters and each cluster has six words and three definitions. The administration time is about 80 minutes. The

test takers are required to match the definitions on the right with the corresponding words on the left in each cluster. Schmitt et al. (2001) conducted a study to validate the test. The reliability of different levels of this version ranged from .92 to .96.

3.2.3 Survey of Reading Strategies (SORS)

This inventory is intended to measure ESL/EFL students' metacognitive awareness and perceived use of reading strategies. This instrument, which is developed by Mokhtari and Sheorey (2002), was adapted from another instrument, Metagognitive Awareness of Reading Strategies Inventory (MARSI), developed by Mokhtari and Reichard (2002). It is a self-report questionnaire comprising 30 items across three subscales:

The inventory is based on a five-point Likert scale measuring how frequently students use the 30 strategies: "I never or almost never do this;" "I do this only occasionally;" "I sometimes do this (about 50 percent of the time);" "I usually do this;" or "I always or almost always do this." According to the authors, the reliability of this instrument is .89, indicating a reasonably dependable degree of consistency in measuring awareness of reading strategies among non-native students of English. Since SORS is a simple, yet effective tool to measure EFL students' awareness of reading strategies, and the participants of this study were Iranian EFL students, translated version of SORS (Zarrati, 2004) was used.

3.3 Data Collection Procedure

The procedure followed to carry out the present study is described in three phases of pre-treatment, treatment, and post-treatment.

3.3.1 Pre-treatment

In order to homogenize students regarding their language proficiency level, the TOEFL PBT was administered. At the same time, the reading section of the TOEFL was used as the pretest to measure the students' reading comprehension. Then, the participants were randomly assigned to experimental and control groups. Since there were six classes, three classes were considered as the experimental group and three classes as the control group.

3.3.2 Treatment

The students in the experimental group received direct teaching of self-regulation strategies in reading through task-supported instruction. The

study was conducted in ten sessions. Each session, first the students' schemata were activated by introducing the topic of the reading text. Then, the students were informed that self-regulation would help them to be an active reader, and that it would assist them to control their reading process, their behavior and their environment. For instance, the researcher introduced environmental structuring, one of the self-regulation strategy in the task sheet (see Appendix), as follows:

Teacher: One of self-regulation strategies is environmental structuring. It helps you to arrange your physical setting better. For instance, you will learn how to isolate, eliminate, or minimize distractions in your environment, or how to break up your study period and spread it over time.

Then the learners had to use self-regulation strategies in the form of the tasks that are explained below. The tasks were based on self-regulation strategies proposed by Zimmerman (1989) (see Table 1). There were eight categories of strategies (see Appendix):

Environmental Structuring
Organizing and Transforming
Goal Setting and Planning
Keeping Records and Monitoring + Organizing and Transforming
Seeking Information + Seeking Social Assistance
Rehearsing and Memorizing
Reviewing Records
Self-evaluation + Self-consequating

The tasks in the environmental structuring category helped the students to pay attention to their surroundings and find the distractions, such as their classmates' whispering and air conditioner. Then they had to mention if they could have adjusted the situation for better, or they should have tolerated the distractions. Organizing and transforming tasks required the learners to skim the text before reading to find out the text organization in terms of title, heading, sub-heading, and paragraphs. Tasks related to goal setting and planning category make students guess how much time they needed to read the text and do the follow-up activities. The tasks in the forth category emphasized keeping records and monitoring, as well as organizing and transforming strategies. To do these tasks, the learners were required to read the text in detail, draw an outline, and highlight the unknown words or structures for further inquiry. The tasks in the next category helped the students to seek information and social assistance. Here, they mentioned which ways they would like to use to remove the ambiguities they had faced in the

previous stage. In rehearsing and memorizing tasks, students got familiar with vocabulary learning strategies and they were required to specify the strategies that helped the most in memorizing unfamiliar words. Reviewing record tasks required learners to go back to the previous phases and check whether they had gone through all the phases. At last, there were self-evaluation and self-consequating tasks which asked students to self-evaluate themselves by answering some questions about their performance, for instance, they should score themselves on how they performed the tasks.

An example of tasks is provided below. Taking environmental structuring strategy as an example, the students in the experimental group were required to practice this strategy in the form of the following task.

Task: Environmental Structuring

Pay attention to your environment. What distracts you? How can you change the situation for the better?

Distractions	I can adjust it by ...	I should tolerate it
Air conditioner		
People's whispering		
Noise from outside the room		
Your thoughts		
Others: ----------------		

Both experimental and control groups enjoyed the same time exposure every session following the phases of pre-reading, during-reading, and after-reading. However, every session, the learners in the experimental group practiced self-regulation strategies on a reading text, but the control group classes were conducted in the conventional way, in a sense that they were only asked to read the reading texts and to do the follow-up reading activities, such as comprehension questions. No self-regulation strategies were introduced to them.

In other words, both groups enjoyed the same time exposure every session. In practice, both followed three phases of pre-reading, during-reading, and after-reading. The only difference was the explanation and application of self-regulation strategies, which were not practiced in the non self-regulated group. After introducing the topic, the non self-regulated students were given time to read the text. Then they were required to do routine reading activities, such as comprehension questions and vocabulary study.

Task-supported teaching was used as a means of instruction because it helps learners to proceduralize strategic solutions to problems (Skehan, 1996). In addition, both task-supported instruction and self-regulation have common priorities in that they both focus on meaning, real world relationship, and outcome. It is also worth mentioning that task-supported teaching has strong empirical evidence (Nunan, 1991).

Since research has shown that self-regulated strategies are not acquired and developed automatically (Orhan, 2007), the learners who did not receive self-regulation treatment were regarded as non self-regulated learners.

3.3.3 Post-treatment

Having practiced ten sessions of reading, the participants in both groups took the very reading comprehension section of the TOEFL as reading comprehension post-test, along with the Vocabulary Levels Test, Survey of Reading Strategies questionnaire (SORS). The participants' syntactic knowledge was measured through the grammar section of the very TOEFL PBT.

4. Results and Discussion

4.1. Results

In order to determine what the most predictive factor (syntactic knowledge, vocabulary breadth and metacognitive awareness of reading strategies) in reading comprehension in self-regulated vs. non-self regulated readers is, two linear regression analyses were run whose results appear in the following.

To answer the first research question, a linear regression was run to find out the most predictive factor (syntactic knowledge, vocabulary breadth and metacognitive awareness of reading strategies) in reading comprehension in self-regulated readers. The model summary statistics indicates that syntactic knowledge of the self-regulated students can predict their performance on the reading comprehension significantly (r = .69, it shows a large-sized effect). The r-squared of .486 indicates that grammar knowledge can predict 48.6 percent of the self-regulated readers' performance on the reading comprehension test. The figures of r-squared and adjusted r-squared (.484 and .479) indicates that the findings of the present regression model can be generalized. In other words, the difference between the r-squared and adjusted r-squared (.487-

.479=.008) indicates that only .8 percent of the variance (.008*100= .8) would be lost if the data were drawn from the population.

The vocabulary breadth is the second predictor that enters the model. The model summary statistics indicates that vocabulary breadth increase the R-value from .69 to .76. And the R^2 is increased from .486 to .590. That is to say the after entering the vocabulary breadth into the regression model, there will be about a 10 percent increase in the predictive power of the regression model (. 590-. 486=.104).

The third variable entered into the regression model, i.e., awareness of metacognitive strategies adds about 2.3 percent (.613-.590=.023) to the predictive power of the regression model. The results of the analysis are presented in Table 2.

Table 2

Model Summary: Syntactic Knowledge, Vocabulary Breadth and Metacognitive Strategies with Reading Comprehension (Self-regulated Group)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.697[a]	.486	.479	2.975
2	.768[b]	.590	.579	2.675
3	.783[c]	.613	.597	2.616
a. Predictors: (Constant), GRAMMAR				
b. Predictors: (Constant), GRAMMAR, VOCAB				
c. Predictors: (Constant), GRAMMAR, VOCAB, STRATEGY				

Table 3 displays the statistics based on which the regression model can be written as:

Reading Comprehension = constant + (Syntactic Knowledge * 561) + (Vocabulary Breadth*.059) + (Strategy*.062)

All of the regression coefficients are statistically significant (P < .05).

Another linear regression was run to answer the second research question to determine what the most predictive factor (syntactic knowledge, vocabulary breadth and metacognitive awareness of reading strategies) in reading comprehension in non self-regulated readers is. The model summary statistics indicates that syntactic knowledge of the self-regulated students is the best predictor of their performance on the reading comprehension significantly (r = .454, it depicts a moderate to large-sized effect). The r-squared of .206 indicates that grammar

knowledge can predict about 20.6 percent of the non self-regulated readers' performance on the reading comprehension test. The close figures of r-squared and adjusted r-squared (.206 and .194) demonstrates that the findings of the present regression model can be generalized. In other words the difference between the r-squared and adjusted r-squared is .012. If the same analysis were run on the population, about 1.2 percent of the predictive power would be lost.

Table 3
Regression Coefficients (Self-regulated Group): Reading Comprehension / Syntactic Knowledge, Vocabulary Breadth & Metacognitive Strategies

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	9.640	1.020		9.449	.000
	GRAMMAR	1.027	.123	.697	8.366	.000
2	(Constant)	7.500	1.043		7.188	.000
	GRAMMAR	.695	.135	.471	5.151	.000
	VOCAB	.076	.018	.394	4.304	.000
3	(Constant)	3.285	2.271		1.446	.152
	GRAMMAR	.561	.147	.381	3.825	.000
	VOCAB	.059	.019	.304	3.067	.003
	STRATEGY	.062	.030	.221	2.078	.041
a. Dependent Variable: POSTTEST						

The variable of metacognitive strategies is the second predictor to enter the regression model. After entering the strategy variable, the R-value increases to .592 and the R-squared increases to .350. In other words, the predictive power of the regression model increases about (.350-.206=14.4) 14.4 percent.

The close figures of R-squared and adjusted R-squared (.350 and .331) demonstrates that the findings of the present regression model can be generalized. In other words the difference between the R-squared and adjusted R-squared (.350-.331=.014) indicates that if the present regression model were made on the data drawn from the population— instead of the present sample—only 1.4 percent of the variance (.014*100= 1.4) would be lost.

Vocabulary breadth is excluded from the regression model because it does not contribute significantly to the regression model (Table 6). It should be noted that although vocabulary breadth is excluded from the regression model, the other two predictors contribute significantly to the regression model. The results of the analysis are presented in Table 4.

Table 4

Model Summary: Syntactic Knowledge, Vocabulary Breadth and Metacognitive Strategies with Reading Comprehension (Non Self-regulated Group)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.454[a]	.206	.194	2.702
2	.592[b]	.350	.331	2.461
a. Predictors: (Constant), GRAMMAR				
b. Predictors: (Constant), GRAMMAR, STRATEGY				

Table 5 displays the statistics based on which the regression model can be written as:

Reading Comprehension = constant + (Syntactic Knowledge * .376) + (Strategy*.114)

All of the regression coefficients are statistically significant ($P < .05$).

Table 5

Regression Coefficients (Non self-regulated Group): Reading Comprehension/ Syntactic Knowledge, Vocabulary Breadth & Metacognitive Strategies

	Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	6.941	.854		8.129	.000
	GRAMMAR	.427	.100	.454	4.288	.000
2	(Constant)	-3.404	2.737		-1.244	.218
	GRAMMAR	.376	.092	.399	4.095	.000
	STRATEGY	.114	.029	.384	3.943	.000
a. Dependent Variable: POSTTEST						

Based on the information displayed in Table 6, it can be concluded that the vocabulary breadth is excluded from the regression model due to its insignificant contribution to the regression model (P = .18> .05).

Table 6
Excluded Variables (Non Self-regulated Group)

Model	Beta In	t	Sig.	Partial Correlation	Collinearity Statistics
					Tolerance
1 VOCAB	.214[b]	1.503	.137	.177	.542
STRATEGY	.384[b]	3.943	.000	.426	.980
2 VOCAB	.175[c]	1.340	.185	.159	.539
a. Dependent Variable: POSTTEST					
b. Predictors in the Model: (Constant), GRAMMAR					
c. Predictors in the Model: (Constant), GRAMMAR, STRATEGY					

4.2. Discussion

Analyses were carried out to find out what the most predictive factor (syntactic knowledge, vocabulary breadth, and metacognitive awareness of reading strategies) in reading comprehension of both self-regulated and non self-regulated EFL readers is.

The results of the linear regression show that as far as reading comprehension is concerned, syntactic knowledge of the self-regulated readers is the most predictive factor followed by vocabulary breadth and metacognitive strategies.

Concerning the non self-regulated readers, syntactic knowledge is the best predictor of their performance on the reading comprehension test. Awareness of metacognitive strategies is the second predictor. However, because of not contributing significantly to the regression model, vocabulary breadth is not entered into the regression.

Previous research findings have supported the impact of syntactic knowledge on reading comprehension. Shiraki (1995) supported the importance of local reading strategies, especially decoding skills of syntax in EFL reading comprehension. Likewise, Lefrancois and Armand (2003) found that syntactic awareness is strongly correlated to reading comprehension. In another study, Martohardjono, Otheguy, Gabriele, de Goeas-Malone, Szupica-Pyrzanowski, Troseth, Rivero, and Schutzman

(2005) supported the relative contribution of the knowledge of L1 and L2 syntax to L2 reading in a group of bilingual readers. Compatible with this study, Shiotsu and Weir (2007) showed the relative superiority of syntactic knowledge over vocabulary knowledge in reading comprehension. Similar supportive results on the positive association between grammar and reading comprehension have also been reported by Jung (2010) who reviewed research on reading comprehension with an emphasis on the role of grammar in L2 reading.

Comparing r-squared of the investigated reading components in both groups reveals that syntactic knowledge is more powerful predictor in the experimental group and that vocabulary breadth, which is not entered into the regression model for the control group, is the second predictor of reading comprehension in the experimental group. Therefore, it is suggested that training on self-regulation increases the predictive power of syntactic knowledge and vocabulary breadth in reading comprehension.

Carrying out self-regulation reading tasks might be a possible cause for the findings. For example, organizing and transforming task and rehearsing and memorizing task (see Appendix) draw students' attention to syntax and vocabulary. Organizing and transforming task required students to analyze the reading text and outline it. Rehearsing and memorizing task raised students' awareness in vocabulary strategies. The designed self-regulation reading tasks were not practiced in the control group.

It is also worth mentioning that both linguistic (lower-level) and non-linguistic (higher-level) processes entered into the regression models. Therefore, previous research (Nassaji, 2003) indicating that both linguistic and non-linguistic processes contribute significantly to reading comprehension is confirmed.

5. Conclusion and Implications

This paper aimed at evaluating the predictive power of syntactic knowledge, vocabulary breadth, and metacognitive awareness of reading strategies in reading comprehension in self-regulated vs. non self-regulated EFL readers. The findings of this study offer support for the relative superiority of syntactic knowledge over vocabulary breadth, and metacognitive awareness of reading strategies in predicting performance on reading comprehension, regardless of being self-regulated or not.

Another conclusion of this paper is that training on self-regulation increases the predictive power of syntactic knowledge and vocabulary breadth in reading comprehension. Moreover, it is concluded that both linguistic (lower level) and non-linguistic (higher level) processes contribute significantly to reading comprehension.

The results of this study put forward some considerable pedagogical implications. Duo to the fact that the findings showed the importance of both linguistic and non-linguistic factors in EFL reading comprehension, it can be maintained that materials and curriculum developers should include both lower-level and higher-level skills in EFL reading books so that students can have adequate chances of improving their knowledge in these two areas. In addition, owing to the fact that self-regulation can significantly promote reading ability, test constructors and materials developers can construct reading tests and tasks in which this ability is tapped.

It is also worth mentioning that self-regulation is a cost-effective teaching method with characteristics compatible with the current wave of educational reform in Iran, such as accounting for learners' needs and goals, allowing student creativity and innovation, and enhancing students' sense of self-worth. Self-regulation does not only enhance students' reading comprehension, it also helps learners to transform their mental abilities into academic skills.

Notwithstanding the limitations of the present study, the researchers hope it offers useful perspectives on L2 reading comprehension, test score predictability, and test content validation. In addition, language teachers, especially those teaching the reading skill are highly recommended that they include educational practices on self-regulation to facilitate students' reading comprehension.

References

Block, E. L. (1992). See how they read: Comprehension monitoring of L1 and L2 readers. *TESOL Quarterly, 26*(2), 319-343.

Chun, D. M. (1997). Research on text comprehension in multimedia environments. *Language Learning & Technology, 1*(1), 60-81.

Dornyei, Z. (2005). *The psychology of the language learner Individual differences in second language acquisition*. Mahwah, New Jersey: Lawrence Erlbaum Associates.

Grabe, W. (1991). Current Developments in Second Language Reading Research. *TESOL Quarterly, 25*(16), 375-406.

Grabe, W., & Stoller, F. L. (2002). *Teaching and researching reading.* Edinburgh: Pearson Education.

Hinkel, E. (2006). Current perspectives on teaching the four skills. *TESOL Quarterly, 40*(1), 109-131.

Jung, J. (2010). Second language reading and the role of grammar. *Columbia University Working Papers in TESOL & Applied Linguistics, 9*(2), 29-48.

Koda, K. (2005). *Insights into second language reading: A cross-linguistic approach.* Cambridge: Cambridge University Press.

Koda, K. (2007). Reading and language learning: Crosslinguistic constraints on second language reading development. *Language Learning, 57*, 1-44.

Kolic-Vehovec, S. (2006). Metacognitive strategies and reading comprehension in elementary-school students. *European Journal of Psychology of Education, 21*(4), 439-451.

Konza, D. (2003). *Teaching children with reading difficulties*. Melbourne: Social Science Press.

Lefrancois, P., & Armand, F. (2003). The role of phonological and syntactic awareness in second-language reading: The case of Spanish-speaking learners of French. *Reading and Writing: An Interdisciplinary Journal, 16*, 219-246.

Lahuerta, A. C. (2011). Clarification of L2 reading theories through the analysis of empirical studies. *Aula Abierta, 39*(2), 149-158.

Liu, F. (2010). A short analysis of the nature of reading. *English Language Teaching, 3*(3), 152-157.

Maftoon, P., &, Tasnimi (2014). Using self-regulation to enhance EFL learners' reading comprehension. *JLTR, 5*(4), 844-855.

Mirhassani, A., Akbari, R., & Dehghan, M. (2007). The relationship between Iranian EFL learners' goal-oriented and self-regulated learning and their language proficiency. *Journal of Teaching English Language and Literature Society of Iran, 1*(2), 117-132.

Mokhtari, K., & Reichard, C. A. (2002). Assessing students' metacognitive awareness of reading strategies. *Journal of Educational Psychology, 94*(2), 249-259.

Mokhtari, K., & Sheorey, R. (2002). Measuring EFL students' awareness of reading strategies. *Journal of Developmental Education*, *25*(3), 2-10.

Martohardjono, G., Otheguy, R., Gabriele, A., de Goeas-Malone, M., Szupica-Pyrzanowski, M., Troseth, E., Rivero, S., & Schutzman, Z. (2005). The role of syntax in reading comprehension: A study of bilingual readers. In J. Cohen, K. T. McAlister, K. Rolstad, & J. MacSwan(Eds.), *Proceedings of the 4th international symposium on bilingualism* (pp. 1522-1544). Somerville: Cascadilla Press.

Nash-Ditzel, S. (2013). Metacognitive reading strategies can improve self-regulation. *Journal of College Reading and Learning*. Retrieved October 7, 2013, from http://www.thefreelibrary.com/Metacognitive+reading+strategies +can+improve+self-regulation a0226161749.

Nassaji, H. (2003). Higher-level and lower-level text processing skills in advanced ESL reading comprehension. *The Modern Language Journal, 87*(2), 261-276.

Nassaji, H., & Fotos, S. (2004). Current developments in research on the teaching of grammar. *Annual Review of Applied Linguistics, 24*, 126-145.

Nation, I. S. P. (1983). Testing and teaching vocabulary. *Guidelines, 5*(1), 12-25.

Nunan, D. (1991). Communicative tasks and the language curriculum. *TESOL Quarterly*, *25*(2), 279-295.

Nuttall, C. (1996). *Teaching reading skills in a foreign language*. Oxford: Mcmillan Heinemann.

O'Malley, J. M., & Chamot, A. U. (1990). *Learning strategies in second language acquisition*. Cambridge: Cambridge University Press.

Orhan, F. (2007). Applying self-regulated learning strategies in a blended learning instruction. *World Applied Sciences Journal, 2*(4), 390-398.

Qian, D. (1999). Assessing the roles of depth and breadth of vocabulary knowledge in reading comprehension. *The Canadian Modern Language Review, 56*(2), 282-308.

Qian, D. (2002). Investigating the relationship between vocabulary knowledge and academic reading performance: An assessment perspective. *Language Learning, 52*(3), 513-536.

Richards, J. C. (1976). The role of vocabulary teaching. *TESOL Quarterly 10*(1), 77-89.

Schmitt, N., Schmitt, D., & Clapham, C. (2001). Developing and exploring the behavior of two versions of the vocabulary levels test. *Language Testing 18*(1), 55-88.

Schoonen, R., Hulstijn, J, & Bossers, B. (1998). Metacognitive and language-specific knowledge in native and foreign language reading comprehension: An empirical study among Dutch students in grades 6, 8 and 10. *Language Learning, 48*(1), 71-106.

Shiotsu, T., & Weir, C. J. (2007). The relative significance of syntactic knowledge and vocabulary breadth in the prediction of reading comprehension test performance. *Language Testing, 24*(1), 99-127.

Shiraki, S. (1995). The role of local reading strategies in EFL reading comprehension. *Memories of Osaka Kyoiku University, 44*(1), 157-166.

Singhal, M. (2001). Reading proficiency, reading strategies, metacognitive awareness and L2 readers. *The Reading Matrix, 1*(1), 1-9.

Skehan, P. (1996). A framework for implementation of task-based instruction. *Applied Linguistics, 17*(1), 38-62.

Stanovich, K.E. (2000). *Progress in understanding reading. Scientific foundations and new frontiers.* New York: Guilford.

Swalander, L., & and Taube, K. (2007). Influences of family based prerequisites, reading attitude, and self-regulation on reading ability. *Contemporary Educational Psychology, 32*(3), 206-230.

Urquhart, A. H., & Weir, C. J. (1998). *Reading in a second language: Process, product and practice.* Edinburgh: Addison Wesley Longman.

Zarrati, Z. (2004). *The relationship between Iranian EFL learners' multiple intelligence and their use of reading strategies.* Unpublished master's thesis, Islamic Azad University, Science and Research Branch, Tehran.

Zimmerman, B. (1989). A social cognitive view of self-regulated academic learning. *Journal of Educational Psychology, 82*(3), 1-23.

Zimmerman, B. J. (2002). Becoming a self-regulated learner: An overview. *Theory into Practice, 41*(2), 64-70.

APPENDIX

Self-regulation Reading Tasks

You are going to go through some reading self-regulation phases which help you to be an active reader metacognitively, motivationally, and behaviorally. Therefore, you will be able to control yourself, your behavior and your environment better while reading.

Please fill in the charts and answer the questions as recommended below.

I   Environmental Structuring

Pay attention to your environment. What distracts you? How can you change the situation for better?

Distractions	I can adjust it by…	I should tolerate it
Air conditioner		
People's whispering		
Noise from outside the room		
Your thoughts		
Others: ----------------		

II   Organizing and Transforming

Take a quick look at the text, and then complete the following chart.

Questions	Answers
What is the title of the text?	
How many paragraphs are there in the text?	
How many headings are there in the text?	
How many subheadings are there in the text?	

III   Goal Setting and Planning

Before reading the text, go through the following steps:

Go over the pre-reading questions.

Guess how much time you need to read the text and do the activities:

> I guess I need --------------- minutes to go through the text and do the activities.

IV   Keeping Records and Monitoring + Organizing and Transforming

Read the text paragraph by paragraph. Please take the following steps in this phase:

> If you face any ambiguous word, phrase, or sentence, take one of the following steps to highlight them for further investigation:
> Annotating
> Underlining them
> Jotting them down on your notebook
> Is there any other way you would like to use to highlight them? If yes, please specify?
> ---
> Draw an outline for the paragraph.
> Write a 1-3 sentence summary, according to your outline.

V   Seeking Information + Seeking Social Assistance

Which of the following ways did you use or would you like to use to remove the ambiguities in the previous phase? Please specify them.

Ways	I tried this way to …
Guessing	
Surfing the net	
Asking the teacher	
Asking your friends	
Consulting a dictionary	

VI   Rehearsing and Memorizing

Which strategy helps you most to memorize unfamiliar words? Please put a check mark on the following list (You may check more than one option).

Strategy	
Writing them down	
Using mental imagery	
Using repetition	
Using flash cards	
Sticking them on the wall	
Learning them from the context	
Learning them through derivation	
Recording and then listening to them	
Learning them through synonyms or antonyms	

VII   Reviewing Records

Go back to the previous phases and check the following:

Have you taken all the steps?
 Is there any unclear point? If so, remove it before going to the last phase.
V III   Self-evaluation + Self-consequating
Self-evaluate yourself by answering the following questions. Put a checkmark next to your answers.

How much did you get the text?   100%   ⬭   50-100% ⬭   less than 50%⬭
Which phase helped you more to deal with the text?   ------------------
Have you done the activities correctly?   All of them ⬭   Most of them ⬭   Some of them ⬭
Was your time estimation correct?   Yes ⬭   No   ⬭
How was your performance in general?   Very well   ⬭   So-so ⬭   Not satisfactory ⬭
How do you score yourself from 1 to 20?   ------------------
Is there anything else you would like to mention about your reading   performance? Please specify (you may specify it in Persian).   ---
How do you like this way of reading a text?   Merits: ---   Demerits: ---