Effects of State Test Anxiety on Test Performance in EFL Testing Contexts among Chinese Graduate Students

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Abstract: *Test anxiety lowers validity and reliability of English tests, and will result in negative washback effects. The study attempts to explore the relationship between Chinese graduate students' state test anxiety and test performance in EFL testing contexts. Both quantitative and qualitative approaches are adopted in the research to form a triangulation study.*

Keywords: test anxiety; test performance; state anxiety; EFL tests; Chinese graduate students

1. Introduction

Language use involves complex and multiple interactions among various characteristics of the language users, and between these characteristics and those of the testing situation, and how well a test taker's underlying language ability is reflected in his or her test performance largely depends on how much the latter is influenced by factors other than language ability (Bachman & Palmer, 1996). Researches have shown that many students fail to show what they have learned as a result of test anxiety (Hill, 1980; Hill & Sarason, 1966, as cited by Hill, 1984; Sarason, Davidson, Lighthall, Waite & Ruebush, 1960, as cited by Hill, 1984). Hill (1980) conducted a longitudinal study which revealed students who reported high test-anxiety usually performed poorly on standardized tests, and highly test-anxious students performed quite well under optimal testing conditions. This suggests highly anxious test takers have, in fact, grasped the materials or contents being tested, and many tests may have provided invalid estimate of students' proficiency level or learning achievement. Through correlation study of test anxiety and educational test performance, Hill and Sarason (1966) found that test anxiety correlated with all areas of achievement tests and with intelligence test performance as well, for boys and girls from all socioeconomic backgrounds. They claim that the problem of debilitating test motivation and test anxiety is a serious and widespread one. In addition, the negative effects would deteriorate when the tests come to be high-stake ones, and evidences show debilitating effects of test anxiety are stronger when high test performance becomes more important (Saraon et al., 1960, as cited by Hill, 1984).

As far as the testing environment in China is concerned, tests of English as a foreign language (EFL), have received prominent attention and expectation from the public, and many have become high-stakes tests. The EFL test scores are an important consideration in decision-making and many crucial situations, like awarding a bachelor, master or doctor's degree, granting graduation, hiring people etc. Realistic needs push the students to take part in various kinds of English tests in order to get a job after graduation or further education, thus resulting in a huge number of candidates for EFL tests, such as the National College English Tests (CET) to exhibit their English proficiency.

With the great importance and stakes attached to English tests, test anxiety, as one factor that might affect EFL test results, has become a critical problem. Efforts to solve this problem can be of significant benefits to the students and will enhance the ability to evaluate students, teachers, educational programs and the educational system. Research results on test anxiety in EFL tests will carry significance to language testing and teaching.

2. Review of Literature

A large sum of research on test anxiety has been conducted. At the beginning of the 1920s, Folin, Demis and Smillie (1914) issued the first research report on test anxiety. The first book on test anxiety is *Anxiety and illness before examination* by Neumann (1933). In the 1950s, Mandler and Sarason (1952), from Yale University, launched systematic research on test anxiety. Atkinson and his colleagues have demonstrated the interfering effects of test anxiety in their pioneering work with college students. They also found that the interfering effects were particularly strong in highly evaluative situations, such as educational testing (Atkinson & Feather, 1966; Atkinson & Ravnor, 1974). Theories and models on test anxiety became an active area of research in the 1970s and 80s. Spielberger (1972) deemed test anxiety as an ever-lasting research topic for psychologists and testing specialists because test anxiety lowers efficiency and decreases test performance. The following reviews the previous work on understanding test anxiety and investigating the effects of test anxiety on performance.

2.1 Understanding test anxiety

Test anxiety can be regarded as a learner characteristic. It generally refers to an unpleasant emotional reaction that results from the perception of appraisals of a particular situation as threatening, and related factors include fear of failure, hope for success, worry and emotionality, which form integral parts of test anxiety (Schwarzer, Van der Ploeg & Spielberger, 1982).

2.1.1 State and trait test anxiety

The distinction between state anxiety and trait anxiety was first suggested by Cattell and Scheier (1961). Spielberger (1966, 1972) clarified this distinction. According to Spielberger (1983, p.6), "state anxiety experienced during examinations consists of feelings of tension, apprehension, nervousness, and worry and associated physiological arousal resulting from activation of the automatic nervous system." In contrast, trait anxiety refers to "relatively stable individual differences in anxiety proneness to differences in the disposition to perceive a wide range of situations involving evaluative stress as dangerous or threatening."

2.1.2 Facilitative and debilitative test anxiety

Although it is commonly accepted that academic performance is impaired by test anxiety, empirical evidence for this phenomenon is not consistent. Negative correlations between test anxiety and performance are found to be low to moderate, but positive relationships have also been found, suggesting test anxiety may sometimes facilitate performance (Schwarzer et al., 1982). Debilitative test anxiety is regarded as negative, inhibiting test takers' working and lowering their efficiency. Facilitative anxiety can help the test takers remain poised, alert, and sufficiently unbalanced to prevent over relaxation in a test situation (Brown, 1994). It helps learners to become more serious about the test because of the possible consequences of the results.

2.2 Previous studies on relationship between test anxiety and test performance

According to Bachman and Palmer (1996), individual and test characteristics are the two categories of factors that affect language test performance; personal characteristics, topical knowledge, affective schemata, and language ability constitute individual characteristics of test takers. As a personal characteristic, test anxiety is supposed to have an influence on test performance. Many studies have been attempted on the correlation between test anxiety and test performance. This section concerns studies that show correlation and non-relationship between test anxiety and test performance.

2.2.1 Studies that show correlation between test anxiety and test performance

Hembree (1988) has found that test anxiety causes poor performance. Hill and Wigfield (1984) have reported studies with correlations up to -0.60 between test anxiety and test performance. In Wolfe (2003)'s discussion of the effect of handwriting versus word-processing composition media on different examinees, he has proposed a test performance model in which test performance is directly influenced by an examinee's test anxiety, achievement, test preparation, along with other variables.

Researchers have further explored the relationship between test anxiety and performance. Yerkes and Dodson proposed a famous law, Yerkes-Dodson law in 1908. They claim that there is an inverted U-shaped relationship between arousal and performance in learning situations. The optimal level of motivation for effective performance lies in the middle of the curve, instead of the high or low end of the arousal or stress continuum. This implies that if the anxiety level is well controlled, learners can perform better as a result of the optimal anxiety level.

2.2.2 Studies that show no correlation between test anxiety and test performance

Although many evidences show the interfering effect of test anxiety, some results show no correlation between test anxiety and test performance. The study of Mulvenon, Connors, and Lenares (2001) suggests test anxiety does not contribute an important amount of variance to student's test performance. In Bodas (2003)'s thesis, test anxiety has been shown to fail, for the most part to "moderate the relationship" between children's IQ level and academic achievement score. Through experimentation on 62 college students, Vogel and Collins (2002) found that high and low levels of test anxiety did not affect quiz performance.

3. Research Methods

The research is conducted to address the following research question: How does state test anxiety affect test performance in EFL testing context among Chinese graduate students? Both quantitative and qualitative approaches are adopted in the research design to form a triangulation study.

3.1 Participants

Eighty-two graduate students from a graduate university participated in this study in 2006. All of them are native Chinese speakers. They are randomly chosen from different majors, including biology, geography, physics, chemistry, etc. There are two reasons that the graduate students of the university are recruited. First, the research is focused on Chinese graduate students' test anxiety, and the university is the largest graduate university in terms of the number of graduate students enrolled. Therefore data collected could be representative. Second, these students represent a relatively homogeneous group with respect to English proficiency since they have all passed an English proficiency test of the National Entrance Examination for Graduate Study.

3.2 Instrument to measure test anxiety level

The State-Trait Test Anxiety Inventory (STAI) designed by C. D. Spielberger in 1983 is a questionnaire adopted in this research to test the state test anxiety of the participants in English testing contexts. STAI is the most frequently used scale in research worldwide with its subjects covering college students, high school and middle school students, and no other measure has received as many foreign language adaptations and citations in the last three decades. The self-report inventory was designed to measure state and trait test anxiety, and consists of 20 items to assess state anxiety, and another 20 items to measure trait anxiety. The state anxiety subscale consists of 20 items that ask how a person feels now, and reflects situational factors that may

influence anxiety levels. Items are like, "I feel calm now", "I feel tense", etc. Four scales are used to rate the results, NOT AT ALL, A LITTLE, MEDIUM, A LOT, which are numbered by 1, 2, 3, 4 respectively. For some items, the rate A LOT stands for the highest anxiety level, but the lowest anxiety level for the other items. Therefore in data analysis, for those items with A LOT representing lowest anxiety level, the 4 rates, i.e. NOT AT ALL, A LITTLE, MEDIUM, A LOT, are numbered by 4, 3, 2, 1 to make sure the higher the score the greater the level of anxiety is. Test-retest reliability for STAI has been reported for high school, college, and graduate students over time periods ranging from two weeks to six months. In this study, the state subscale of STAI has been translated by the author and named STA.

3.3 Procedures of data collection and experimental design

Twenty-five students were randomly chosen from a graduate university to participate in an experimental design to explore the relationship between state test anxiety and test performance in a high stakes EFL testing context. The 25 students were tested twice within two weeks. Two weeks before they sat the 2006 General English Qualifying Test for Non-English Major Graduate Students, the test result of which is an important consideration in awarding Master or PHD degree, a model test was administered to them. The test paper of 2005 General English Qualifying Test for Non-English Major Graduate Students is used in the model test. The STA scale was administered to the test-takers immediately after they finished the test, and their scores in the two tests were then compared in relation to their state anxiety experienced during the two tests. The two test papers used in the model and real tests are parallel because they share the same test specs, item types and number of items, and the test scores of all candidates who took part in the two tests indicate the difficulty levels of the two tests are very close. Statistics has shown that 961 test-takers of 2005 got a mean score of 51.3, and 593 examinees of 2006 got a mean score of 51.9. In addition, the two tests were scored according to the same rating scale.

4. Data Analysis and Results

The research data are processed for analysis through SPSS 11.5. Paired sample tests are adopted to compare the test takers' state test anxiety level and test score across the real and model tests. Besides, case study method is applied to each individual participant to gain a deeper examination of the effect of state test anxiety on test performance.

4.1 Paired samples test results

The following two tables (Table 1 and Table 2) display the results of the paired samples test. Both of the students' state test anxiety level and test score across the real and model tests are compared respectively in the tables.

Table 1: Paired samples test of the state test anxiety level across the two tests

		Paired Differences		Sig. (2-tailed)
		Mean	Std. Deviation	
Pair 1	State anxiety level across the real and model tests	-10.04	12.621	.001

Table 2: Paired samples test of the test score across the two tests

		Paired Differences		Sig. (2-tailed)
		Mean	Std. Deviation	
Pair 1	Test score across the real and model tests	.644	7.7432	.681

From Table 1 and Table 2, it can be found that significance levels of the difference of test anxiety and test score across the two tests are 0.001 and 0.681, one lower than 0.05 and the other higher than 0.05. That means there is significant change in the test anxiety in the two tests, while there is no significant difference in the test score. Therefore, it can be inferred that test score and test anxiety may not change in a linear way, and the relation between the test anxiety and test score may not be a simple one. Thus an in-depth probe into each participant becomes necessary. Comparison of the two variables of test score and test anxiety across the two tests is then made by analyzing the 25 cases one by one.

4.1.2 Case study results

Examination of each of the 25 cases shows four types of relations between test anxiety and test score: type (1) both variables rose in the second test (real test); type (2) the value of anxiety went up while that of test score declined; type (3) the value of anxiety declined while that of test score went up; type (4) both variables were almost the same in the two tests. Among the 25 cases, 15 cases fall into type (2), accounting for 60%; 6 belong to type (1), accounting for 24% ; 2 belong to type (3), accounting for 8% ; 2 belong to type (4), accounting for 8%. The fact that test score values rise in some cases but fall in other cases explains why there is no significant difference in the test score, and proves that the two variables do not change in a linear pattern, but follow a more complicated pattern.

In order to find out the reasons behind the different types of interaction between state test anxiety and performance, interviews were made to 11 test-takers who showed high variance in test anxiety in the two tests and fall into the four types. Questions were like, "Was there any difference in your anxiety level in the two tests？If there was, in which test did you feel more anxious and how big was the difference? Did the difference result in any difference in your performance?"

There are several findings from the interview. First, too low test anxiety can result in low performance. One test taker who falls in type (1) said, "The first test was just an exercise, so I did not feel nervous at all. Since I thought the result was not going to make any difference, I took the test without timing myself, and finally I found I had not started to write

the composition when we were told that there was only 15 minutes left." This exemplifies too low anxiety will prevent test takers from good performance. Second, too high anxiety will result in low performance. Another interviewee who belongs to type (2) reported, "In the last 7 or 8 minutes during the second test, I was so worried that I can not concentrate myself on the final reading passage, and at last I had to quit the task. Actually when I was practicing reading comprehension skills in preparation for the test, 7 minutes is enough for me to finish one passage." Two test takers who fall in type (3) recalled they felt higher anxiety in the first model test because they were not told about the test before they came in the classroom and were shocked by the "pop quiz". The above findings are in agreement with Yerkes and Dodson (1908)'s proposal of inverted U-shape relationship between test anxiety and test performance, which well explains the different types of change of the two variables and reveals too high or too low anxiety level can result in low performance. Moreover, it explains why previous studies show opposite results on the relation between test anxiety and test score. From the above analysis, we can conclude that the relationship between test anxiety and test result is not simply positive or negative, but follows an inverted U-shape pattern, and test takers should not have too high or too low test anxiety level to achieve best performance.

5. Discussions and Implications

Based on the above results and findings, the following suggestions are made to EFL teaching and testing.

1. It is suggested that test anxiety be taken into consideration in EFL test design as well as EFL teaching. EFL teachers and test designers need to be aware of the debilitating and facilitating effects of test anxiety, the possible effect of test anxiety on student's performance, and the necessity of preventing test anxiety from working on students of high test anxiety. First, it is necessary for EFL teachers and test designers to investigate or keep informed of the status quo of the target students' anxiety levels in EFL tests. Second, further investigation should be conducted on students exhibiting high test anxiety to find about the subjective and objective factors that cause their high anxiety in tests of different EFL skills. Only when EFL teachers and designers are aware of the possible negative effect of test anxiety in EFL testing and the reasons behind it, can they be able to find ways to ameliorate such effects.

2. After an investigation on the highly text-anxious students is made, EFL test designers and teachers should try to ensure these students are not disadvantaged by state test anxiety in a test. As for the test designers, once they are aware of the test methods that may interfere in the students' test performance, they should consider adopting alternative test methods in test designing so as to reduce the debilitating effects of test anxiety on test performance and improve test validity. For example, in view of the debilitating effects of time pressure on reading comprehension performance of highly anxious test takers, a little more time should be allowed for reading comprehension tasks to prevent high anxiety from lowering test taker's working efficiency. Relaxed time limits will work for proficiency tests without lowering the test validity. However, as for reading tests designed to test candidates' reading speed, a certain number of test items should be added correspondingly when more time is allowed, so as to ensure test validity. The time added depends on how long time the test candidate will be affected by time pressure towards the end of a test. The test candidate is informed of the relaxed time limit, but the test officially ends when the candidate's test performance starts to be affected by time pressure, and thus the test performance debilitated due to time pressure will not be considered.

3. Besides EFL test designers, EFL teachers should be active to find solutions to help students keep their state test anxiety at a level that is neither too high nor too low in a test. First, highly anxious test takers should constantly be encouraged to stay calm, at ease, relaxed, confident and pleasant in any test situation. At the same time, teachers are suggested to ensure that the result of the test has consequence for the test taker, so that students can be serious about the test and their anxiety level will not be too low. Second, test-taking strategy training program need to be included in EFL teaching, especially for the students of strong test anxiety.

References

[1] Atkinson, J. W., & Feather, N. T. (1966). *A theory of achievement motivation.* New York: Wiley.
[2] Atkinson, J. W., & Ravnor, J.O. (1974). *Motivation and achievement.* Washington, DC: Winston.
[3] Bachman, L.F., & Palmer, A.S. (1996). *Language testing in practice.* Oxford : Oxford University Press.
[4] Bodas, J. (2003). Abstract of " The Moderating Role of Anxiety in Predicting Academic Achievement in Children". Thesis submitted to the faculty of Virginia Polytechnic Institute and State University. Retrieved May 15, 2006 from http://scholar.lib.vt.edu/theses/available/etd-12122003-143014/unrestricted/WorldwideAccessETD.pdf.
[5] Brown, H. D. (1994). *Teaching by principles: An interactive approach to language pedagogy.* Englewood Cliffs, NJ: Prentice Hall Regents.
[6] Cattell, R. B., & Scheier, I. H. (1961). *The meaning and measurement of neuroticism and anxiety.* New York: Ronald Press.
[7] Folin, O., Demis, W., & Smillie, W.G. (1914). Some observations on emotional glycosuria in man. *Journal of Biological Chemistry, 17,* 519–520.
[8] Hembree, R. (1988). Correlates, causes, effects and treatment of test anxiety. *Review of Educational Research, 58,* 47-77.
[9] Hill, K. T. (1980). Motivation, evaluation and educational testing policy. In L.J. Fyans (Ed.), *Achievement motivation: Recent trends in theory and research.* New York: Plenum.
[10] Hill, K. T. (1984). Debilitating motivation and testing: A major educational problem-Possible solutions and policy applications. In Ames, R. & Ames, C. (Eds.),

Research on Motivation in Education（Volume 1）, pp. 245-274. Orlando: Academic Press.

[11] Hill, K. T., & Sarason, S. B. (1966). The relation of test anxiety and defensiveness to test and school performance over the elementary school years. *Monographs of the society for research in child development, 31*(2, Serial No. 104).

[12] Hill, K. T., & Wigfield, A. (1984). Test anxiety: A major educational problem and what can be done about it. *The Elementary School Journal, 85*.

[13] Mandler, G., & Sarason, S.G. (1952). A study of anxiety and learning. *Journal of Abnormal and Social Psychology, 47*, 166-173.

[14] Mulvenon, S.W., Connors, J.V., & Lenares, D. (2001). Impact of accountability and school testing on students: Is there evidence of anxiety? *ERIC Digest* 460155. Retrieved April 9, 2006, from ERIC database.

[15] Neumann, J. (1933). *Anxiety and illness before examination*. Gutersloh: Bertels.

[16] Schwarzer, R., Van der Ploeg, H. M., & Spielberger, C. D. (1982). Test anxiety: an overview of theory and research. In Schwarzer, R , Van der Ploeg, H.M. & Spielberger, C. D. (Eds.), *Advances in test anxiety research, 1,* pp.3-9. Hillsdale, NJ: Lawrence Erlbawn Associations, Inc.

[17] Spielberger, C. D. (1966). Theory and research on anxiety. In C. D. Spielberger (Ed.), *Anxiety and behavior,* pp.34-78. New York: Academic Press.

[18] Spielberger, C. D. (1972). Anxiety as an emotional state. In C. D. Spielberger (Ed.), *Anxiety: Current trends in theory and research (Vol. 1),* pp. 23-49. New York: Academic Press.

[19] Spielberger , C.D. (1983). Manual for the state-trait anxiety inventory (STAI). Palo Alto, CA: Consulting Psychologists Press.

[20] Vogel, H.L., & Collins, A.L. (2002). The relationship between test anxiety and academic performance. Retrieved March 8, 2006 from http://clearinghouse.missouriwestern.edu/manuscripts/333.asp?logon=&code=.

[21] Wolfe, E. W. (2003). Examinee characteristics associated with choice of composition medium on the TOEFL writing section. Journal of Technology, Learning, and Assessment, 2 (4). Retrieved March 7, 2006 from http://www.jtla.org.

[22] Yerkes, R. M., & Dodson, J. D. (1908). The relation of strength of stimulus to rapidity of habit formation. *Journal of Comparative Neurology and Psycholog*y, *18*, 459–482.

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