International Journal of English Language & Translation Studies
ISSN: 2308-5460

The Relationship between Phonological Memory, L2 Reading Comprehension and Vocabulary Size of Iranian High School Students

[PP: 64-72]

Parviz Ghazanfar
Department of English Language Teaching, College of Humanities
Khouzestan Science and Research Branch, Islamic Azad University
Ahvaz, **Iran**

Mohammad Taghi Farvardin
[Corresponding Author]
Department of English Language Teaching, College of Humanities
Ahvaz Branch, Islamic Azad University
Ahvaz, **Iran**
farvardin.tefl@gmail.com

ABSTRACT

Phonological memory (PM) is viewed as one of the key elements in language learning. The present study was an effort to investigate the relationship between PM, reading comprehension, and vocabulary size of Iranian high school EFL learners. The participants were 58 high school freshmen and senior students. Administering Oxford Quick Placement Test (QPT), the participants were divided into two groups of proficiency, i.e. elementary and lower intermediate. Afterwards, two measures of PM, namely nonword repetition (NWRP) and nonword recognition (NWRC) tests, a reading comprehension test, and Schmitt's vocabulary levels test were administered. The results showed a significant relationship between reading comprehension, vocabulary size, and PM measures at both levels of proficiency. Moreover, the regression analyses showed that NWRC can be a better predictor of L2 learners' performance on reading comprehension at the lower intermediate level, and NWRC was found to be a better predictor of vocabulary size for both groups of language proficiency.

Keywords: working memory, phonological memory, vocabulary size, reading comprehension, L2 learning

ARTICLE INFO The paper received on: **28/05/2015** , Reviewed on: **30/06/2015,** Accepted after revisions on: **15/08/2015**

Suggested citation:
Ghazanfar, P. & Farvardin, M. T. (2015). The Relationship between Phonological Memory, L2 Reading Comprehension and Vocabulary Size of Iranian High School Students. *International Journal of English Language & Translation Studies. 3(3), 64-72.* Retrieved from http://www.eltsjournal.org

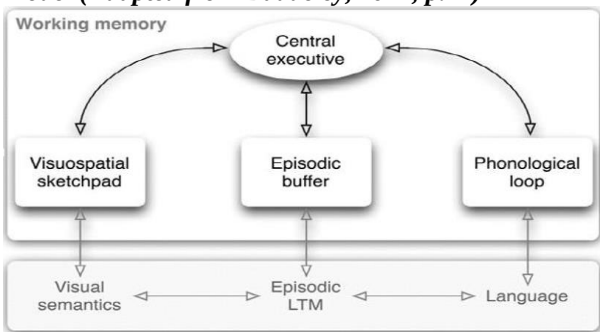
1. Introduction

Memory is an indispensable and key element in language learning (Skehan, 1998). Memory is defined as the process of maintaining information over time (Matlin, 2005). One of the prominent models of memory was proposed by Atkinson and Shiffrin (1968). According to this model, memory can be divided into three parts: sensory memory (SM), short-term memory (STM), and long-term memory (LTM). STM is the memory which retains information long enough to allow our senses to use it. LTM is another component of memory in which the information has enough time to be processed and learned. Then it can be moved from STM to LTM. This part which is believed to have a limitless capacity is capable to hold the learned information for a long time (Atkinson & Shiffrin, 1968).

Another model was proposed by Baddeley and Hitch in 1974. This model seemed more reasonable than the Atkinson-Shiffrin model which claimed STM is a static store. Baddeley and Hitch's model showed STM to be a dynamic process. According to Baddeley and Hitch (1974), one of the sub-components of STM was working memory (WM). The term WM evolved from the earlier concept of STM. According to Baddeley (2012), STM refers to the simple temporary storage of information, whereas WM implies a combination of storage and manipulation. However the two are still on occasion used interchangeably.

In Baddeley's model (2012), WM consists of four constituents: (1) a central executive, an attention control system which was in charge of integrating information from various WM sub-systems and LTM; (2) the phonological loop (PL) which was in charge of the provisional preservation of acoustic- or speech-based material was considered to sub-serve phonological memory (PM, (3) the visual-spatial sketchpad, which handles visual images and spatial information; and (4) an episodic buffer, involved in the binding of information from subsidiary systems and long-term memory into a unitary episodic representation.

Figure 1: Multi-Component Working Memory Model (Adapted from Baddeley, 2012, p.11)



It is believed that there is a close link between PM and language learning. Ellis (1996) claimed that significant portion of language learning involved sequence learning, and even abstract grammatical knowledge was a product of the analysis of sequential information. According to Kormos and Sáfár (2008), "as PM is responsible for remembering sequential information, so the role of PM in language learning is far greater than supposed" (p. 263).

Vocabulary knowledge is an important element in second language (L2) learning. Vocabularies are considered to improve comprehension and production in the L2. It is also indicated that PM capacity is an important predictor of vocabulary learning in children and adolescents (e.g. , Gathercole & Adams, 1996; Gathercole , Service , Hitch , Adams , & Martin , 1999) as well as adults (e.g., Gathercole , Hitch , Service , & Martin , 1997).

It is also proposed that memory is in close relation with reading comprehension. While there are several models of reading comprehension, something they all have in common is the assumption that information processing occurs in WM which has a finite capacity (Kintsch & Rawson, 2005). Nation

(2005) also stated that at least in poor comprehension there is a close link between language comprehension and verbal memory.

Some previous L2 studies suggest that individual differences in PM and WM capacity predicted reading ability at lower proficiency levels (e.g., Harrington & Sawyer, 1992). These studies found that learners with higher WM capacity performed better than those with lower WM capacity on the given tasks.

The present study aimed to investigate the relationship between Iranian high school students' PM and L2 reading comprehension and also the relationship between PM and vocabulary size. Not to mention, the researcher tried to use some PM measures and found out which measurement could predict both Iranian high school students' reading comprehension and vocabulary size. The current study attempted to answer the following questions:

1- What is the relationship between Iranian high school students' PM and L2 reading comprehension?
2- What is the relationship between Iranian high school students' PM and L2 vocabulary size?
3- Which measure of PM can best predict Iranian high schools' L2 reading comprehension?
4- Which measure of PM can best predict Iranian high schools' L2 vocabulary size?

2. Review of the Literature

PM was highlighted as a potentially important source of individual differences in information processing. Besides, it was stated that PM which was a sub-constituent of WM was a key element to different facets of second language learning (Kormos & Sáfár, 2008). Although some studies emphasized the effect of PM on reading comprehension, some researches denied the existence of connections between PM and reading comprehension. Chun & Payne (2004), for instance, examined the role of learner differences in L2 German reading comprehension and vocabulary acquisition of 13 L1 English students. The researchers did not find any significant relationship between PM and reading comprehension or vocabulary acquisition test. On the other hand, recent studies indicated that there was a strong relationship between PM and reading comprehension (e.g., Alptekin & Ercetin, 2009; Harrington & Sawyer, 1992). Harrington and Sawyer (1992), for example, investigated the relationship between L2 PM capacity and L2 reading among Japanese ESL learners. The results showed a moderately strong relationship between PM capacity and both TOEFL reading (r =.54, p<.05) and TOEFL grammar (r =.57, p<.05). In addition, there was a weak relationship between L2 reading span and cloze passage (r =.33, p<.05). Alptekin and Ercetin (2009) also found evidence of mediating role of proficiency in the relationship between PM capacity and L2 reading ability. They studied 30 L1 Turkish undergraduate students with advanced L2 English proficiency. The participants were asked to work and complete both a reading comprehension test and two PM tests. The research results showed that there was a significant correlation (r =.40, p<.05) between scores on one PM measure and participant's ability to make inferences in the texts. But no additional relationships were found among PM and reading comprehension.

In many other studies of both L1 and L2 vocabulary acquisition, a close link between nonword repetition (NWRP) test and vocabulary knowledge was detected (e.g., Martin & Ellis, 2012; Masoura & Gathercole, 2005; Service, & Kohonen, 1995). However, foreign vocabulary learning showed sort of diminution in the relationship between

NWRP test and vocabulary knowledge in more advanced language learners. In Masoura and Gathercole's (2005) study of Greek children, NWRP test ability was relatively high related to the knowledge of English vocabulary (r = .48, p<.01). They found that PM had a great impact on vocabulary learning at earlier stages. They concluded that as the knowledge of L2 enlarged, the existing L2 knowledge contributed a facilitated role in L2 vocabulary learning. Later, Martin and Ellis (2012) investigated the relationship between PM, WM, and vocabulary and grammar learning in an artificial foreign language. NWRP, NWRC, and listening span were used as memory measures. Individual differences in final abilities in vocabulary and grammar correlated between 0.44 and 0.76.

3. Methodology

3.1 Participants

The participants in this study were all male Iranian EFL freshmen and senior students studying at Shahed Sheikh Ansari high school located in Ahvaz. The participants' first language was Farsi. The range of the participants' age was from 15 to 18. After administering Oxford quick placement test (QPT), the participants were divided into the elementary and lower intermediate groups. The number of the participants in the elementary and lower intermediate groups was 30 and 28, respectively.

3.2 Instruments

Quick Placement Test

The quick placement test (QPT), version 2, was applied to measure the level of the participants' language proficiency. The test included 40 multiple choice questions assessing the participants' L2 proficiency. The test was completed in 30 minutes. Every correct answer received one point and the total score was 40. A summary of the test levels and band scores are depicted in Table 3.5.

Table 1: QPT Band Scores

Level	Band Score (out of 60)
Beginner	0-17
Elementary	18-29
Lower Intermediate	30-39
Upper Intermediate	40-47
Advanced	48-60

Memory tests

Both nonword recognition (NWRC) and nonword repetition (NWRP) tests were used in this research to assess PM capacity. The NWRC test included 16 items where the participants were asked to listen to two groups of three, four, five, and six nonwords and then distinguish whether the two groups contained identical sounds or not. Each correct answer received one point, and the total point was 16. The stimuli were selected from Gathercole, Pickering, Hall, and Peaker. (2001). Table 2 depicts the instance stimuli used in the NWRC test. An inter-stimulus interval of 1.5 seconds was applied to separate the first and the second presentation.

Table 2: Example Stimuli for NWRC Test

Examples of non-word recognition stimuli	correct responses
List 1: chad pook jick mun terdge List 2: chad pook jick mun terdge	Same
List 1: turg deet peb chim nam ked List 2: turg deet chim peb nam ked	Different

The second PM test was NWRP. This test is one of the popular measures of PM capacity where participants have to repeat nonwords. Nonwords are of different lengths and do not exist in the given language but conform to its phonotactic rules. Following the studies carried out before, the participants in the present study heard a list of one-syllable nonwords and were asked to repeat them (Farvardin, Afghari, & Kousha, 2014; Martin & Ellis, 2012). There were four lists at each of four lengths: three, four, five, and six words. The nonwords were taken from a stimulus pool of nonwords provided by

Gathercole et al. 2001). The highest possible score was 22 correct phonemes. Two raters scored the participants' responses to the NWRP. The inter-rater reliability of the two sets of scores was $r = .85$ ($p < .01$).

Reading Comprehension Test

The reading measure included four short reading passages at each level of proficiency. The passages were selected from the test bank of the Bureau of Education. The participants were asked to complete each reading comprehension test. Each passage was followed by 5 multiple choice comprehension questions. So the total point was 20. The Cronbach's alpha of the reading comprehension tests for the elementary and lower intermediate groups were .77 and .82, respectively.

Schmitt's Vocabulary Size Test

To test the vocabulary size and find out the relationship between PM and vocabulary size, Schmitt et al.'s (2001) vocabulary levels test version 2 (2000-word frequency level) was applied. The vocabulary levels test consisted of 30 items with the amount time of 15 minutes.

3.3Data Collection Procedure

The QPT was applied in the first step of research to distinguish the level of the participants' proficiency. The test was administered one week before conducting the study. In the second session, the reading comprehension and the vocabulary size tests were administered on the participants. The participants answered each in 15 minutes. In the third session, NWRC and NWRP tests were administered to assess the participant' PM capacity. The required times for the NWRC and NWRP tests were 10 and 5 minutes, respectively.

4. Data Analysis

In order to answer the research questions, data from the NWRP, NWRC, vocabulary size, and the reading comprehension tests were entered into SPSS 21 (2012). The Pearson product-moment correlations followed by multiple regressions were investigated for the test scores. Significance level was set at $p< 0.05$.

4.1 Results

Table 3 shows the means (Ms), standard deviations (SDs), and ranges of the scores of the vocabulary size, reading comprehension, NWRP and NWRC tests for the elementary and lower intermediate groups.

Table 3: Descriptive Statistics of Elementary and Lower Intermediate Groups

	Elementary				Lower intermediate			
Variables	M	SD	Max	Min	M	SD	Max	Min
Vocabulary Size Test	16.73	5.07	27	8	**21.43**	4.74	30	13
Reading Comprehension Test	11.87	2.67	17	8	12.07	2.77	17	7
NWRP Test	9.20	2.35	16	6	**11.18**	2.13	17	9
NWRC Test	**12.57**	1.61	16	10	12	2	16	8

Table 3 displays that the elementary group had the higher mean score on NWRC test (M= 12.57, SD=1.61). However, the higher mean score on the NWRP test was obtained by the lower intermediate group (M= 11.18, SD=2.13). In addition, the lower intermediate group gained a higher score on vocabulary size test (M= 21.43, SD=4.74).

To answer the first and the second research questions, Pearson correlations between PM tests, vocabulary size test, and the reading comprehension test were calculated. Table 4 depicts the correlation coefficients between PM tests (NWRP and NWRC), vocabulary size, and reading comprehension test at both levels of language proficiency.

Table 4: Pearson Correlations between Vocabulary Size, Reading Comprehension, and PM Tests

	Elementary				Lower Intermediate			
Variable	1	2	3	4	1	2	3	4
1. Vocabulary Size	–				–			
2. Reading Comprehension	.54**	–			.64**	–		
3. NWRP	.52**	.49**	–		.59**	.74**	–	
4. NWRC	.64**	.41*	.51**	–	.73**	.42*	.48**	–

* $p< .05$, **$p< .01$

Cite this article as: Ghazanfar, P. & Farvardin, M. T. (2015). The Relationship between Phonological Memory, L2 Reading Comprehension and Vocabulary Size of Iranian High School Students. *International Journal of English Language & Translation Studies. 3(3), 64-72.* Retrieved From http://www.eltsjournal.org

Table 4 shows that NWRP test was moderately correlated with vocabulary size for the elementary group (r = .52, p< .01), and moderately high correlated with vocabulary size for the lower intermediate group (r = .59, p< .01). Moreover, NWRC test was moderately high correlated with vocabulary size test for the elementary group (r = .64, p< .01), and strongly correlated for the lower intermediate (r = .73, p< .01). The highest correlation coefficient between vocabulary size and PM tests was that of the NWRC and vocabulary size at the lower intermediate group (r = .73, p< .01). As Table 4 illustrates, NWRP test was also moderately correlated with the reading comprehension scores for the elementary group (r = .49, p< .01), and strongly correlated for the lower intermediate group (r = .74, p< .01). Moreover, NWRC test was correlated with the reading comprehension scores at both proficiency levels (elementary: r = .41, p< .05; lower intermediate, r = .42, p< .05). The highest correlation coefficient between reading comprehension scores and NWRP, and NWRC scores was that of reading comprehension and NWRP at the lower intermediate level,(r = .74 , p< .01).

Multiple regressions between independent variables (NWRP and NWRC tests as measures of PM) and dependent variable (vocabulary size scores) were computed so as to figure out the level of relationship between the variables, and to find out which variable could be a better predictor of L2 vocabulary size (Tables 5 and 6).

Table 5: Model Summary Results of Vocabulary Size Test

Proficiency Level	R	R Square	Std. Error of the Estimate
Elementary	.68	.47	3.84
Lower Intermediate	.77	.59	3.17

As shown in Table 5, R^2 for the elementary and lower intermediate groups are .47 and .59, respectively. In other words, the results tell us that for elementary and lower intermediate groups, the PM tests accounted for 47% and 59% of the variance, respectively.

Table 6: Coefficients in Regression Analysis

Proficiency Level	Factors	Unstandardized Coefficients		Standardized Coefficients	Sig.
		B	Std. Error	Beta	
Elementary	(Constant)	-8.86	5.60	–	.12
	NWRP Test	.61	.37	.27	.11
	NWRC Test	1.59	.51	**.50**	**.001**
Lower Intermediate	(Constant)	-2.71	4.15	–	.52
	NWRP Test	.62	.34	.26	.08
	NWRC Test	1.44	.34	**.61**	**.001**

Dependent Variable: Vocabulary Size Test Scores

Table 6 shows that between the measures of PM, NWRC test had significant Beta values at both elementary level (B = .50, p< .01), and lower intermediate level (B = .61, p< .01). The results show that NWRC could better predict vocabulary size of the participants. To find out which variable could be a better predictor of the participants' L2 reading comprehension, multiple regressions between independent variables (NWRP and NWRC tests as measures of PM) and dependent variable (reading comprehension scores) were computed (Tables 7 and 8).

Table 7: Model Summary Results of Reading Comprehension

Proficiency Level	R	R Square	Std. Error of the Estimate
Elementary	.53	.28	2.36
Lower Intermediate	.79	.62	1.77

As displayed in Table 7, R^2 for the elementary and lower intermediate groups are .28 and .62, respectively. The results reveal that for the elementary and lower intermediate groups, the PM tests accounted for 28% and 62% of the variance, respectively.

Table 8: Coefficients in Regression Analysis

Proficiency Level	Factors	Unstandardized Coefficients		Standardized Coefficients	Sig.
		B	Std. Error	Beta	
Elementary	(Constant)	3.03	3.43	–	.38
	NWRP Test	.45	.23	.37	.06
	NWRC Test	.38	.32	.23	.24
Lower Intermediate	(Constant)	-.48	2.32	–	.84
	NWRP Test	.62	.34	.26	.08
	NWRC Test	1.04	.19	**.75**	**.001**

Dependent Variable: Reading Comprehension Scores

Table 8 depicts that between the measures of PM, NWRC test had significant Beta values at lower intermediate level (B = .75, p< .01). The results show that NWRC could better predict the reading comprehension scores of the participants at the lower intermediate group. The range of the correlation coefficients between measures of PM and reading comprehension were .52 to .73 (p<.01).

4.2 Discussion

The findings showed that for the elementary and lower intermediate groups, the PM tests accounted for 28% and 62% of the variances of the reading comprehension scores, respectively. The results showed evidence that PM may play a key role in reading comprehension performance. The results were in line with some previous studies (e.g., Alpetckin & Ercetin, 2009; Harrington & Sawyer, 1992). On the other hand, the results were against the findings of Chun and Payne (2004). The findings are also in line with the results of the previous studies which had revealed a close link between PM and L2 vocabulary learning (e.g., Martin & Ellis, 2012; Masoura & Gathercole, 2005; Service, & Kohonen, 1995). Indeed, for elementary learners, the strength of the association between PM and vocabulary size was identical to that previously seen. For example, NWRC test was moderately high correlated with vocabulary size test for the elementary group (r = .64, p< .01), and strongly correlated for the lower intermediate (r = .73, p< .01). Regression analyses, further, showed that NWRC might be a good predictor of L2 learners' performance on reading comprehension at the lower intermediate level (r = .59, p<.01). Also, it was found that both NWRC and NWRP tests were highly correlated with vocabulary size (p<.01). The results of the study showed that between the measures of PM, NWRC test had significant Beta values at both elementary level (B = .50, p< .05), and lower intermediate level (B = .61, p< .05). Therefore the results revealed that NWRC was found to be better predictor of vocabulary size for both groups of proficiency.

5. Conclusion

In general, the findings of the present study lent further support to the evidence that PM ability could play a vital role in young adults' L2 learning. There were some limitations in this study. The participants were all male. Furthermore, various types of reading comprehension questions could have been used other than multiple choice test. Moreover, only NWRP and NWRC tests were applied for the PM measures, but it should be noted that other types of PM measures could have been used such as digit span task. Further research is needed to provide answers to the questions pertaining to the relationships between PM and other aspects of L2 acquisition in other ESL classroom contexts. In addition, since the design of the present study was correlational, in showing existing relationships among factors, the causal mechanisms should be uncovered and this requires further investigation.

About the Authors:

Parviz Ghazanfar holds an MA in TEFL from Islamic Azad University, Khouzestan Science and Research Branch, Ahvaz, Iran. He has been teaching English in the Ministry of Education for

over 28 years. His research areas of interest include psycholinguistics and teaching skills in a foreign language.

Mohammad Taghi Farvardin holds a Ph.D. in TEFL. He is currently an assistant professor in the Department of English Language Teaching at Islamic Azad University, Ahvaz Branch, Ahvaz, Iran. His research interests include psycholinguistics, teaching and learning skills in a foreign language, and L2 vocabulary learning.

References:

Alptekin C., & Erçetin G. (2009). Assessing the relationship of working memory to L2 reading: Does the nature of comprehension process and reading span task make a difference? *System, 37*, 627- 639. http://dx.doi.org/10.1016/j.system.2009.09.007

Atkinson, R. C., Shiffrin, R. M. (1968). Human memory: a proposed system and its control processes. In *The Psychology of Learning and Motivation: Advances in Research and Theory*, ed. KW Spence, pp. 89–195. New York: Academic. http://dx.doi.org/10.1016/s0079-7421(08)60422-3

Baddeley, A. D. (2012). Working Memory: Theories, Models, and Controversies. *Annual Review of Psychology*, *63*, 1-29. http://dx.doi.org/10.1146/annurev-psych-120710-100422

Baddeley, A. D., Hitch, G. J. (1974). Working Memory. In *The Psychology of Learning and Motivation: Advances in Research and Theory*, ed. GA Bower, pp. 47–89. New York: Academic. http://dx.doi.org/10.1016/s0079-7421(08)60452-1

Chun, D.M., & Payne, J. S. (2004). What makes students click: Working memory and look-up behavior. *System, 32*, 481-503. http://dx.doi.org/10.1016/j.system.2004.09.008

Ellis, N. C. (1996). Sequencing in SLA: Phonological memory, chunking, and points of order. *Studies in Second Language Acquisition, 18*, 91–126. http://dx.doi.org/10.1017/s0272263100015060

Farvardin, M. T., Afghari, A. & Koosha, M. (2014). The effect of dual n-back task training on phonological memory expansion in adult EFL learners at the beginner level. *English Language Teaching, 7*(9), 137-143. http://dx.doi.org/10.5539/elt.v7n9p137

Gathercole, S. E., & Adams, A. M. (1996). Children's phonological working memory: Contributions of long term knowledge and rehearsal. *Journal of Memory and Language, 33*, 672–688. http://dx.doi.org/10.1006/jmla.1994.1032

Gathercole, S. E., Hitch, G. J., Service, E. & Martin, A. J. (1997). Phonological short term memory and new word learning in children. *Developmental Psychology, 33* (6), 966–979. http://dx.doi.org/10.1037//0012-1649.33.6.966

Gathercole, S. E., Pickering, S. J., Hall, M., & Peaker, S. J. (2001). Dissociable lexical and phonological influences on serial recognition and serial recall. *Quarterly Journal of Experimental Psychology, 45A*, 1–30. http://dx.doi.org/10.1080/02724980042000002

Gathercole, S. E., Service, E., Hitch, G., Adams, A.M., & Martin, A. J. (1999). Phonological short-term memory and vocabulary development: Further evidence on the nature of the relationship. *Applied Cognitive Psychology, 13*, 65-77. http://dx.doi.org/10.1002/(sici)1099-0720(199902)13:1<65::aid-acp548>3.0.co;2-o

Harrington, M., & Sawyer, M. (1992). L2 WM capacity and L2 reading skill. *Studies in Second Language Acquisition, 14*, 25-38. http://dx.doi.org/10.1017/s0272263100010457

IBM Corp. Released. (2012). *IBM SPSS Statistics for Windows* (Version 21.0). Armonk, NY: IBM Corp.

Kintsch, W., & Rawson, K. A. (2005). Comprehension. In M. J. Snowling & C. Hulme (Eds.), *The science of reading: A handbook* (pp. 211-226). Malden, MA:

Blackwell Pub. http://dx.doi.org/10.1002/9780470757642.ch12

Kormos, J. & Sáfár, A. (2008). Phonological short-term memory, WM and foreign language performance in intensive language learning. *Language Cognition, 11*(2). 261-271. http://dx.doi.org/10.1017/s1366728908003416

Martin, K. I. & Ellis, N. (2012). The roles of phonological short-term memory and working memory in L2 grammar and vocabulary learning. *Studies in Second Language Acquisition, 34*, 379– 413. http://dx.doi.org/10.1111/j.1467-9922.2007.00408.x

Masoura, E. V. & Gathercole, S. E. (2005). Contrasting contributions of phonological short-term memory and long-term knowledge to vocabulary learning in foreign language. *Memory 13* (3/4), 422–429. http://dx.doi.org/10.1080/09658210344000323

Matlin, M. W. (2005). *Cognition*. Crawfordsville: John Wiley & Sons, Inc.

Nation, K. (2005). Children's reading comprehension difficulties. In M. J.Snowling & C. Hulme (eds.). *The science of reading: A handbook*. Malden, MA: Blackwell, 248–265. http://dx.doi.org/10.1002/9780470757642.ch14

Quick Placement Test. (2001). Oxford: Oxford University Press.

Schmitt, N., Schmitt, D., Clapham, C. (2001). Developing and exploring the behaviour of two new versions of the vocabulary levels test. *Language Testing, 18*, 55-88. http://dx.doi.org/10.1177/026553220101800103

Service, E., & Kohonen, V. (1995). Is the relationship between PM and foreign language learning accounted for by vocabulary acquisition? *Applied Psycholinguistics, 16*, 155-72. http://dx.doi.org/10.1017/s0142716400007062

Skehan, P. (1998). *A cognitive approach to language learning*. Oxford: Oxford University Press.

Cite this article as: Ghazanfar, P. & Farvardin, M. T. (2015). The Relationship between Phonological Memory, L2 Reading Comprehension and Vocabulary Size of Iranian High School Students. *International Journal of English Language & Translation Studies. 3(3), 64-72.* Retrieved From http://www.eltsjournal.org