Middle-East Journal of Scientific Research 13 (7): 956-962, 2013
ISSN 1990-9233

DOI: 10.5829/idosi.mejsr.2013.13.7.3174

Investigating Iranian Test-takers' Cognitive and Metacognitive Strategy Use: IELTS Reading Section in Focus

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Abstract: This study reports an investigation of Iranian test-takers' use of cognitive and metacognitive strategies while performing on IELTS reading tests. Specifically, the study set out to investigate: a) the relationship between Iranian test-takers' use of cognitive and metacognitive strategies and their L2 reading test performance on the reading section of the IELTS test; and b) the role gender might play in Iranian test-takers' use of cognitive and metacognitive strategies. 60 adult Iranian EFL learners who had recently completed an IELTS preparation course took a sample IELTS test, followed by a cognitive and metacognitive questionnaire on how they thought while completing the reading section. Pearson correlation and independent-samples t-test were run to analyze the data. The results suggested that there was a strong positive correlation between Iranian test-takers' use of cognitive and metacognitive strategies and their performance on the reading section of the IELTS test. It was also found that there was no significant difference in strategy use between male and female Iranian test-takers. Discussion of the findings and implications for further research are articulated.

Key words: Cognitive and metacognitive strategies · L2 reading · IELTS exam

INTRODUCTION

Throughout the past decades, Language testing (LT) research has focused on providing a model of language ability. In this regard, there has also been plenty of research aimed at the identification and characterization of individual characteristics that influence variation in performance on language tests. Bachman [1] has identified two types of systematic sources of variability [p.350]:

- Variation due to differences across individuals in their communicative language ability (CLA), processing strategies and personal characteristics; and
- Variation due to differences in the characteristics of the test method or test tasks.

Although attempts have been made to specify the model of CLA, the current theory of strategic competence influencing second language (L2) test performance remains in its early developmental stage. For instance, Purpura [2] points out that the depiction of metacognitive strategies in Bachman and Palmer's model [3] is not based on empirical research. In an attempt to overcome such shortcomings, LT researchers have approached L2 test performance in relation to strategies used by test-takers through the process of taking tests as a potential means of investigating the issue of variation caused by individual differences.

A major part of this area of research has been concerned with the nature of L2 reading, in which an attempt has been made to identify and describe test-taking strategies test-takers might employ when taking a test. These studies have attempted to draw a distinction between what readers did to solve the test item problem (i.e., test-taking strategies) and what they might do in order to read a text (i.e., reading strategies). Along the same line of research, this study aimed at investigating a) the relationship between Iranian test-takers' use of cognitive and metacognitive strategies and their EFL reading test performance on the reading section of the IELTS test; and b) the role gender might play in male and female Iranian test-takers' use of cognitive and metacognitive strategies.

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Review of Literature: LT researchers have begun to approach L2 test performance in relation to strategies used by test-takers through the process of taking a test. In this regard, cognitive and metacognitive strategies have received considerable attention. The literature on cognitive and metacognitive strategies has revealed that they are closely related, postulating that metacognitive strategies have a direct impact on cognitive strategies in L2 learning, use or performance [e.g., 1-10]. Moreover, it has been found that cognitive strategies, in turn, have a direct impact on L2 performance because they are directly involved in the target language use [4].

In addition, research on L2 reading strategy use has revealed how strategic readers interact with a written text and how their strategic behavior is related to effective reading comprehension [e.g., 11-18]. In fact, there is now a general consensus that successful L2 readers know how to use appropriate strategies to enhance text comprehension [19-21].

More relevant to the issue under investigation in this study has been the work of researchers who aimed at understanding the nature of cognitive and metacognitive strategies that influence language test performance. For instance, Purpura [2] investigated the relationship between perceived cognitive and metacognitive strategy use and language test performance through the applications of the structural equation modelling (SEM) approach. He reported that metacognitive strategy use had a significant and positive effect on cognitive processing (values between 0.59 and 0.86) which, in turn, directly impacted the language performance.

Phakiti [22] utilized a cognitive and metacognitive questionnaire drawn from the existing literature together with retrospective interviews and an EFL achievement test to examine the relationship between Thai learners' cognitive and metacognitive strategy use and their reading test performance. He found that cognitive and metacognitive strategies were both positively correlated with the reading test performance. In his study, Phakiti [22] also focused on success levels and compared the differences in the strategy use and reading performance among highly successful, moderately successful and unsuccessful learners by means of factorial multivariate analysis of variance (MANOVA) and found significant differences among these learner groups. Many other researchers have also shown that successful learners differ from less successful ones in both the quantity and quality of cognitive and metacognitive strategy use [23, 20, 24, 25, among others].

Song [26] utilized a revised strategy questionnaire mainly based on Purpura [2] to examine the extent to which cognitive and metacognitive strategy use accounted for Chinese test-takers' performance. Having employed regression analyses, Song [26] found that cognitive and metacognitive strategies accounted for a large part of the test scores.

In short, it can be seen in the relevant literature that the use of cognitive and metacognitive strategies may depend on various factors such as the personality characteristics of test-takers, the setting in which testing occurs and the nature of test tasks. Accordingly, it can be claimed that research on the relationship between strategic competence and test performance awaits more investigation in more novel contexts. In an attempt to contribute in this regard, the present study focused on Iranian test-takers' use of cognitive and metacognitive strategies in the reading section of the IELTS test and its relationship to their performance.

Research Questions: This study was an attempt to examine Iranian test-takers'cognitive and metacognitive strategy use in the reading section of the IELTS test. In so doing, the study aimed at answering the following research questions:

- Is there any relationship between Iranian test-takers' use of cognitive and metacognitive strategies and their EFL reading test performance on the reading section of the IELTS test?
- Is there a significant difference between male and female Iranian test-takers in terms of their use of cognitive and metacognitive strategies?

METHOD

Participants: 60 Iranian advanced adult EFL learners (30 males and 30 females), aged 20 to 29, participated in this study. At the time of the study, the participants had just completed an IELTS preparation course and intended to take the IELTS test in a few weeks. They were asked to voluntarily participate in the study and were not informed of the research procedures prior to the data-gathering period. The participants' overall IELTS scores and their reading skill scores were used to make sure that the participants were all true advanced learners and that they were homogenous regarding their L2 reading ability. Later, the data from 52 learners, who proved to be advanced and whose reading score fell one standard deviation above and below the mean, were included and analyzed in the study.

Table 1: A taxonomy of the cognitive-metacognitive questionnaire (Adopted from Phakiti, 2003a)

Processing	Subscale	Number of items	Items used	Reliability
Cognitive strategies	Comprehending	6	1,2,6,7,8,9	.748
	Retrival	5	3,4,5,10, 20	.586
	Subtotal	11		.803
Metacognitive strategies	Planning	10	11,12,14,16,18	.869
			21,22,24,26,29	
	Monitoring	9	13, 15,17,19,	.767
	Subtotal	19	23, 25,27,28,30	.928
	Total	30		

Instruments: Two sets of measurement instruments were employed in this study: (a) a sample IELTS test (academic module); and (b) a cognitive-metacognitive strategy use questionnaire.

Sample IELTS Test (Academic Module): This sample test was adopted from Cambridge IELTS Practice Tests series [27] and was run and scored by the researchers based on the guidelines provided in the book. The test included 40 listening questions, 40 reading questions, 2 writing tasks and a speaking task. As mentioned earlier, the overall score was used to account for the participants' advanced proficiency level and the scores on the reading section indicated the participants' reading performance.

Cognitive and Metacognitive Strategy Questionnaire: This strategy questionnaire was adopted from the questionnaire used by Phakiti [28]. The questionnaire (Appendix A) allowed participants to mark strategy use on a 5-point Likert scale: 1 (Never), 2 (Sometimes), 3 (Often), 4 (Usually) and 5 (Always). The length of time needed to complete the questionnaire ranged from approximately 10-15 minutes. It should be noted that Phakiti [28] has reported the construct validation of the questionnaire and the usefulness of likert-scale questionnaires has also been supported by many strategy researchers [2, 8, 9 among others]. Table 1 presents the taxonomy of the questionnaire.

Procedure: First, a sample of IELTS test was given to all participants to make sure about their homogeneity in terms of their general English proficiency and their reading ability. The participants were given enough time to complete the test based on the IELTS exam guidelines. It is worth noting that it had been arranged for the participants to complete the reading section as the last part of the test so that they would find it easier to complete the strategy questionnaire. Having taken the IELTS sample test, the participants were given sufficient time based on Phakiti [28] to complete the questionnaire. As mentioned earlier, only the collected data from 52 participants, who met the two homogeneity criteria discussed in Section 4.1., were taken into account and statistically analyzed in the study. The data from the other 8 participants were discarded. The following section will present the results of the data analyses.

RESULTS

Research Question 1: The first research question was an attempt to investigate whether there was any relationship between Iranian test-takers' use of cognitive and metacognitive strategies and their EFL reading test performance on the reading section of the IELTS test. In order to examine this relationship, a Pearson product-moment correlation was run. Table 2 presents the results of the correlation. In this table, it can be seen that there was a strong positive correlation between the test-takers' use of cognitive strategies and their reading test performance [$r = 0.91$, $n = 52$, $p<0.01$]. Likewise, the figures in the table reveal that there was also a strong positive correlation between the test-takers' use of metacognitive strategies and their reading test performance [$r = 0.67$, $n = 52$, $p<0.01$]. Thus, it can be concluded that participants' use of both cognitive and metacognitive strategies and their reading test performance were highly correlated. The strength of correlation was determined based on the guidelines suggested in Cohen [29].

Research Question 2: The second research question was concerned with whether there was a significant difference between male Iranian test-takers' use of cognitive and metacognitive strategies and that of females. In order to answer this question, an independent-samples t-test was conducted. Tables 3 and 4 provide the descriptive statistics and results of the t-test, respectively.

Table 2: Pearson correlation between the participants' test scores and their strategy use

		RTS*	Cognitive	Metacognitive
RTS	Pearson Correlation	1	.917(**)	.676(**)
	Sig. (2-tailed)		.000	.000
	N	52	52	52
Cognitive	Pearson Correlation	.917(**)	1	.723(**)
	Sig. (2-tailed)	.000		.000
	N	52	52	52
Metacognitive	Pearson Correlation	.676(**)	.723(**)	1
	Sig. (2-tailed)	.000	.000	
	N	52	52	52

*RTS = Reading Test Score

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

Table 3: Descriptive statistics on the t-test

	Gender	N	Mean	Std. Deviation	Std. Error Mean
Strategies	male	26	72.8846	22.04419	4.32322
	female	26	77.0385	22.80786	4.47299

Table 4: Results of the independent samples t-test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	d	Sig. (2-tailed)	Mean Differenc	Std. Error Difference	Lower	Upper
Strategies	Equal variances assumed	.196	.660	-.668	f 50	.507	e-4.15385	e 6.22076	₣ 16.6486	8.34092
	Equal variances not assumed			-.668	49.942	.507	-4.15385	6.22076	-16.6490	8.34128

It can be seen in Table 4 that the value listed in the Sig. column is larger than the critical value (0.66 ≥ 0.05). Accordingly, it can be claimed that there was no significant difference between Iranian male test taker's use of strategies (M=72.88, SD=22.04) and that of females (M=77.03, SD=22.80).

DISCUSSION

This study was primarily motivated from the assumption that variability in language test performance can be attributed to test-takers' use of cognitive and metacognitive strategies [2]. The findings of the present study revealed that there was a strong positive correlation between Iranian test-takers' use of cognitive and metacognitive strategies and their performance on the reading section of the IELTS test. Such findings lend further support to Purpura's claim [2] that cognitive and metacognitive strategies are both positively correlated with reading test performance. Song [26], who investigated the extent to which cognitive and metacognitive strategy use accounted for Chinese test-takers' performance in the College English Test Band, has also reported that cognitive and metacognitive strategies correlated positively with Chinese test-takers' L2 performance. In line with the present findings, a number of other researchers have confirmed that cognitive and metacognitive strategy use could explain the variation in language test performance [e.g., 30, 8, 31, 10, 4]. More specifically and closely tied to our findings, Phakiti [22] has reported that cognitive and metacognitive strategies were both positively correlated with the reading test performance.

It was also found in this study that there was no significant difference in strategy use between male and female Iranian test-takers. The fact that gender plays no

significant role with regard to strategy use is consistent with the findings reported by Phakiti [28]. He has also shown that males did not differ in terms of strategy use from their female counterparts. In another study, Phakiti [22] reconfirmed his findings regarding the insignificance of gender.

Moreover, the present findings confirm the claims about the advantages of and necessity for, cognitive and metacognitive strategy use training. In line with previous studies [10, 32] it can be claimed that a combination of cognitive and metacognitive strategy training can be very beneficial to L2 learners and can more effectively enhance learning. Furthermore, this study sheds light on the mechanism for assessing test-taking styles of Iranian EFL learners and for relating strategy use to how information is understood, remembered and retrieved by them in tests. Last but not least, implications of this study can provide EFL educators with information on effective test-taking and language-learning strategies, which they can incorporate in their EFL classrooms and materials.

CONCLUSION

This study aimed at investigating Iranian test-takers' use of cognitive and metacognitive strategies in relation to their L2 reading test performance on the IELTS exam. The researchers also had an eye on the role gender might play in this regard. The findings of the study suggest that cognitive and metacognitive strategy use could explain variation in language test performance. In other words, it was found that there was a strong positive correlation between Iranian test-takers' use of cognitive and metacognitive strategies and their performance on the reading section of the IELTS test. Moreover, it was revealed that there was no significant difference between male and female Iranian test-takers in terms of their cognitive and metacognitive strategy use.

Acknowledging some limitations of the present study, certain suggestions can be made for further research. Firstly, it is clear that the questionnaire data employed in this study cannot provide an ideal reflection of mental processing. It is therefore recommended that future researchers consider triangulation of data and combine quantitative and qualitative data gathering and analysis methods. Another potential limitation of the study was the inadequate number of questionnaire items. The types of cognitive and metacognitive strategies in the questionnaire were only part of the possible strategies the students might have used during the reading test. Accordingly, caution needs to be exercised in discussing and generalizing the findings. Finally, it is worth acknowledging that the relationship of cognitive and metacognitive strategies to EFL reading performance could have been far more complicated than what has been found or implied. In other words, the use of cognitive and metacognitive strategies may depend on a variety of factors such as the kind of test-takers, the setting in which testing occurs and the nature of test tasks. Thus, it is recommended that replications of the present study be carried out in other contexts with learners of different levels of proficiency for different language skills.

REFERENCES

1. Bachman, L.F., 1990. Fundamental Considerations in Language Testing. Oxford University Press.
2. Purpura, J.E., 1999. Learner Strategy Use and Performance on Language Tests: A Structural Equation Modeling Approach. Cambridge University Press.
3. Bachman, L.F. and A.S. Palmer, 1996. Language Testing in Practice. Oxford University Press.
4. Anderson, N.J., 2005. L2 learning strategies. In E. Hinkel. (Ed.) Handbook of research in second language teaching and learning, pp: 757-771. Mahwah, NJ: Lawrence Erlbaum.
5. Brown, A.L., R. Bransford, R. Ferrara and J. Campione, 1983. Learning, remembering and understanding. In P. Mussen (Ed.), Handbook of child psychology: Cognitive development (4th Edition, Vol. 3), pp: 77-166. New York: John Wiley and Sons.
6. Chamot, A.U., 2005. Language learning strategy instruction: Current issues and research. Annual Review of Applied Linguistics, 25: 112-130.
7. Faerch, C. and G. Kasper, 1983. Strategies in Interlanguage Communication. Longman.
8. O'Malley, M.J. and A.U. Chamot, 1990. Learning Strategies in Second Language Acquisition. Cambridge University Press.
9. Oxford, R., 1996. Employing a questionnaire to assess the use of language learning strategies. Applied Language Learning, 7: 25-45.
10. Wenden, A.L., 1991. Learner Strategies for Learner Autonomy. Prentice-Hall.
11. Anderson, N.J., 1991. Individual differences in strategy use in second language reading and testing. Modern Language Journal, 75: 460-472.

12. Barnett, M.A., 1988. Reading through context: How real and perceived strategy use affects L2 comprehension. Modern Language Journal, 72: 150-162.
13. Bernhardt, E.B., 1986. Three approaches to reading comprehension in intermediate German. Modern Language Journal, 67: 111-115.
14. Block, E.L., 1992. See how they read: Comprehension monitoring of L1 and L2 readers. TESOL Quarterly, 26: 319-343.
15. Carrell, P.L., 1991. Second language reading: Reading ability or language proficiency. Applied Linguistics, 12: 159-179.
16. Purpura, J.E., 1997. An analysis of the relationships between test takers' cognitive and metacognitive strategy use and second language test performance. Language Learning, 47: 289-325.
17. Purpura, J.E., 1998. Investigating the effects of strategy use and second language test performance with high- and low-ability test takers: A structural equation modeling approach. Language Testing, 15: 333-379.
18. Salataci, R. and A. Akyel, 2002. Possible effects of strategy instruction on L1 and L2 reading. Reading in a Foreign Language, 14: 1-17.
19. Alderson, J.C., 2000. Assessing Reading. Cambridge University Press.
20. Chamot, A.U., L. Kupper and Interstate Research Associates, VA., 1989. Learning strategies in foreign language instruction. Foreign Language Annals, 22: 13-24.
21. Yang, Y., 2002. Reassessing readers' comprehension monitoring. Reading in a Foreign Language, 14: 18-42.
22. Phakiti, A., 2003b. A closer look at the relationship of cognitive and metacognitive strategy use to EFL reading comprehension test performance. Language Testing, 20: 26-56.
23. Abraham, R.G. and R.J. Vann, 1987. Strategies of two learners: a case study. In A.L. Wendenand & J. Rubin (Eds.), Learner strategies in language learning, pp: 85-102. New York: Prentice Hall.
24. Oxford, R., 1989. 'The best and the worst': an exercise to tap perceptions of language-learning experiences and strategies. Foreign Language Annuals, 22: 447-54.
25. Kaylani, C., 1996. The influence of gender and motivation on EFL learning strategy use in Jordan. In R. Oxford (Ed), Language learning strategies around the world: cross-cultural perspectives, pp: 75-88. Honolulu, HI: University of Hawaii.
26. Song, X., 2004. Language learning strategy use and language performance for Chinese learners of English. Unpublished master's thesis. Ontario: Queen's University, Kingston, Canada.
27. Cambridge ESOL., 2007. Cambridge IELTS Practice Tests 6. Cambridge University Press.
28. Phakiti, A., 2003a. A closer look at gender differences in strategy use in L2 reading. Language Learning, 53: 649-702.
29. Cohen, J., 1988. Statistical Power Analysis for the Behavioural Sciences. Erlbaum.
30. O'Malley, M.J., 1987. The effects of training in the use of learning strategies on learning English as a second language. In A.Wenden&J. Rubin (Eds.), Learner strategies in language learning, pp: 133-144. New York: Prentice- Hall.
31. Oxford, R., 1990. Language learning strategies: What every teacher should know. Heinle & Heinle Publishers.
32. Wenden, A., 1987. How to be a successful language learner: Insights and prescriptions from L2 learners. In A. Wenden & J. Rubin (Eds.), Learner strategies in language learning (pp: 103-118). London: Prentice-Hall.

Appendix A. The cognitive and metacognitive strategy questionnaire
(Adopted from Phakiti (2003a)).

Name-Surname: _____

Today's date: _____ Gender: [ ] male [ ] female Age: _____

Directions: A number of statements which people use to describe themselves when they were taking a reading test are given below. Read each statement and indicate how you thought during the test. Choose 1 (Never), 2 (Sometimes), 3 (Often), 4 (Usually) and 5 (Always).

	Your thinking	1	2	3	4	5
1.	I made short notes or underlined main ideas during the test.					
2	I translated the reading texts and tasks into Farsi.					
3.	I used pictures or titles of the texts to help comprehend reading tasks.					
4.	I used my own English structure knowledge to comprehend the text.					
5.	I spent more time on difficult questions.					
6.	I tried to understand the texts and questions regardless of my vocabulary knowledge.					
7.	I tried to find topics and main ideas by scanning and skimming.					
8.	I read the texts and questions several times to better understand them.					
9.	I used my prior knowledge to help understand the reading test.					
10.	I tried to identify easy and difficult test tasks.					
11.	When I started to complete the test, I planned how to complete it and followed the plan.					
12.	I was aware of what and how I was doing in the test.					
13.	I checked my own performance and progress while completing the test.					
14.	I attempted to identify main points of the given reading texts and tasks.					
15.	I thought through the meaning of the test tasks/questions before answering them.					
16.	I was aware of which strategy to use and how and when to use it.					
17.	I corrected mistakes immediately when found.					
18.	I asked myself how the test questions and the given texts related to what I already knew.					
19.	I determined what the test tasks/questions required me to do.					
20.	I was aware of the need to plan a course of action.					
21.	I was aware of how much the test remained to be completed.					
22.	I tried to understand the questions adequately before attempting to find the answers.					
23.	I made sure I understood what had to be done and how to do it.					
24.	I was aware of my ongoing reading and test taking.					
25.	I kept track of my own progress to complete the questions on time.					
26.	I used multiple thinking strategies to help answer the test questions.					
27.	I made sure to clarify the goal and know how to complete it.					
28.	I checked my accuracy as I progressed through the test.					
29.	I selected relevant information to help me understand the reading texts and answer the test questions.					
30.	I carefully checked the answers before submitting the test.					