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The Relationship among Academic Discipline, Gender and Total Exam Score on Test-Taking Strategies: The Case of the General English Section of the National Iranian PhD Entrance Exam

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Abstract

The investigation of test-taking strategies is a crucial aspect of test validation studies especially if the test is a high-stakes one. The purpose of this study was to uncover if gender, academic discipline and the total exam score influence on the test-taking strategies employed by the candidates of the General English Section of the National Iranian PhD Entrance Exam which is a high-stakes test in Iran. Four sub-components of the strategies, namely, cognitive/metacognitive, test wiseness, time management and emotional strategies were investigated. The MANOVA results indicated no statistically significant difference between male and female exam candidates in the employment of strategies. However, Engineering and Basic Sciences academic discipline candidates outperformed the Humanities in the application of cognitive/metacognitive and test wiseness strategies. Moreover, the total exam score was influenced by the emotional strategies. The findings of this pioneering study also have implications for test designers, curriculum developers and teachers.

Keywords: *test-taking strategy, academic discipline, gender, PhD Entrance Exam*

1. Introduction

In a competitive society, the decision about individuals is based on tests. Among these tests, language tests have a substantial effect on test takers' lives, admission to a program or finding a proper job (Cohen, 2012); therefore, test designers and decision makers should ensure the validity of tests.

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According to Cohen (2006), test validity necessitates attending to the way respondents find their answer; however, research in the language assessment has mainly concentrated on the test outcome and the issues related to the test takers are ignored; therefore, he mentions that, "what was missing was the aspect of test validation that related to test-takers' behaviors in taking the tests" (Cohen, 2012, p.96). Furthermore, he states that, "such research [in test-taking strategies] has been used in constructing validation studies, providing a new source of data for convergent validation of the construct being assessed" (p. 314). In other words, test designers should pay attention to the strategies the respondents used to take a language test, that is, the processes that are consciously chosen by the test takers to deal with both language and item response demand. These strategies might be management strategies, wiseness strategies or learners' strategies.

Cohen and Upton (2007) define test-taking strategies as the cognitive processes chosen by the test takers and these processes are to some extent consciously chosen. Considering the importance of test-taking strategies, Cohen (2006), believes that employing the strategies that can enhance the performance on the total test or special test items is of crucial importance.

2. Literature Review

The interest among researchers to attend to the test-taking strategies used by test takers in taking different tests returns back to the late 1970s (Cohen, 1998). Students who lack proper test-taking strategies may not perform equally well, even if they are well prepared for the test, comparing with the time they use test-taking strategies (Peng, 2005). Proper application of test-taking strategies help learners present their knowledge more efficiently which, in turn, improves the validity of the test since test takers can accurately demonstrate what they really know (Scruggs & Mastropieri, 1992). Along the same lines, Ebel (1965) states that, "more error in measurement is likely to originate from students who have too little, rather than too much, skill in taking tests" (p. 206). However, it does not mean that test-taking strategies replace studying and preparing for a test. Millman and Pauk (1969), cited in Peng (2005), mention that those who do not carefully study for a test and just want to find an easy and quick way of getting a high score on a test will find test-taking strategies of little help. Rezaei (2005) investigated the effect of knowing and using test-taking strategies on the achievement test performance by Iranian EFL learners. The finding confirmed a high positive relationship between strategy use and test performance. He concludes that, "performance on language tests can be improved if both language teachers and test designers have a better insight into different strategies that the students apply" (p. 27). Similarly, Amer (1993) found a positive relationship between the application of test-taking strategies and test performance.

Test-taking strategies are commonly divided into three broad categories: language learner strategies, test management strategies and test wiseness strategies (Cohen & Upton, 2006). Cohen (2012, p. 97) defines the three abovementioned types of test-taking strategies as,

- *Language learner strategies:* the way that respondents operationalize the basic skills of listening, speaking, reading and writing, as well as the related skills of vocabulary learning, grammar and translation. So, for example, with regard to reading skills associated with summarizing, strategies would include distinguishing key points from lesser ones, as well as being able to conceptualize or paraphrase material at a higher level of generality.
- *Test-management strategies*: strategies for responding meaningfully to the test items and tasks. So strategies on a reading test could deal with how respondents return to the question to obtain more information, how they compare multiple-choice options rigorously to determine the most plausible response, and how they crosscheck the reading text to make sure the choices seems appropriate.
- *Test-wiseness strategies*: strategies for using knowledge of test formats and other peripheral information to answer test items without going through the expected linguistic and cognitive processes. Again, with regard to a reading test, it would mean using the process of elimination rather blindly, using cues in other items to answer an item under consideration and selecting an option because it appears to have the word or phrase from the passage in it-possibly a key word.

These three broad categories have sub-components each. Cognitive and metacognitive strategies, subsumed under the learner strategies, have been defined by many researchers. Cognitive strategy has been defined as "the strategy that involves mental manipulation or transformation of materials or tasks and is intended to enhance comprehension, acquisition, or retention" (O'Malley & Chamot 1990, p. 229). Prestley (2000) and Millman, Bishop and Ebel (1965) assert that cognitive strategies include using memory aids (charts and graphs), reading questions to ensure the correct and complete understanding of the content, finding clues in the question and underlining. Phakiti (2003a, p. 29), defines metacognitive strategies as the "active monitoring and consequent regulation and orchestration of cognitive processes to achieve cognitive goals". Flavell (1979) and Pintrich (2002) define metacognitive strategies as the strategies that have an executive functioning in controlling cognitive processes. In other words, these strategies will be applied to plan, monitor and regulate learning. While test takers use cognitive strategies to understand or recall new information, metacognitive strategies regulate test takers' cognition and evaluate their progress (Hwang & Lee, 2009). Moreover, the span of cognitive strategies can be within a subject area such as EFL while the metacognitive ones cover multiple areas (Schraw, 1998).

Purpura (1999) found that metacognitive strategies have no direct impact on test performance; however, they have a significant positive effect on the application of cognitive strategies. He

concluded that this result verifies what has been proposed by Brown and Palincsar (1982) and Wenden (1987) who proposed that combining the training of cognitive and metacognitive strategies together leads to the improved learning. Phakiti (2003a) studied metacognitive strategies and reading comprehension. The results indicated that successful test takers significantly applied more metacognitive strategies than the moderately successful and unsuccessful ones; furthermore, metacognitive strategies were positively related to reading performance. Pugalee's (2004) study confirmed that using tables and charts, checking and guessing, and logical reasoning are the three most highly used cognitive strategies that help in problem-solving. Re-reading was also considered as having a high prominence in understanding a problem. Moreover, planning, self-checking and proper strategy selections were the most frequent metacognitive strategies selected by test takers.

Another learner strategy that may affect test performance is emotional or affective strategy. Though the relationship between emotionality and test performance is not well established (Kim & Rocklin, 1994), some studies have indicated no relationship (Williams, 1996; Mulkey & O'Neil, 1999) or a positive relationship between them (Kim & Rocklin, 1994). One of the emotional aspects that may impact the test performance is test anxiety. Research has shown that highly anxious students do not have a good performance on the standardized tests. This anxiety can be the result of teachers' expectations or a negative self-image (Rawl, 1984; Hong, 1999). Moreover, test anxiety disrupts the cognitive and attentional strategies especially for the tasks that need higher order thinking and processes (Sarason, 1984). On the contrary, confidence is positively related to successful test performance (Sherman, 1980; Smith, 2002).

Time management and the effect of timing strategies is the factor which is related to test management strategies. Hong, Sas and Sas (2006) state that among the management strategies, time strategies concern the allocation of time to the items or sections of the test considering their difficulty or complexity. While taking a test, test takers look at their watch at the time intervals they have determined in mind to ensure they would not lag behind the test time (Dembo, 2004) then, they can divide their time among the test items considering the worth of the items (Loulou, 1997; Priestley, 2000) this way, the can answer easy items first and then devote the extra time on more challenging and time-consuming items. Trueman and Hartley (1996) in a study about time management and academic performance found that women were far better than men in time management. Behnam, Jenani and Ahangari (2014) concluded that time-management training affects EFL learners' test-anxiety.

The third main category of test-taking strategies is test wiseness strategies. Wiseness strategies are defined by Cohen (2006, p. 308) as, "strategies for using knowledge of test formats and other peripheral information to answer test items without going through the expected linguistic and cognitive processes." Test wiseness strategies consist of excluding the implausible alternatives and choosing the best one (Cater et al., 2005; Hong, Sac, & Sac, 2006), predicting the answer (Loulou, 1997), error avoidance (Parham, 1996) and using the hints in test (Loulou, 1997; Hughes & Deshler, 1993). Millman, Bishop and Ebel (1965) view test wiseness strategies as independent of the test takers' content knowledge. And finally, Yang (2000), in a study on test

wiseness strategies, concluded that students who were test-wise had a more meaningful and logical approach to item response.

The results of the studies carried out on gender differences in using test-taking strategies indicated no great differences between males and females. Marrs and Sigler (2012) compared the strategies used by males and females. The results indicated that females tended to have a deeper learning approach comparing with the shallow approach (e.g. only memorizing) of males. Baldige (2014) investigated the gender differences in using the guessing strategy and found no statistically significant difference between males and females. Goodwin, Ostrom and Scott (2009) did not found any significant difference between males and females in the use of test wiseness strategies; however, Yang (1999) observed that females were more strategy aware than males.

As the discussion on test-taking strategies suggests, the purpose of the present study is finding the possible impact of academic disciplines (Humanities, Basic Sciences and Engineering), gender (male and female post-graduate students), and the total score (of the General English section of the PhD Entrance Exam provided by the Educational Assessment Organization which is in percent) on the test-taking strategies (cognitive/metacognitive, test wiseness, affective and time strategies) applied in taking the General English section of the National Iranian PhD Entrance Exam. Therefore, the present study addresses the following research questions.

1. Is there any difference between male and female post-graduate students in the total strategy score and the scores of the four sub-components of test-taking strategies (cognitive/metacognitive, test wiseness, affective and time strategies)?

2. Is there any difference among the post-graduate students of the three academic disciplines (Humanities, Basic Sciences and Engineering) in total strategy score and the scores of the four sub-components of test-taking strategies (cognitive/metacognitive, test wiseness, affective and time strategies)?

3. Is there any difference among the total score (below 20% and above 20%) on the General English section of the National Iranian PhD Entrance Exam, the total strategy score and the scores of the four sub-components of test-taking strategies (cognitive/metacognitive, test wiseness, affective and time strategies)?

3. Method

3.1 Participants

The sampling of the present study was the stratified random sampling. The strata were gender and academic discipline from which the participants of the study were randomly selected. Therefore, the participants of the present study were 159 male (n= 87) and female (n= 72) post-graduate students of Humanities (n= 80), Basic Sciences (n= 39) and Engineering (n= 40) academic disciplines with an age range of 22 and 40. They were the post-graduate students of randomly selected five public universities in Iran who had taken the National Iranian PhD Entrance Exam to further their studies at the PhD level in the three above mentioned disciplines in public universities.

3.2. Instrument

To investigate the possible differences between males and females and the academic disciplines in the application of test-taking strategies in the General English section of the National Iranian PhD Entrance Exam, a likert type 35 item test-taking strategy questionnaire was developed. Eleven items concerned with cognitive/metacognitive test-taking strategies such as using memory, repeating, self-checking and strategy selection, twelve items were dealing with test wiseness strategies like anticipating answers, guessing or using hints, five items were related to the time strategies namely, time using, assessing time and allocating time and finally, the last seven items were devoted to the affective test-taking strategies such as confidence, test anxiety and effort. The reliability of the questionnaire, estimated by Cronbach's Alpha, was .815. It should be mentioned that the questionnaire was developed in the participants' first language, Persian.

3.3. Procedure

The questionnaire was distributed among the PhD exam candidates and they were totally informed about the purpose and the way of answering. Furthermore, there was no time limitation for filling in the questionnaire. In order to refresh their mind on the type of strategies they used to answer the General English section of the PhD Entrance Exam, a version of the exam was distributed along with the test-taking strategy questionnaire. The exam included multiple-choice items of grammar, vocabulary and reading comprehension, respectively. The participants were asked first to answer the exam and then fill in the questionnaire.

4. Results

After collecting the data, they were put into SPSS and a number of results emerged that will be explained below. The first research question was to find if there is any difference between male and female post-graduate participants in their total test-taking strategy score and the scores of the four sub-components of the strategies, that is, cognitive/metacognitive, test wiseness, affective and time strategies, in so doing, a Multivariate Analysis of Variance (MANOVA) was run. The results are presented in the following tables (Tables 1, 2, and 3).

Table 1 Descriptive Statistics of Gender and Test-taking Strategies

	Gender	Mean	Std. Deviation	N
Cognitive/Metacognitive Strategies	Male	56.9885	10.92841	87
	Female	60.4444	11.39915	72
	Total	58.5535	11.24168	159
Test Wiseness Strategies	Male	57.2184	13.51952	87
	Female	62.9028	12.34385	72
	Total	59.7925	13.26701	159
Time Strategies	Male	65.8276	17.42239	87
	Female	69.3056	14.66301	72
	Total	67.4025	16.27420	159
Emotional Strategies	Male	69.8736	14.08513	87
	Female	71.3056	14.40426	72
	Total	70.5220	14.20324	159
Total Strategy Score	Male	89.0230	14.61441	87
	Female	92.5556	11.99048	72
	Total	90.6226	13.56358	159

Table 2. Multivariate Test of Gender and Test-Taking Strategies

Effect		Value	F	Hypothesis df	Error df	Sig.
Gender	Pillai's Trace	.050	1.598[a]	5.000	153.000	.164
	Wilks' Lambda	**.950**	**1.598[a]**	**5.000**	**153.000**	**.164**
	Hotelling's Trace	.052	1.598[a]	5.000	153.000	.164
	Roy's Largest Root	.052	1.598[a]	5.000	153.000	.164

a. Exact statistic

Table 3 Test of Between-Subjects Effects of Gender and Test-Taking Strategies

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Gender	Cognitive/Metacognitive Strategies	470.529	1	470.529	3.789	.063
	Test Wiseness Strategies	1272.981	1	1272.981	7.531	.071
	Time Strategies	476.547	1	476.547	1.809	.181
	Emotional Strategies	80.786	1	80.786	.399	.529
	Total Strategy Score	491.627	1	491.627	2.701	.102

As the tables suggest, there is no significant difference between males (M= 89.02, SD= 14.61) and females (M= 92.55, SD=11.99) on their total strategy score (Table 1). Furthermore, there was no significant difference between the two genders in the sub-components of the test-taking strategies, namely, cognitive/metacognitive (males: M=56.98, SD=10.92 and females: M=60.44, SD=11.39), test wiseness strategies (males: M=57.21, SD=13.51 and females: M=62.90, SD=12.34), time strategies (males: M=65.82, SD=17.42 and females: M=69.30, SD=14.66) and finally emotional strategies (males: M=69.87, SD=14.08 and females: M=71.30, SD=14.40) which is confirmed by the Wilk's Lambda= .95, F (5,153)= 1.59, p= .16 (Table 2); therefore, the Sig. values (Table 3) did not indicate any statistically significant difference between males and females at the level .05.

To find if there is any difference among the three academic disciplines of Humanities, Basic Sciences and Engineering participants in their total test-taking strategies score and the scores of the four sub-components, cognitive/metacognitive, test wiseness, affective and time strategies, a Multivariate Analysis of Variance was run which is as follows (Tables 4-7).

Table 4. Descriptive Statistics of Academic Discipline and Test-taking Strategies

	Academic Discipline	Mean	Std. Deviation	N
Cognitive/Metacognitive Strategies	Humanities	55.4500	9.90704	80
	Basic Sciences	62.1538	11.75750	39
	Engineering	61.2500	11.75988	40
	Total	58.5535	11.24168	159
Test Wiseness Strategies	Humanities	56.5125	13.28556	80
	Basic Sciences	62.7949	13.57470	39
	Engineering	63.4250	11.46206	40
	Total	59.7925	13.26701	159
Time Strategies	Humanities	67.1500	16.04748	80
	Basic Sciences	65.6410	18.53799	39
	Engineering	69.6250	14.42876	40
	Total	67.4025	16.27420	159
Emotional Strategies	Humanities	68.3125	14.40428	80
	Basic Sciences	72.1026	14.21599	39
	Engineering	73.4000	13.38158	40
	Total	70.5220	14.20324	159
Total Strategy Score	Humanities	89.4875	13.11584	80
	Basic Sciences	91.6410	15.82717	39
	Engineering	91.9000	12.14190	40
	Total	90.6226	13.56358	159

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Table 5. Multivariate Test of Academic Discipline and Test-taking Strategies

	Effect	Value	F	Hypothesis df	Error df	Sig.
Academic Discipline	Pillai's Trace	.161	2.675	10.000	306.000	.004
	Wilks' Lambda	**.842**	**2.737[a]**	**10.000**	**304.000**	**.003**
	Hotelling's Trace	.185	2.798	10.000	302.000	.003
	Roy's Largest Root	.168	5.149	5.000	153.000	.000

a. Exact statistic

Table 6. Tests of Between-Subjects Effects of Academic Discipline and Test-taking Strategies

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Academic Discipline	Cognitive/Metacognitive Strategies	1566.919	2	783.459	6.642	**.002**
	Test Wiseness Strategies	1740.029	2	870.015	5.206	**.006**
	Time Strategies	323.690	2	161.845	.608	.546
	Emotional Strategies	819.296	2	409.648	2.058	.131

Table 7. Scheffe Post Hoc Test of Academic Discipline and Test-taking Strategies

Dependent Variable	(I) Academic Discipline	(J) Academic Discipline	Mean Difference (I-J)	Std. Error	Sig.
Cognitive/Metacognitive Strategies	Humanities	Basic Sciences	**-6.7038***	2.12103	**.008**
		Engineering	**-5.8000***	2.10313	**.024**
	Basic Sciences	Humanities	**6.7038***	2.12103	**.008**
		Engineering	.9038	2.44401	.934
	Engineering	Humanities	**5.8000***	2.10313	**.024**
		Basic Sciences	-.9038	2.44401	.934
Test Wiseness Strategies	Humanities	Basic Sciences	**-6.2824***	2.52467	**.048**
		Engineering	**-6.9125***	2.50337	**.024**
	Basic Sciences	Humanities	**6.2824***	2.52467	**.048**
		Engineering	-.6301	2.90911	.977
	Engineering	Humanities	**6.9125***	2.50337	**.024**
		Basic Sciences	.6301	2.90911	.977
Time Strategies	Humanities	Basic Sciences	1.5090	3.18622	.894
		Engineering	-2.4750	3.15933	.736
	Basic Sciences	Humanities	-1.5090	3.18622	.894
		Engineering	-3.9840	3.67139	.556

	Engineering	Humanities	2.4750	3.15933	.736
		Basic Sciences	3.9840	3.67139	.556
Emotional Strategies	Humanities	Basic Sciences	-3.7901	2.75547	.391
		Engineering	-5.0875	2.73221	.180
	Basic Sciences	Humanities	3.7901	2.75547	.391
		Engineering	-1.2974	3.17505	.920
	Engineering	Humanities	5.0875	2.73221	.180
		Basic Sciences	1.2974	3.17505	.920
Total Strategy Score	Humanities	Basic Sciences	-2.1535	2.65626	.720
		Engineering	-2.4125	2.63385	.658
	Basic Sciences	Humanities	2.1535	2.65626	.720
		Engineering	-.2590	3.06074	.996
	Engineering	Humanities	2.4125	2.63385	.658
		Basic Sciences	.2590	3.06074	.996

*The mean difference is significant at the .05 level.

The result of the Wilk's Lambda F (10, 304) = 2.73, P= .003 indicates a statistically significant difference among the academic disciplines in the test-taking strategies (Table 5). By looking at Table 6, it becomes evident that the difference is significant for cognitive/metacognitive (Sig = .002) and test wiseness strategies (Sig= .006). To know which academic disciplines differ in these two strategies, Scheffe post hoc test was run (Table 7). The Humanities discipline participants showed a statistically significant difference in cognitive/metacognitive strategies from the Basic Sciences participants (Sig= .008) in which the Basic Sciences participants (M=62.15, SD=11.75) performed better than the Humanities participants (M=50.45, SD=9.90) (Table 4). Another statistically significant difference was between the Humanities discipline participants and the Engineering participants in cognitive/metacognitive strategies (Sig= .02). The Engineering participants (M=61.25, SD=11.75) outperformed the Humanities participants (M=50.45, SD=9.90). The second statistically significant different strategy was test wiseness strategies in which the differences were between Humanities (M=56.51, SD=13.28) and Basic Sciences participants (M=62.79, SD=13.57) and Humanities (M=56.51, SD=13.28) and Engineering participants (M=63.42, SD=11.46) (Table 4). In both cases, the Humanities participants performed lower than the other two disciplines.

The last research question was to find if the total score (below 20% and above 20%) of the PhD Entrance exam, provided by the Educational Assessment Organization, was affected by the test-taking strategy use among the post-graduate students. In other words, the purpose of this research question was to see whether the participants whose percent in the exam was below 20% differed in their strategy use, total strategy score and the score of the four sub-components of the test-taking strategy questionnaire from those whose percent was above 20%. The results of the Multivariate Analysis of Variance (MANOVA) are presented below (Tables 8-10).

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Table 8. Descriptive Statistics of Exam Percent and Test-taking Strategies

	Exam Percent	Mean	Std. Deviation	N
Cognitive/Metacognitive Strategies	Below 20%	57.9551	11.34872	89
	Above 20%	59.3143	11.13884	70
	Total	58.5535	11.24168	159
Test Wiseness Strategies	Below 20%	60.5618	11.96487	89
	Above 20%	58.8143	14.78963	70
	Total	59.7925	13.26701	159
Time Strategies	Below 20%	66.6292	15.14654	89
	Above 20%	68.3857	17.66704	70
	Total	67.4025	16.27420	159
Emotional Strategies	Below 20%	67.8876	12.05238	89
	Above 20%	73.8714	16.01079	70
	Total	70.5220	14.20324	159
Total Strategy Score	Below 20%	89.5506	11.18848	89
	Above 20%	91.9857	16.07004	70
	Total	90.6226	13.56358	159

Table 9. Multivariate Test of Exam Percent and Test-taking Strategies

Effect		Value	F	Hypothesis df	Error df	Sig.
Exam Percent	Pillai's Trace	.065	2.119[a]	5.000	153.000	.045
	Wilks' Lambda	**.935**	**2.119[a]**	**5.000**	**153.000**	**.045**
	Hotelling's Trace	.069	2.119[a]	5.000	153.000	.045
	Roy's Largest Root	.069	2.119[a]	5.000	153.000	.045

a. Exact statistic

Table 10. Tests of Between-Subjects Effects of Exam Percent and Test-taking Strategies

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Exam Percent	Cognitive/Metacognitive Strategies	72.390	1	72.390	.571	.451
	Test Wiseness Strategies	119.655	1	119.655	.678	.411
	Time Strategies	120.889	1	120.889	.455	.501
	Emotional Strategies	1402.954	1	1402.954	7.229	**.008**

Total Strategy Score	232.350	1	232.350	1.265	.262

As it can be seen in Table 9, the Wilk's Lambda test F (5, 153) = 2.11, p= .04 indicates a statistically significant difference between those whose score was below 20% and those whose scores was above 20%. The difference between these two groups was in the use of emotional strategies (Sig= .008) (Table 10) in which the groups whose score was above 20% (M=73.87, SD=16.01) performed better than the below 20% group (M=67.88, SD=12.05) (Table 8).

5. Discussion and conclusion

As stated, the purpose of the present study was to find the impact of gender, academic discipline and exam scores, each the focus of one research question, on the test-taking strategies applied by the candidates of the General English section of the National Iranian PhD Entrance Exam. The finding related to the first research question was that there is no statistically significant difference between male and female post-graduate students in their total test-taking strategies score and the score on its four sub-components, cognitive/metacognitive, test wiseness, affective and time strategies. The finding of this research question is in line with Goodwin, Ostrom, and Scott (2009), Phakiti (2003a) and Baldige (2014) who found no significant difference between males and females in the strategy use. Referring to Goodwin, Ostrom, and Scott (2009), the finding of similarity in the performance of both genders is as informative as finding the differences considering the fairness in assessment. If it favored one gender, the fairness of the exam, especially the case of this study which is a high-stakes exam in Iran, would go under serious question. It can be concluded that since the PhD Entrance exam is a high-stakes test with important consequences, both males and females attempted to apply the best and efficient strategies to cope with the exam; therefore, their performance on the type of strategies did not differ. As stated by Phakiti (2003a, p.656), "in a high-stakes test situation, learners' strategy use may be different because the test has a gatekeeping function wherein access to certain achievement grades is restricted." In conclusion, the fact of finding no gender difference might be a sign indicating that the high-stakes PhD Entrance exam, the General English section, is free from gender bias.

Comparing the three major academic disciplines, Humanities, Basic Sciences and Engineering, the MANOVA results indicated a lower performance of the Humanities on both cognitive/metacognitive and test-wiseness strategies. The reason for considering cognitive and metacognitive strategies in one group is that according to some scholars (e.g. Purpura, 1999; Flavell 1992) there is no clear cut distinction between cognitive and metacognitive strategies and

the same strategy can be used cognitively or metacognitively considering the goal of using the strategy. The reason for the superior performance of the Engineering and Basic Sciences participants comparing with the Humanities was that the curricula and the academic materials of these academic disciplines includes non-linguistic information such as formulas, graphs, figures, tables, charts and symbols all of which are classified among the cognitive strategies. The academic content of the Humanities contains few of the above mentioned memory aids. This might be one possible reason for the superior performance of the two disciplines of Engineering and Basic Sciences in cognitive strategies.

As described by O'Malley and Chamot (1990), metacognitive strategies include planning, selective attention, self-monitoring and problem-identification. According to Phakiti (2003b), planning strategy means previewing and overviewing a problem or task to develop directions of what to do, how and when. The reason for the better performance of the Engineering and Basic Sciences participants might be more frequent use of planning strategy in their academic discipline when working in a lab or factory to design, manufacture or produce new products.

Test wiseness strategies were the second group of strategies in which the Humanities performed lower than the Engineering and Basic Sciences. As stated before, test wiseness strategies include predicting and guessing the answer, excluding the implausible answers and avoiding errors (Carter et al., 2005; Parham, 1996; Loulou, 1997). The reason for the superior performance of the Engineering and Basic Sciences participants might be related to the necessities of their academic disciplines which include error avoidance in doing experiments as sometimes the cost of errors is high or predicting what might happen during the course of experiments. The probable reason for the lower performance of the Humanities participants in test-taking strategies might be due to the fact that the Humanities disciplines in Iran are rather culture-bound, the students of these disciplines might not feel a strong need for working on either English tests or texts; therefore, they might not have received enough training during their university years on how to deal with the difficulties they have in English. Though test-wiseness seems to be functioning independent of the factors such as test content or proficiency level, (Millman, Bishop, & Ebel, 1965), Rogers and Bateson (1991a) state that, "students with low content knowledge but test-wise knowledge and students with partial knowledge but low test-wise knowledge will perform less well than students who possess both on such items" (p. 210). Therefore, the reason for the low application of test wiseness strategies by the Humanities might be both low proficiency in English and low test-wise knowledge.

As the finding of the third research question suggested, those participants who were more emotionally strategic could achieve a higher score in the high-stakes test of English. Highly anxious students do not have a good performance on the standardized tests since test anxiety

disrupts the cognitive and attentional strategies especially for the tasks that need higher order thinking and processes (Sarason, 1984). Keeping calm and confident at the exam session, especially in high-stakes exams, might be one of the influential factors in successful completion of the exam. On the other hand, being anxious, even if the test takers possess enough proficiency to pass the test, disrupts the performance (Reeve & Bonaccio, 2008). Considering the causes of anxiety in a high-stakes test, factors such as the negative consequences of the failure or poor study habits (Mealey & Host, 1992) might be among the most crucial ones. Another important reason for the consideration of anxiety in high-stakes tests is that anxiety introduces measurement bias to the test which renders a test unfair and consequently invalid (Haladyna & Downing, 2004). According to Hembree (1988), "the IQs, aptitudes, and progress of test–anxious students are consistently misinterpreted" and as a result "the validity of the entire testing process is challenged" (p. 75). Since all the above mentioned points might be influential on the exam candidates, especially the candidates of the high-stakes PhD Entrance exam, they need to be trained on how to be emotionally prepared for the exam; moreover, the exam proctors might need to be trained on how to comfort the test takers at the exam session. In conclusion, it is evident that the proper application of test-taking strategies, especially in taking a high-stakes test, can help test takers overcome difficulties in taking a test which in consequence, brings a positive attitude toward the test and reduces the test anxiety.

The discussion on the findings of the study will have some implications. It is recommended to train EFL students in efficient test-taking strategies. Moreover, knowing the type of strategies most frequently used by the test takers in taking high-stakes tests help test designers to improve the assessment instrument in a way to make is fair for all test-takers (Cohen, 1998, 2006). Furthermore, teachers and curriculum developers could include the test-taking strategies training in order to help those who employ poor strategies.

As to the limitation of the study, the participants were not compared on their performance in the three sub-sections of the General English section of the National Iranian PhD Entrance exam, grammar, vocabulary and reading comprehension; however, it merits being a pioneer study on the PhD Entrance exam, as a high-stakes test, in Iran.

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