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The Predictive Power of Syntactic Knowledge, Vocabulary Breadth and Metacognitive Strategies for L2 Reading Fluency

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Abstract

Fluent reading is a multifaceted ability that integrates several linguistic and non-linguistic processes. Accordingly, recognizing the critical components of fluent reading is highly significant in planning and implementing effective reading programs. This study was undertaken to evaluate the predictive power of syntactic knowledge, vocabulary breadth, and metacognitive awareness of reading strategies in the reading fluency of Iranian EFL learners. To this end, a sample of 149 Iranian EFL language learners took the Vocabulary Levels Test, Survey of Reading Strategies Questionnaire (SORS), a TOEFL PBT, and a fluency test. The linear regression results indicated that vocabulary breadth was the first predictor of readers' performance on reading fluency, followed by metacognitive awareness of reading strategies. At the same time, syntactic knowledge was not entered into the regression model. Moreover, the findings confirmed the contribution of both linguistic and non-linguistic processes to reading fluency. Having a clear picture of fluency components can be advantageous to teaching reading comprehension and test score predictability.

Keywords: Reading fluency, Syntactic knowledge, Vocabulary breadth, Metacognitive awareness.

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1. Introduction

Reading is probably the most important skill for second language learners in academic contexts (Grabe, 2017; Sarbazi et al., 2021; Taşçı & Turan, 2020). Accordingly, the scope and depth of research on reading in L2 has grown remarkably. Some researchers addressed the importance of reading fluency and concluded that successful L2 reading comprehension does not depend exclusively on vocabulary size (Abatyihun, 2018; Sarbazi et al., 2021; Nation, 2009).

Reading fluency is a multi-layered concept that may not be defined easily. The National Reading Panel (NICHD, 2000) has identified fluency and comprehension as two critical components of an effective reading program. The panel defines fluency as the ability "to read orally with speed, accuracy, and proper expression" (p. 4).

Introducing fluency as a complex and multifaceted concept, Grabe (2009, cited in Grabe, 2010) presents a more comprehensive definition. He defines fluency as "the ability to read rapidly with ease and accuracy, and to read with appropriate expression and phrasing. It involves a long incremental process, and text comprehension is the expected outcome" (p. 72). In the same vein, Rasinski (2004) defines reading fluency as "accurate and automatic decoding of the words in the text, along with expressive interpretation of the text, to achieve optimal comprehension" (p. 2). He states that reading fluency acts as a bridge between word decoding and comprehension, two primary components of the reading skill. Rasinski adds that at one end of this bridge, there are accuracy and automaticity. At the other end, there is prosody which is linked to comprehension. It is, therefore, essential to examine reading fluency more extensively and examine the effectiveness of its contributing factors through rigorous empirical research.

Few studies in L2 contexts have explored reading fluency and its contributing components. Therefore, the present study took a componential approach toward reading fluency to determine the relative importance of linguistic and non-linguistic factors involved in reading fluency. In so doing, three variables of

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syntactic knowledge, vocabulary breadth, and metacognitive awareness of reading strategies were selected. The study aimed to find the most predictive variable for reading fluency among Iranian EFL learners. In what follows, the variables of the study, reading fluency, syntactic knowledge, vocabulary breadth, and metacognitive strategies, are elaborated, and some related empirical studies are reviewed.

2. Literature Review

The importance of reading fluency in successful reading comprehension has been addressed by many researchers (Grabe, 2017; Mehigan, 2020; Rupley et al., 2020). Reading fluency is generally defined as having three components: accuracy of decoding, automaticity, and prosody (Rasinski, 2004). Accuracy of decoding refers to the ability to decode words accurately in text. Automaticity is the ability to recognize words with minimal attentional resources quickly, and prosody is defined as the ability to read with appropriate phrasing and expression.

To improve their reading accuracy, readers need at least two decoding skills: phonemic awareness and phonics. Phonemic awareness refers to the ability to identify sounds or phonemes in spoken words, whereas phonics is the understanding that there is a relationship between phonemes and letters (NICHD, 2000). According to Rasinski (2004), accuracy is determined by the percentage of words read correctly per minute (WCPM/Total).

Automaticity enables students to identify letters, syllables, and words rapidly and accurately. As decoding becomes faster and more effortless, more cognitive resources are freeing up for other tasks, such as text comprehension. In this regard, readers need the practice to move beyond conscious decoding to automatic decoding. The number of words read correctly in one minute is calculated (WCPM) to assess the automaticity or speeding rate (Rasinski, 2004).

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According to Rasinski (2004), prosody, or expressive interpretation, enables readers to understand the text. When readers use appropriate volume, tone, emphasis, phrasing, and other elements in oral expression, they give evidence of interpreting meaning from the text. Prosody is assessed using a qualitative rubric (e.g., Rasinski's adapted Multidimensional Fluency Scale).

Accuracy and automaticity are based on Laberge's automaticity theory and Perfetti's verbal efficiency theory (Taguchi, Gorsuch, & Sasamoto, 2006). Both theories assert that attention resource capacity is limited.

Automaticity theory seems to be the most widely accepted theory for reading fluency. According to this theory, when readers recognize words fast and automatically with a minimum amount of attention, they can use most of their attentional resources to comprehend better. Automaticity theory states that automaticity in lower identification skills, such as decoding and word recognition, leads to allocating more attentional resources to higher-level processes, such as comprehension and metacognition. In other words, after decoding processes are sufficiently practiced, it is possible to focus the mind on higher-level processes; therefore, comprehension is improved (Crosson & Lesaux, 2010; Rasinski, 2004; Taguchi et al., 2006).

Verbal efficiency theory, on the other hand, expands the notion of automaticity beyond lower-level decoding processes. According to this theory, higher-level reading processes can be automatized, such as activating background knowledge or using cognitive and metacognitive strategies. This theory also emphasizes that the more efficient lower-level reading processes are, the more attentional resources are available for higher-level processes of reading. Verbal efficiency theory differs from automaticity theory in that Verbal efficiency theory suggests the possibility that some higher-level reading processes can be automatized too.

These theories—automaticity theory and verbal efficiency theory—are among bottom-up models of reading, stating that higher-level processes activate

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after the completion of lower levels. However, more recent reading theories are interactive in which comprehension is considered the result of both lower-level and higher-level processes.

Only a few studies have explored L2 reading fluency development; among those attempts are the studies carried out by Crosson and Lesaux (2010), Taguchi and Gorsuch (2002), and Taguchi, Takayasu-Maass, and Gorsuch (2004).

Crosson and Lesaux (2010) investigated the relationship between text-reading fluency and reading comprehension in 76 Spanish-speaking fifth graders. They reported that text-reading fluency explained the unique variance in reading comprehension above and beyond word-reading fluency.

Researching first-year Japanese university EFL students of beginner to intermediate proficiency, Taguchi and Gorsuch (2002) focused on repeated reading to help students read faster and comprehend better. The results showed that the participants' reading comprehension scores increased with repeated reading and that fluent reading led to steady incremental growth in participants' mean comprehension scores.

In another study, Taguchi, Takayasu-Maass, and Gorsuch (2004) completed quantitative and qualitative analyses of participants' reading behaviors. They suggested that EFL readers' reading rate favorably affects learners' perceptions of reading activities and facilitates reading comprehension. Furthermore, they found that assisted repeated reading and extensive reading are equally effective in increasing participants' reading rate.

The present study was concerned with both lower-level and higher-level reading processes. Syntactic knowledge and vocabulary breadth require lower-level processes, while applying metacognitive strategies demands higher-level processing (Taguchi et al., 2006). In what follows, the relationship between each of these variables and reading is elaborated briefly.

Reading skill is closely associated with syntactic knowledge. The relationship between reading and grammar has been investigated in various

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studies (e.g., Lefrancois & Armand, 2003; Martohardjono et al., 2005; Shiotsu & Weir, 2007). Therefore, language learners must know how phrases are structured and cases are assigned to phrases. However, many scholars (Nassaji, 2007; Shiotsu & Weir, 2007) believed that the role of syntax in L2 reading had been underestimated in research. Nevertheless, the current research aimed to reconsider the role of syntactic knowledge in reading since "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).

Recognition of depth and breadth of vocabulary as two crucial dimensions of vocabulary knowledge is necessary to understand the relationship between vocabulary and reading comprehension (Qian, 2002; Taşçı & Turan, 2020). Vocabulary breadth, another study variable, refers to vocabulary size, while vocabulary depth is defined as how well a learner knows a word. Qian states that these two dimensions are closely associated with each other and with reading comprehension. Breadth or size of vocabulary can be evaluated in terms of recognition, recall, or production of vocabulary items. Research has shown that reading and vocabulary knowledge affect each other reciprocally and causally (Koda, 2005; Taşçı & Turan, 2020; Pulido, 2007). Koda (2005) concludes that in the earlier stages, vocabulary knowledge facilitates reading, while in later stages, vocabulary learning involves conceptual expansion.

Learning how to learn has been an important issue in education and psychology. By developing metacognitive strategies, the third variable of the present study, one can understand, control, and manipulate the cognitive process to maximize learning. Research findings indicate that skilled reading requires the ongoing monitoring of comprehension and regulation according to reading goals. In other words, learners who are skilled in employing metacognitive strategies and, therefore, are aware of their abilities are more strategic and perform better

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than those who lack awareness of monitoring and regulation (Dardjito, 2019; Kolic-Vehovec, 2006; Singhal, 2001).

Taking a componential approach to reading ability, some researchers have investigated the relative importance of contributing factors involved in reading ability (e.g., Atai & Nikuinenezhad, 2012; Maftoon & Tasnimi, 2014; Shiotsu & Weir, 2007). The results of Atai and Nikuinenezhad's (2012) study verified that knowledge of grammar enhances the performance on reading comprehension of EFL readers. Moreover, the findings indicated that syntax was a better predictor of reading comprehension than vocabulary breadth. Maftoon and Tasnimi (2014) probed the predictive power of syntactic knowledge, vocabulary breadth, and metacognitive awareness of reading strategies in reading comprehension. They divided their participants into self-regulated vs. non-self-regulated readers. Regression analysis results showed the relative superiority of syntactic knowledge over other variables in predicting performance on reading comprehension in both groups. In their study, Shiotsu and Weir (2007) found support for the relative superiority of syntactic knowledge over vocabulary knowledge in reading comprehension. In this study, the grammar scope was clearly described as encompassing the knowledge of inflectional morphology, verb forms, and transformations.

As echoed in the literature, reading fluency is essential for successful reading (Nation, 2005). Theoretical assumptions suggest that fluent readers are sufficiently fast and accurate in their word recognition; therefore, they are more motivated to read (Grabe, 2017; Mehigan, 2020). However, it is widely acknowledged that readers may not read as easily and quickly in their L2 as in their native languages (Maluch & Sachse, 2020). Despite its importance, reading fluency is not vastly investigated in L2 reading literature, and it is considered an underdeveloped construct in EFL language studies, both in research and practice (Grabe, 2010; Rupley et al., 2020). Therefore, in the present study, the researcher sought to address this gap by evaluating the predictive power of syntactic

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knowledge, vocabulary breadth, and metacognitive strategies in L2 reading fluency to assess the contribution of linguistic versus non-linguistic components.

3. Method

3.1. Participants

This ex-post-facto study selected 149 Iranian male and female EFL language learners studying at Islamic Azad Universities of Qazvin and Tehran (North and Science and Research Branches) through purposive sampling. The participants were native speakers of Persian, ranging from 20 to 30 years of age. To ascertain the homogeneity of the participants in terms of language proficiency, 200 EFL learners took a paper-based TOEFL (PBT). Then, two-thirds of the population, 149 students whose scores were within plus and minus one standard deviation of the mean, were considered participants in the study to have a normal distribution.

3.2. Instrumentation

The instruments used in the study were as follows:

1. The 2003 version of the paper-based TOEFL was utilized to assess the English language proficiency of L2 learners. The paper-based TOEFL generally has three sections: 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 (40 items) and Reading Comprehension (30 items).

   The Structure and Written Expression section measured syntactic knowledge in standard written English, and the reading comprehension section measured reading ability and understanding short passages.

   The TOEFL PBT was administered to check the homogeneity of the participants in terms of language proficiency. It was also used as a means for assessing the students' syntactic knowledge.

   It is worth mentioning that factor analysis was carried out to probe the validity of the TOEFL. Only one factor was extracted, which accounted for 62.82

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percent of the total variance. Since reading and grammar sections of the TOEFL loaded on a single factor, it can be claimed that the exclusion of the listening section did not distort its construct validity.

2. The second version of the Vocabulary Levels Test, revised and validated by Schmitt, Schmitt, and Clapham (2001), was used to estimate vocabulary size for the participating language learners. This test measured learners' vocabulary knowledge from several frequency levels: the first 2000 words, 3000 words, 5000 words, 10,000 words, and academic vocabulary. The test consists of 150 items.
3. Survey of Reading Strategies (SORS) was utilized to measure ESL/EFL students' metacognitive awareness and perceived use of reading strategies. This instrument is a self-report questionnaire comprising 30 items across three subscales of global reading subscale (13 items), problem-solving subscale (8 items), and support reading subscale (9 items) (Mokhtari & Reichard, 2002).
4. The fluency test, taken from Rasinski (2004), was used to measure all three components of reading fluency—accuracy, rate, and prosody.

The steps were as follows:

1. Each student was asked to read the passage for one minute, and their reading was tape-recorded.
2. Any uncorrected errors, such as mispronunciations, substitutions, omissions, insertions, and reversals, made by the student were marked. The researcher did not interrupt the students to correct their errors.
3. Accuracy was determined by dividing the number of words read correctly per minute (WCPM) by the total number of words read (WCPM/total). This index was a percentage.
4. The rate was determined by calculating the total number of words read correctly in one minute (WCPM).
5. To assess prosody, the researcher consulted a rubric (Table 1) and assigned a score. Scores ranged from 4 to 16. Table 1 presents the fluency

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rubric utilized in this study. It is a multidimensional fluency rubric designed by Rasinski (2004). This rubric measures appropriate expression and volume, phrasing, smoothness, and pace in reading.

As Table 1 shows, each student's score on prosody was the sum of the four scores on the four components of prosody, namely, expression and volume, phrasing, smoothness, and pace. In other words, each student received a score of 1 to 4 on each component. Then, the sum of the scores on these four components formed each participant's score for prosody. The criterion for each score is explained in Table 1.

Table 1. *Multidimensional Fluency Scale*

Dimension	1	2	3	4
A. Expression and Volume	Reads with little expression or enthusiasm in voice. Reads words as if simply to get them out. Little sense of trying to make text sound like natural language. Tends to read in a quiet voice.	Some expression. Begins to use voice to make the text sound like natural language in some areas of the text, but not others. Focus remains largely on saying the words. Still reads in a quiet voice.	Sounds like natural language throughout the better part of the passage. Occasionally slips into expressionless reading. Voice volume is generally appropriate throughout the text.	Reads with good expression and enthusiasm throughout the text. Sounds like natural language. The reader is able to vary expression and volume to match his/her interpretation of the passage.

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B. Phrasing	Monotonic with little sense of phrase boundaries, frequent word-by-word reading.	Frequent two- and three-word phrases giving the impression of choppy reading; improper stress and intonation that fail to mark ends of sentences and clauses.	Mixture of run-ons, mid-sentence pauses for breath, and possibly some choppiness; reasonable stress/intonation.	Generally well-phrased, mostly in clause and sentence units, with adequate attention to expression.
C. Smoothness	Frequent extended pauses, hesitations, false starts, sound-outs, repetitions, and/or multiple attempts.	Several "rough spots" in the text where extended pauses, hesitations, etc., are more frequent and disruptive.	Occasional breaks in smoothness caused by difficulties with specific words and/or structures.	Generally smooth reading with some breaks, but word and structure difficulties are resolved quickly, usually through self-correction.
D. Pace (during sections of minimal disruption)	Slow and laborious.	Moderately slow.	Uneven mixture of fast and slow reading.	Consistently conversational.

3.3. *Data Collection Procedure*

First, the TOEFL PBT was administered to all participants to establish homogeneity of the students regarding language proficiency level. At the same time, its grammar section was used to measure the participants' syntactic knowledge. Then all participants took the Vocabulary Levels Test, Survey of Reading Strategies Questionnaire (SORS), and fluency test.

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To assess fluency, the researcher asked each student to read a passage for one minute, and his/her reading was audiotaped. Then, the audiotaped data were analyzed to determine three components of fluency, namely accuracy, rate, and prosody. The procedure for analyzing the audiotaped data was as follows:

The researcher listened to each participant's performance twice. Once the number of words read correctly per minute (WCPM) was calculated to determine the rate. Then, this number was divided by the total number of words (WCPM/total) to determine accuracy.

A second time, the researcher used the rubric (Table 1) to assess the third component of fluency (prosody). Since prosody itself has four components—expression and volume, phrasing, smoothness, and pace—each learner's score was determined based on the sum of the scores on these parts. The researcher assigned a score of 1 to 4 to each student's expression and volume, phrasing, smoothness, and pace separately, based on the multidimensional fluency scale (Table 1). Then, the scores were summed up.

For the sake of reliability, another instructor also assessed students' prosody independently, and then the ratings were correlated. The inter-rater reliability coefficient showed a significant agreement ($r(147) = .92$, $P = .000 < .05$) between the two raters.

4. Results

According to the data displayed in Table 2, the reliability indices of the instruments range from .94 (vocabulary breadth and reading fluency) to .70 (reading comprehension section of the pretest).

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Table 2. *Reliability Indices of Instruments*

	N of Items	Mean	Variance	
TOEFL	70	19.76	47.50	.71
Syntactic Knowledge	40	11.78	20.02	.60
Vocabulary Breadth	156	66.40	581.76	.94
Metacognitive Strategies	150	98.64	179.60	.82
Reading Fluency	150	124.79	338.31	.94

The results displayed in Table 3 indicate that the present data meet the normality assumption. The ratios of skewness and kurtosis over their standard errors were lower than +/- 1.96.

Table 3. *Descriptive Statistics*

	N	Skewness			Kurtosis		
	Statistic	Statistic	Std. Error	Ratio	Statistic	Std. Error	Ratio
READING	149	.329	.199	1.65	-.329	.395	-0.83
VOCAB	149	.062	.199	0.31	-.709	.395	-1.79
GRAMMAR	149	.341	.199	1.71	.013	.395	0.03
STRATEGY	149	.369	.199	1.85	.204	.395	0.52

Linear regression was run to predict readers' reading fluency based on their syntactic knowledge, vocabulary breadth, and metacognitive awareness of reading strategies. As shown in Table 4, the model summary statistics indicate that the vocabulary breadth of the students is the best predictor of their performance on the reading fluency (r = .52, it did represent a large-sized effect). The r-squared of .276 indicates that vocabulary breadth can predict 27.6 percent of the readers' performance on the reading fluency test. The reasonably close figures of r-squared and adjusted r-squared (.276 and .271) proves that the

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findings of the present regression model can be generalized. In other words, the difference between the r-squared and adjusted r-squared (.276-.271=.005) indicates that if the present regression model were made on the data drawn from the population – instead of the present sample – only .6 percent of the variance (.005*100= .5) would be lost.

The metacognitive awareness of reading strategies is the second predictor that enters the model. The model summary statistics indicate that meta-cognitive awareness of reading strategies increases the R-value from .52 to .59. Moreover, the R^2 is increased from .276 to .351. That is to say that after entering the meta-cognitive awareness of reading strategies into the regression model, there will be about a 7.5 percent increase in the predictive power of the regression model (.351-.276=.075). However, the syntactic knowledge is not entered into the regression model due to its non-significant contribution to the model (Table 4)

Based on these results, it can be concluded that the null hypothesis as L2 vocabulary breadth and metacognitive awareness of reading strategies are not statistically significant predictor variables for L2 reading fluency is rejected. It should be noted that although syntactic knowledge is not entered into the regression model, the other two predictors contribute significantly to the regression model.

Table 4. *Model Summary of Syntactic Knowledge, Vocabulary Breadth and Metacognitive Awareness of Reading Strategies with Reading Fluency*

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.525[a]	.276	.271	15.70754
2	.593[b]	.351	.342	14.91541

a. Predictors: (Constant), VOCAB

b. Predictors: (Constant), VOCAB, STRATEGY

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An F-test in regression compares the fits of different linear models, and it can assess multiple coefficients simultaneously. Based on the statistically significant ANOVA results (F (2,146) = 39.53, P < .05, ω^2 = .58), it can be concluded that the regression model, including vocabulary breadth and metacognitive awareness of reading strategies as predictors, significantly predict learners' performance on the reading fluency test. The results are illustrated in Table 5.

Table 5. *ANOVA Results*

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	13801.704	1	13801.704	55.939	.000[b]
	Residual	36268.846	147	246.727		
	Total	50070.550	148			
2	Regression	17589.998	2	8794.999	39.533	.000[c]
	Residual	32480.553	146	222.470		
	Total	50070.550	148			

a. Dependent Variable: FLUENCY

b. Predictors: (Constant), VOCAB

c. Predictors: (Constant), VOCAB, STRATEGY

Table 6 displays the statistics based on which the regression model can be written as;

Reading Fluency = constant + ((Vocabulary* .329) + (Strategy *.399) +

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

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Table 6. *Regression Coefficients*

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	98.206	3.780		25.978	.000
	VOCAB	.400	.054	.525	7.479	.000
2	(Constant)	63.610	9.120		6.975	.000
	VOCAB	.329	.054	.431	6.128	.000
	STRATEGY	.399	.097	.291	4.127	.000

a. Dependent Variable: FLUENCY

Based on the information displayed in Table 7, it can be concluded that the syntactic knowledge is not entered into the regression model due to its non-significant contribution to the model (P = .20 > .05).

Table 7. *Excluded Variables*

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics
						Tolerance
1	GRAMMAR	.193[b]	2.169	.032	.177	.607
	STRATEGY	.291[b]	4.127	.000	.323	.896
2	GRAMMAR	.112[c]	1.273	.205	.105	.570

a. Dependent Variable: FLUENCY

b. Predictors in the model: (Constant), VOCAB

c. Predictors in the model: (Constant), VOCAB, STRATEGY

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The following Normal P-P Plot indicates that the regression model met the normality assumption. The majority of the dots fell on the diagonal, indicating that the distribution of scores was normal.

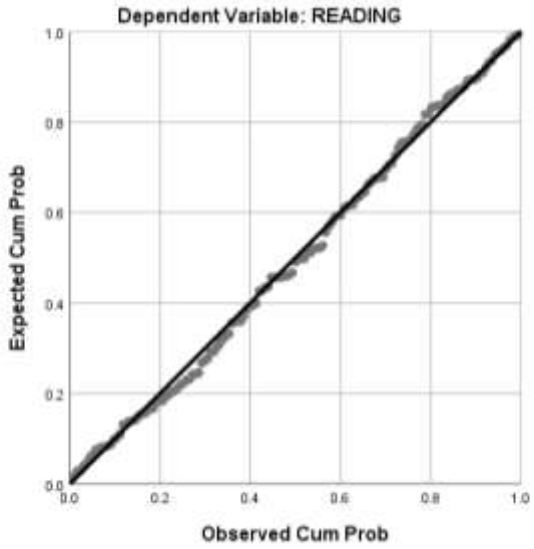


Figure 1. Normal P-P plot of regression standardized residual

The results displayed in the following scatter plot indicated that the assumptions of linearity and homoscedasticity were met to some extent. The spread of dots did not form a curve shape, indicating that the regression model was linear. They also did not form a funnel shape, i.e., narrow at one end and wide at the other. Thus, it can be claimed that the assumption of homoscedasticity (homogeneity of variances) was met.

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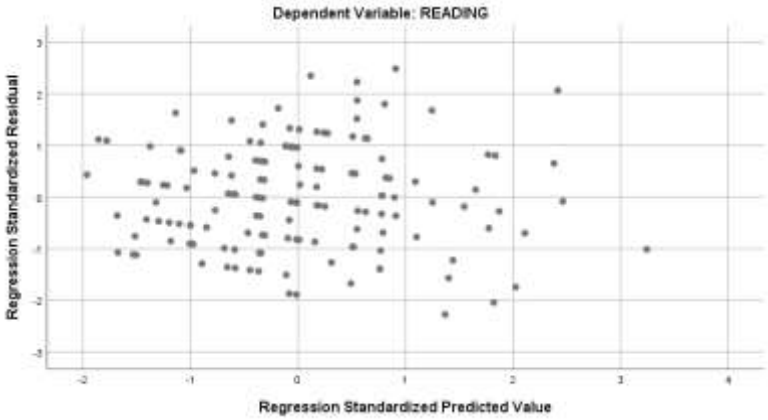


Figure 2. Scatter plot of regression

5. Discussion

The purpose of this study was to evaluate the predictive power of syntactic knowledge, vocabulary breadth, and metacognitive awareness of reading strategies in the reading fluency of EFL learners. According to regression analysis results, vocabulary breadth was the first predictor of reading fluency, followed by metacognitive awareness of reading strategies. Nonetheless, syntactic knowledge did not enter into the regression model.

Identifying vocabulary breadth as the first predictor of learners' performance on the reading fluency test can be justified on some grounds. According to Lexical Quality Hypothesis (Perfetti, 2007), skilled reading depends on high-quality lexical representations, and therefore vocabulary should be a powerful predictor of reading. The findings support Li and Kirby (2014), who argue that breadth of vocabulary is required for good L2 reading. The results of a review on the vital role of vocabulary knowledge in reading performance by Hamzehlou Moghadam, Zaial, and Ghaderpour (2012) also indicated that vocabulary knowledge is fundamental to reading. The researchers asserted that since lexical errors are recurring more than other errors, they form an essential obstruction to both comprehension and communication.

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While vocabulary breadth surpassed syntactic knowledge in regression coefficients in this study, the findings cannot easily suggest that syntactic knowledge is quite non-significant. In a systematic review, Choi and Zhang (2021) synthesized the findings in the literature on the relative contribution of vocabulary and grammatical knowledge to L2 reading. Their study results showed that there was no clear evidence supporting which type of linguistic knowledge (i.e., vocabulary and grammatical knowledge) was more contributive than the other. Moreover, the inconclusive findings might be attributed to the variations in the design of the studies. So, a few words of caution seem necessary here. The present research was based on Rasinski's (2004) fluency scale; follow-up research may come up with other findings regarding other scales and instruments. Furthermore, since no previous studies have examined the relative roles of vocabulary, grammar, and metacognitive awareness in L2 reading fluency, it is not possible to directly compare the findings of this study and those of previous studies.

Metacognitive awareness of reading strategies was the second predictor in the regression model. This likely happens because EFL learners have a greater awareness of the cognitive process than native speakers. They are also more conscious and deliberate about the learning process (Abatyihun, 2018). Metacognition helps readers choose the most appropriate strategies according to a given task and their language learning preferences. In this regard, this study is in line with many empirical studies that indicated proficient strategic reading requires metacognitive awareness (e.g., Kolic-Vehovec, 2006; Yüksel & Yüksel, 2012).

Furthermore, the findings provide more evidence for the interactive model of reading. In other words, both linguistic (vocabulary breadth) and non-linguistic (metacognitive awareness of reading strategies) variables entered into the regression models, indicating that both lower-level and higher-level processes contribute significantly to reading fluency.

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6. Conclusion

This study addressed the predictive power of syntactic knowledge, vocabulary breadth, and metacognitive awareness of reading strategies in the reading fluency of Iranian EFL learners. The findings offered new insights into the significant mediating impact of vocabulary breadth and metacognitive strategies on reading fluency. According to the results of the study, vocabulary breadth was the first predictor of the learners' reading fluency, followed by metacognitive awareness of reading strategies. Nevertheless, syntactic knowledge did not contribute to the regression model. More specifically, the results of this study showed that vocabulary breadth accounted for over 27 percent of the variance in reading fluency. Therefore, vocabulary breadth was the more efficient predictor than metacognitive strategies and syntactic knowledge, respectively.

In addition, the findings support the fact that both linguistic and non-linguistic processes contribute significantly to reading ability since metacognitive awareness of reading strategies, which requires non-linguistic and higher-level processing, entered the regression model as the second predictor. Therefore, the study results align with the interactive reading model, confirming that both bottom-up and top-down processing is required for successful reading.

The results of this study have pedagogical implications for teaching, testing, and materials development. As vocabulary breadth was found to be the strongest significant predictor of reading fluency, the study supports the notion that vocabulary knowledge is a necessary component of reading fluency for EFL learners. Therefore, teachers must find ways to increase students' vocabulary knowledge. In addition, EFL reading instructors are recommended to pay considerable attention to metacognitive awareness in their pedagogy parallel with their attempts to teach vocabulary and grammar to enhance the learners' reading fluency. Furthermore, instructors, materials developers, and test constructors should consider both linguistic and non-linguistic processes of reading. The

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researcher recommends conducting further studies in which other variables such as background knowledge, vocabulary depth, and different proficiency levels will be included.

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