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An investigation of Chinese university EFL learner's foreign language reading anxiety, reading strategy use and reading comprehension performance

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Abstract

The present study explored the interrelations between foreign language (FL) reading anxiety, FL reading strategy use and their interactive effect on FL reading comprehension performance at the tertiary level in China. Analyses of the survey data collected from 1702 university students yielded the following results: (a) Both Foreign Language Reading Anxiety Scale (FLRAS) and Foreign Language Reading Strategy Use Scale (FLRSUS) had important subcomponents, (b) more than half of the students generally did not feel anxious when reading English, and were confident in and satisfied with their English reading proficiency. Meanwhile, (c) more than half of them moderately used different types of reading strategies such as planning, checking and confirming, predicting and assessing, when reading English, (d) compared with their female peers, male students felt significantly more anxious when facing reading activities, less satisfied with their English reading proficiency, and used specific analyzing and planning strategies significantly less often during a reading activity, (e) FLRAS was significantly inversely related to FLRSUS, and both were significantly correlated with the students' FL reading comprehension performance, and (f) FLRAS (overall FL reading anxiety), FLRAS1 (general anxiety about FL reading), and FLRSUS2 (predicting strategies) were good predictors

of FL reading comprehension performance. Based on the findings, some implications are discussed.

Keywords: FL reading anxiety, FL reading strategy use, FL reading comprehension performance

1. Introduction

Both language anxiety and strategy use have been revealed to be of paramount importance in the learning of a second/foreign language (SL/FL) and interact with various other factors during the process (Aida, 1994; Ewald, 2007; Jackson, 2002; Liu & Jackson, 2008; Magogwe & Oliver, 2007; Onwuegbuzie, Bailey, & Daley, 1999; Oxford & Nyikos, 1989). Meanwhile, it has been generally endorsed that both anxiety and learning strategies can be very specific and vary according to a specific language task such as listening, reading, speaking and writing (Kinoshita & Bowman, 1998; Nakatani, 2006; Oxford, 1990; Sellers, 2000; Vogely, 1998). Accordingly, when facing a concrete language task, the associated anxiety language learners experience and the strategies they use may be different and interact with each other, mediating their performance on the task. Nevertheless, the number of studies on the interaction of such issues in regard to specific language tasks is far from enough (Nakatani, 2010). As reading is the most common FL/SL learning activity and a critical means of acquiring a FL/SL (Saito, Horwitz, & Garza, 1999), the present study aimed to investigate the interrelation between FL reading anxiety and FL reading strategy use and their effect on FL reading comprehension performance at the tertiary level in China.

2. Literature review

Language anxiety is a type of anxiety specifically associated with SL/FL learning contexts (Young, 1991). It is ''the feeling of tension and apprehension specifically associated with second language (L2) contexts, including speaking, listening, and learning'' (MacIntyre & Gardner, 1994, p. 284).

Often measured by the Foreign Language Classroom Anxiety Scale (FLCAS) developed by Horwitz, Horwitz, and Cope (1986), language anxiety has been consistently found to be negatively related to language learning performance, especially oral performance (Abu-Rabia, 2004; Ewald, 2007; Clement, 1987; Dewaele, Petrides, & Furnham, 2008; Dewaele & Thirtle, 2009; Dewaele & Tsui, 2013; Gardner, 1985; Horwitz, 2000, 2001; Hurd & Xiao, 2010; Liu, 2006, 2007; MacIntyre & Gardner, 1991, 1994; Marcos-Llinás & Garau, 2009; Mills, Pajares, & Herron, 2006; Tallon, 2009).

During the process, researchers have come to realize that anxiety can occur in any aspect of language learning (e.g., reading, listening, speaking and writing) and thus cannot just be measured by FLCAS, which is predominantly concerned with speaking anxiety in language class (Kinoshita & Bowman, 1998; Sellers, 2000; Vogely, 1998). They thus have developed several different scales to measure different types of language anxiety, such as the Cultural Anxiety Scale (CAS; MacDougall et al., 1992, as cited in Kinoshita & Bowman, 1998), Listening Comprehension Anxiety (Elkhafaifi, 2005; Vogely, 1998) and Reading Anxiety Scale (RAS; Sellers, 2000). Of particular interest in the present study was foreign language reading anxiety.

Reading, though not identified as being as anxiety-provoking as speaking, is a complex and difficult process even in one's native language, and is even more so in an FL/SL (Harrington & Sawyer, 1992; Lally, 1998; Miyake & Friedman, 1998; Saito et al., 1999). Thus, FL/SL learners may become anxious as well when reading in a SL/FL because it is both an important skill and a critical means of acquiring a FL/SL, which has caught the attention of many researchers (Saito et al., 1999). In order to measure FL reading anxiety, Saito et al. (1999) developed the Foreign Language Reading Anxiety Scale, which has been used or adapted in subsequent research (Liu & Hu, 2009; Mills et al., 2006). These investigations have resulted in mixed findings about the relationship between reading anxiety and L2 reading performance. For example, Brantmeier (2005) examined reading anxiety with 92 university students enrolled in an advanced level Spanish grammar and composition course. Results indicated that the learners generally did not feel anxious about reading in a second language and that they were more anxious about post-L2 reading tasks (both oral and written) than the act of reading itself. Students felt less anxious about reading when immediate communication apprehension was not a concern.

Wu (2011) investigated the relationship between language anxiety (LA), reading anxiety (RA), and reading comprehension performance. Analyses of the data collected from 91 university students showed that (a) RA was related to and yet independent of LA, (b) students with lower LA and RA tended to perform better in the reading comprehension test, (c) students' LA decreased with their learning in reading classes while RA showed no differences, and (d) there were no significant differences between males and females in their levels of LA and RA. These results suggest that RA was a more stable construct compared to LA.

Similar to language anxiety, strategy use has proved to be helpful in SL/FL learning, helping make SL/FL learning more efficient and successful (Cohen, 1998; Collier, 2010; Grenfell & Macaro, 2007; O'Malley & Chamot, 1990; Oxford, 1990; Takeuchi, Griffins, & Coyle, 2007; Wenden & Rubin, 1987). Oxford and her colleagues made a great contribution to learning strategy identification (Nyikos

& Oxford, 1993; Oxford, 1990). Believed to be conscious thoughts and behaviors that help learners better understand, learn, and remember the SL/FL information (Chamot, 2005; Murphy, 2008; Nakatani, 2005; O'Malley & Chamot, 1990; Oxford, 1990), language strategy use is often measured by the Strategy Inventory for Language Learning (SILL) developed by Oxford (1990), who placed a whole range of learning strategies into six categories: memory, cognitive, compensation, metacognitive, affective, and social. Because the SILL mainly deals with general statements which may not be relevant for identifying task-specific strategies (Nakatani, 2006; Oxford, 1990), researchers have developed task-specific strategy use inventories to explore the use of specific strategies and its relationship to the performance in a specific task such as Reading Strategy Use Scale (Dreyer & Nel, 2003) and Communication Strategy Use Scale (Nakatani, 2010). For example, Dreyer and Nel (2003) analyzed the use of strategies before reading, during reading, and after reading. The successful students in this study were active during all three phases of reading (post-test). They found that at-risk readers mainly used metacognitive strategies related to planning, whereas successful readers were goal-directed and tended to monitor and evaluate their learning and reading comprehension.

Meanwhile, both language anxiety and language learning strategies are shown to be interrelated to many other variables in language learning, such as students' self-efficacy (Onwuegbuzie et al., 1999; Clément et al., 1994), willingness to communicate (Jackson, 2002; Liu & Jackson, 2008), personal and instructional factors (Yan & Horwitz, 2008), the teacher's role (Aida, 1994; Horwitz et al., 1986; Ewald, 2007), gender (Campbell, 1999; Ehrman & Oxford, 1995; Machida, 2001), motivation (Grainger, 1997, 2005), task type (Skehan, 1989), and SL/FL proficiency (Dewaele & Thirtle, 2009; Dewaele & Tsui, 2013; Liu, 2006; Magogwe & Oliver, 2007; Oxford & Nyikos, 1989).

During the process of researching foreign language strategy use, criticisms have been voiced on this line of research: Some target the methodology used to elicit, measure, and classify strategies; some concern assumptions about the role of strategy use in language learning; and some focus on the lack of theoretical rigour of learner strategy research (Dörnyei, 2005; LoCastro, 1995; Seliger, 1983). For example, Seliger (1983) doubted whether "the verbalizations of learners represent some form of internal reality" (p. 180). It is true that many problems exist in the research of language learning strategy use. It is also true that the use of language learning strategies differs from learner to learner and from task to task and interacts with various other variables such as motivation, goal, anxiety, style, and outcome, as demonstrated in numerous current studies as well as in Macaro (2006). Only by continuously researching language learning strategy use in relation to other various factors can we better

understand it and its role in language learning and can language teachers implement appropriate instruction in the classroom to really help learners, as also discussed in Macaro (2006).

As reviewed, anxiety is often debilitative while strategies are largely helpful in SL/FL learning, both of which probably interact with diverse other variables during the process. However, few studies have examined the interaction between language anxiety and strategy use concerning a specific SL/FL task such as a reading, listening or writing task. For this reason, the present study sought to explore the interrelation between FL reading anxiety and FL reading strategy use and their effect on FL reading comprehension performance at the tertiary level. To achieve this purpose, the following questions were formulated:

1. What are the components of the FL Reading Anxiety Scale and the FL Reading Strategy Use Scale?
2. What are the profiles of the students' FL reading anxiety and FL reading strategy use when dealing with a reading task?
3. How is the students' FL reading anxiety related to their reading strategy use?
4. How are the students' FL reading anxiety and FL reading strategy use correlated with their FL reading comprehension performance?

3. The study

3.1. Participants

Altogether 1702 (778 males and 924 females) first-year (1174) and second-year (528) students from five universities in China participated in the present study. With an average age of 19 and the age range of 16 to 24, the students were from various disciplines such as electronic engineering, business and administration, chemistry, mathematics and Chinese.

3.2. Instruments

The participants in the present study answered a set of questionnaires and took a reading comprehension test, as detailed below.

With a reliability score of .872 in the present study, the 29-item *Foreign Language Reading Anxiety Scale* (FLRAS) was adapted from the original 31-item survey used in Saito et al. (1999). To better fit the present context, two items, namely "I am worried about all the new symbols I have to learn in order to read English" and "I have to know so much about English history and culture in order to read English," were deleted because they were concerned with a much bigger issue of causes of difficulties in English reading.

With a reliability score of .903 in the present study, the 31-item *Foreign Language Reading Strategy Use Scale* (FLRSUS) was adapted from that developed by Dreyer and Nel (2003). To better fit the present context, two items, namely "I search out information relevant to my reading goals" and "I evaluate whether what I am reading is relevant to my reading goals," were deleted because they were weakly concerned with reading English for general purposes.

The background questionnaire aimed to collect personal information such as gender, age, university, and year of study.

All the items except the background questionnaire items were accompanied by a 5-point scale ranging from *strongly disagree* to *strongly agree* for Items 1-29 or from *never or almost never true of me* to *always true of me* for Items 30-58.

The reading comprehension test comprised the following parts: three reading passages of 500-1000 words each, accompanied by questions of various types such as multiple choice questions and short answer questions, with a total score of 40. The test was taken from a College English Band 4 (a nation-wide exit and proficiency English test for undergraduate non-English majors in China) model test.

3.3. Procedure

All the questionnaires were translated into Chinese and double-checked. They were then administered in both Chinese and English to 40 intact classes in 5 universities in the 12th or 13th week of the usually 18-week semester. The students answered the questionnaires in 15 minutes in class and then took the English reading test in 45 minutes. Right before the study began, the course instructors explained to the class that the questionnaires were important and needed to be answered seriously, and that the reading test would account for 5% of their final course grade.

3.4. Data analysis

Rotated principal factor analyses were run to identify the underlying factors of FLRAS and FLRSUS. Means and standard deviations of FLRAS, FLRSUS and their subscales were computed to determine how anxious the respondents felt and how frequently they used different reading strategies when reading English. Independent samples *t* tests were then run to explore the difference in the measured variables between male and female students. Correlational analyses were conducted to examine the correlations between the measured variables and the students' performance in English reading. Finally, regression analyses were run to explore the predictive effect of the measured variables on English reading performance.

3.5. Results

3.5.1. Factor analysis of FLRAS and FLRSUS

A factor analysis with varimax rotation for FLRAS and FLRSUS respectively served to reveal the underlying components. The results revealed that, as presented in Table 1, FLRAS had two factors and FLRSUS had five factors. The two FLRAS factors were: general anxiety about FL reading (FLRAS1), which included 11 items (1, 5, 7, 9, 11, 19-24) reflective of nervousness/distress, or feeling intimidated when facing reading activities, and self-belief (FLRAS2), which had 4 items (6, 10, 13, 29) reflecting confidence in and satisfaction with one's FL reading proficiency. The two factors accounted for 21.37% and 3.66% of the total variance respectively. The five FLRSUS components were: specific analyzing (FLRSUS1), assessing strategies (FLRSUS 2), checking and confirming (FLRSUS3), planning (FLRSUS4), and predicting (FLRSUS5). Nineteen items were included in the first FLRSUS component, FLRSUS1 (30-34, 38, 40-47, 50, 52-53, 57-58), which involved specific analyzing strategies during a reading activity and explained 30.60% of the total variance. FLRSUS2 had 3 items (48-49, 51), which concerned assessing what had been read during a reading activity and accounted for 3.01% of the total variance. Three items (35-36, 55) represented the third FLRSUS component (FLRSUS3), which entailed checking and confirming during a reading activity and explained 2.62% of the total variance. Two items (37, 56) tapped the fourth FLRSUS component (FLRSUS4), which referred to a sense of planning for a reading activity and accounted for 2.24% of the total variance. The fifth FLRSUS component (FLRSUS5) included two items (39, 54), which involved predicting during a reading activity and accounted for 1.71% of the total variance.

The loadings in Table 1 reveal that most of the items within a subcomponent of FLRAS were significantly correlated with that subcomponent: The 11 items included in FLRAS1 were related to FLRAS1, with coefficients ranging from .490 to .679; the items included in FLRAS2 were related to FLRAS2, with a range of coefficients from -.535 to .486. It was the same with FLRSUS and its five components, with a coefficient range from .305 to .870.

Table 1 Varimax rotated loadings for factor analysis of FLRAS and FLRSUS (*N* = 1702)

	FLRAS1	FLRAS2	FLRSUS1	FLRSUS2	FLRSUS3	FLRSUS4	FLRSUS5
1. I am usually at ease reading in English.	-.513						
5. I start to panic when I am asked to read a text aloud in my English class.	.533						
6. No matter how hard I try, I just can't read well in English.	.651	.236					
9. Looking at books in English makes me upset and/or nervous.	.622						
10. I can read English, but I don't feel like it.		.450					
11. I start to panic when I have to read silently in class.	.490						
13. I enjoy reading in English even though I may not understand everything I read.		-.535					
19. I get upset when I'm not sure whether I understand what I am reading in English.	.563						
20. I feel intimidated whenever I see a whole page of English in front of me.	.679						
21. I am nervous when I am reading a passage in English when I am not familiar with the topic.	.613						
22. I get upset whenever I encounter unknown grammar when reading English.	.624						
23. When reading in English, I get nervous and confused when I don't understand every word.	.583						
24. It bothers me to encounter words I can't pronounce while reading English.	.525						
29. I am satisfied with the level of reading ability in English that I have achieved so far.		.486					
30. I briefly skim the text before reading.			.870				
31. I skim/scan to get the main idea.			.798				
32. I pay attention to important information.			.423				
33. I try to relate the important points in the text to one another in an attempt to understand the entire text.			.470				
34. I generate questions about the text.			.402				
35. While I am reading, I reconsider and revise my prior questions about the text based on the text's content.					.693		
36. While I am reading, I reconsider and revise my background knowledge about the subject based on the text's content.					.710		
37. I plan how I am going to read a text.						.496	
38. I often look for how the text is organized and pay attention to headings and sub-headings.			.439				
39. I usually make predictions as to what will follow next.							.627
40. While I am reading, I try to determine the meaning of unknown words that seem critical to the meaning of the text.			.429				
41. I try to underline when reading in order to remember the text.			.739				
42. I read material more than once in order to remember the text.			.649				
43. I make notes when reading in order to remember the text.			.305				

	FLRAS1	FLRAS2	FLRSUS1	FLRSUS2	FLRSUS3	FLRSUS4	FLRSUS5
44. When appropriate, I try to visualize the descriptions in the text that I am reading in order to remember the text.			.570				
45. I summarize/paraphrase the material that I am reading in order to remember the text.			.683				
46. When reading, I ask myself questions about the text content to better remember the text.			.655				
47. When I think that I am not comprehending a text, I change my reading strategies (e.g. re-reading).			.429				
48. As I am reading, I evaluate the text to determine whether it contributes to my knowledge/understanding of the subject				.407			
49. After I have read a text, I review it.				.545			
50. After I have read a text, I try to interpret what I have read.			.469				
51. After I have read a text, I evaluate what I have read.				.553			
52. While reading, I jump forward and/or backward in the text to find the important information.			.438				
53. While reading, I distinguish between information I already know and new information.			.516				
54. I try to anticipate information in the text.							.800
55. As I read along, I check whether I anticipated information correctly.					.740		
56. I set goals for reading (e.g. studying for a multiple-choice test, reading for a research paper).						.380	
57. I vary my reading style depending on my reading goals.			.354				
58. After I have read a text I summarise it.			.605				

Note. FLRAS1 = general anxiety about FL reading; FLRAS2 = self-belief; FLRSUS1 = specific analyzing; FLRSUS2 = assessing strategies; FLRSUS3 = checking and confirming; FLRSUS4 = planning; FLRSUS5 = predicting.

3.5.2. Profiles of the students' FL reading anxiety and strategy use

As described above, both FLRAS and FLRSUS were 5-point Likert scales, thus a score of 4-5, 3-4, and below 3 on the scale meant strong agreement, agreement and no/little agreement respectively. When computing the scores, the researchers adjusted the values assigned to different alternatives of 18 items which expressed confidence in reading English. For these items, the response *strongly disagree* received the score of 5 instead of 1, the response *strongly agree* was given the value of 1 instead of 5, and so on. Thus, the total score of the FLRAS revealed the respondent's anxiety in English reading; and the total score of the FLRSUS was reflective of the frequency of strategy use when reading English. It was the same with their components.

As shown in Table 2, the participants scored 2.52 to 2.76 on FLRAS and its two components, all below the scale mid-point of 3. This means that more than half of the students generally did not feel anxious when reading English (FLRAS & FLRAS1) and were confident in and satisfied with their English reading proficiency

(FLRAS2). Meanwhile, Table 2 shows that the participants scored from 2.97 to 3.58 on FLRSUS and its five components, meaning that more than half of the participants used those types of strategies moderately when reading English.

Table 2 Means and standard deviations of the measured variables (*N* = 1702)

	FLRAS1	FLRAS2	FLRAS	FLRSUS1	FLRSUS2	FLRSUS3	FLRSUS4	FLRSUS5	FLRSUS
M	2.52	2.59	2.76	3.21	2.97	3.33	3.14	3.27	3.21
SD	.56	.48	.37	.53	.84	.81	.80	.94	.53

In order to explore the profiles of FL reading anxiety and reading strategy use for male and female students as well, we computed the means and standard deviations of FLRAS and FLRSUS for them both respectively, which is presented in Table 3. The results showed that male students scored higher on all the FFRAS scales and FLRSUS5 but lower on all the other FLRSUS scales than females. And the differences were statistically significant on all FLRAS scales, FLRSUS1 and FLRSUS4, although all the effect sizes were small, as proved by the independent samples *t*-test results reported in Table 3 (to avoid Type I errors, Bonferroni correction was carried out in the analyses, with the threshold of *p* lowered from .05 to be at .0055.). This suggests that compared with their female counterparts, the male students felt significantly more anxious when facing reading activities, were less satisfied with their English reading proficiency, and used specific analyzing (FLRSUS1) and planning (FLRSUS4) strategies significantly less often during a reading activity.

Table 3 Independent samples *t*-test results of gender difference in FLRAS and FLRSUS

	Male	Female	*t*-test result			
	(*N* = 778)	(*N* = 924)	*t*	*p*	Mean difference	Effect size (Cohen's *d*)
FLRAS1	2.58	2.47	4.11**	.000	.11	0.24 (small)
FLRAS2	2.64	2.55	3.77**	.000	.11	0.19 (small)
FLRAS	2.81	2.71	5.15**	.000	.10	0.21 (small)
FLRSUS1	3.17	3.23	-2.05	.040	-.06	
FLRSUS2	3.01	2.97	1.57	.116	.04	
FLRSUS3	3.32	3.33	-.27	.787	-.01	
FLRSUS4	3.07	3.20	-3.46**	.001	-.13	0.26 (small)
FLRSUS5	3.26	3.28	-.63	.527	-.02	
FLRSUS	3.19	3.23	-1.69	.091	-.04	

Note. ***p* = .000; Cohen's *d* effect size: small = $d \leq 0.2$, medium = $d = 0.5$; large = $d \geq 0.8$ (Cohen, 1988).

3.5.3. Correlations between FLRAS, FLRSUS and English reading performance

Analyses of the reading test scores showed that the students scored 19 to 37 in the test, with a mean of 28.6. Correlational analyses (two-tailed) were run to

explore the correlations between FLRAS, FLRSUS, and the students' reading test scores. To avoid Type I errors, Bonferroni correction was carried out in the analyses, with the threshold of *p* lowered from .05 to be at .0055. The results are reported in Table 4.

Table 4 Correlations between the measured variables

	FLRAS1	FLRAS2	FLRAS	FLRSUS1	FLRSUS2	FLRSUS3	FLRSUS4	FLRSUS5	FLRSUS	RP
FLRAS1	1	.371** (m)	.885** (l)	-.196** (s)	-.112** (m)	-.170** (m)	-.165** (m)	-.121** (m)	-.210** (m)	-.076*
FLRAS2		1	.531** (l)	-.024	.026	-.027	-.046	-.025	-.029	-.071* (s)
FLLAS			1	-.183** (m)	-.153** (m)	-.165** (m)	-.185** (m)	-.118** (m)	-.209** (m)	-.149** (m)
FLRSUS1				1	.576** (l)	.598** (l)	.592** (l)	.521** (l)	.952** (l)	.020
FLRSUS2					1	.439** (m)	.429** (m)	.368** (m)	.689** (l)	.085* (s)
FLRSUS3						1	.452** (m)	.544** (l)	.732** (l)	.075* (s)
FLRSUS4							1	.387** (m)	.709** (l)	.034
FLRSUS5								1	.649** (l)	.075* (s)
FLLSUS									1	.048

Note. **p* = .002 or .003; ***p* = .0000; RP = performance on the reading test; s = small; m = medium; l = large; coefficient of determination: s = $r \leq 0.1$, m = $r = 0.3$, l = $r \geq 0.5$ (Cohen, 1988)

As noted from Table 4, all the FLRAS and the FLRSUS scales were highly significantly correlated with one another within the scales, with coefficients ranging from .371 to .952 ($p = .000$), whose effect sizes were all medium but to upper end or large. This means that, for example, a student who felt nervous when facing reading activities (FLRAS1) tended to be less confident in his/her English reading proficiency (FLRAS2), and a student who frequently used planning strategies (FLRUS4) tended to use other types of reading strategies more such as predicting strategies (FLRSUS5). Meanwhile, FLRAS1 and FLRAS were significantly negatively correlated with FLRSUS scales, with a coefficient range of -.118 ~ -.210 ($p = .000$), whose effect sizes were small or medium but to the lower end. FLRAS2 was negatively but not significantly correlated with FLRSUS scales. This indicates that a student who was anxious about reading English tended to infrequently use different types of reading strategies. For example, a less confident English reader tended to use planning strategies (FLRSUS4) less frequently.

In addition, as shown in Table 4, all FLRAS scales were significantly inversely related to the students' reading test performance ($r = -.076 \sim -.149$, $p < .0055$); and FLRSU2, FLRSU3 and FLRSUS5 were significantly positively related to the latter, with a coefficient range of .075 ~ .085 ($p < .0055$), though the effect size of all the coefficients was largely small (the effect size of the coefficient between FLRAS and RP was medium but to the lower end). Alternatively, a student who was less confident in his/her English reading proficiency (FLRAS2) tended to perform worse on the English reading test. On the contrary, a student who used assessing strategies (FLRSUS2), and checking and confirming strategies (FLSUS3) more frequently tended to do better on the test.

3.5.4. The regression model

The results of the correlational analyses discussed previously show numerous bivariate relationships, which failed to indicate the influence of one variable on another. Better clues were provided by multiple regression analyses. A stepwise method was employed in forming regression models. Altogether three models resulted with the change in R^2 being all significant: .022 for Model 1 (FLRAS), .036 for Model 2 (FLRAS, FLRAS1), and 0.04 for Model 3 (FLRAS, FLRAS1, FLRSUS2). Model 3, the best one for the present study, with the change of .04 in R^2 at the .008 level, included 3 variables: FLRAS, FLRAS1, and FLRSUS5. The results are shown in Table 5, which reports coefficients from the regression models, as well as their levels of significance.

Table 5 Regression coefficients and significance

						Reading performance in English
	ß	*t*	*p*	VIF	Variance	Cohen's f^2
FLRAS	-.149	41.81**	.000	1.000	3.1%	.0225 (small)
FLRAS1	-.375	-7.33**	.000	4.61	1.3%	.0373 (medium to the lower end)
FLRSUS5	-.372	-7.29**	.000	4.62	0.6%	.0417 (medium to the lower end)

Note. $^{**}p \leq .01$; Cohen's f^2 effect size: small = $f^2 \leq .02$, medium = $f^2 = .15$, large = $f^2 \geq .35$ (Cohen, 1988)

As can be seen, all the three variables were negative predictors for English reading performance and all the coefficients were statistically significant at the .000 level. Among the three variables, FLRAS was the most powerful predictor ($\beta = -.149$, $t = 41.81$), followed by FLRAS2 ($\beta = -.375$, $t = -7.33$), and FLRSUS5 ($\beta = -.372$, $t = -7.29$), with the effect size being small to medium but to the lower end.

3.6. Discussion

3.6.1. Factor analysis of FLRAS and FLRSUS

Rotated principal factor analyses showed that FLRAS had two important components: general anxiety about FL reading (FLRAS1), and self-belief in English reading proficiency (FLRAS2). As proposed by Horwitz et al. (1986), FL classroom anxiety has three dimensions: communication anxiety, test anxiety and fear of negative evaluation. In Zhang (2013), FL listening anxiety involves three factors: listening anxiety, self-belief and listening decoding strategies. Accordingly, in the present study, FLRAS1 was interpreted as General Anxiety about FL Reading which was reflective of anxiety, stress or nervousness about English reading; FLRAS2 was interpreted as Self-Belief because all the items in FLRAS2 were concerned with learners' self-belief in their own FL reading proficiency. Understandably, FLRAS1

was the leading component of FLRAS. These findings clearly suggest that foreign language reading anxiety is specific and concrete, as found in Brantmeier (2005).

Rotated principal factor analyses on FLRSUS revealed that it had five factors: planning, predicting, checking and confirming, specific analyzing, and assessing strategies. This shows that strategies can be very specific in regard to specific language tasks and FL reading strategies are a group of independent strategies related to FL reading.

Even so, the components of both FLRAS and FLRSUS need to be confirmed in future research. With better confirmed categorization of the factors of the two scales, samples from different FL/SL contexts will be better analyzed and compared in terms of FL reading anxiety and reading strategy use to better understand the issues. It will also enable us to examine the relations between the two variables and other language learning-related variables such as motivation and past experiences.

3.6.2. Profiles of the students' FL reading anxiety and strategy use

Statistical analyses showed that more than half of the students generally did not feel anxious when reading English and were confident in and satisfied with their English reading proficiency, which is consistent with the findings in Brantmeier (2005), Wu (2011), and Liu and Hu (2009). This might be because reading is often the most common activity in FL/SL learning and usually does not require oral communication with others. If immediate oral communication were required, the FL reader might feel anxious, as found in Brantmeier (2005). Even so, around one-third of the participants still felt anxious when reading; thus, they need help the most. To help these students become less anxious during a reading task, course instructors can adopt a variety of strategies such as being empathetic and facilitative, giving them more opportunities, creating a (more) friendly classroom environment, and so on, as discussed in a number of current studies (Horwitz, 2000; Liu, 2006; Tsui, 1996)

Meanwhile, more than half of the respondents moderately used different types of reading strategies such as planning, checking and confirming, predicting and assessing, when reading English, consistent with findings on the use of general strategies (Lu & Liu, 2011; Takeuchi et al., 2007; Wenden & Rubin, 1987). This might be because when confronting a reading task, learners have to process countless pieces of information for different purposes. Consequently, they have to employ different strategies during the process.

In traditional Chinese culture, men have often been considered to be of more use and greater competence. They thus usually have an advantage over women in school, life and work. For example, in schooling, male students are

often given more opportunities and praised more, and should thereby be less anxious and more confident than their female counterparts. To our surprise, male students reported to be significantly more anxious about English reading and less satisfied with their English reading proficiency than their female peers, as proved by independent samples *t*-tests results, different from the findings in Matsuda and Gobel (2004) and Wu (2011), who found no significant differences between males and females in FL reading anxiety. This might be largely thanks to the one-family-one-child policy adopted in the early 1980s which forces Chinese people to change their views towards men and women and enables women to have more opportunities to learn and demonstrate their abilities in life, including in schools.

In addition, the tests showed that male students employed specific analyzing (FLRSUS1) and planning (FLRSUS4) strategies significantly less often during a reading activity. No significant differences occurred in other types of reading strategies between them, similarly to the finding in Ehrman and Oxford (1995). This might be attributed to several causes such as general English proficiency, English reading comprehension proficiency, and English reading experiences. That is why gender difference in levels of FL reading anxiety and strategy use deserves further research.

3.6.3. Correlations among FLRAS, FLRSUS and English reading performance

Correlational analyses indicated that FLRAS was significantly inversely related to FLRSUS, as found in research on general FL anxiety and strategy use (Lu & Liu, 2011; Nakatani, 2006). This means that a student who was anxious about English reading tended to use specific analyzing, assessing, checking and confirming, planning and predicting strategies significantly less frequently while working on an English reading task. Though it might be the other way around, this finding clearly shows that FL reading anxiety closely interacts with FL reading strategy use, which may interactively work together to affect students' performance in FL reading tests, as proved by the regression analyses results reported in Table 5. Thus, in FL classroom teaching and learning, it is necessary for both learners and teachers to be aware of the interaction of these two variables first and then to consciously train anxious learners to use different types of reading strategies during a FL reading activity as done in Conti (2004) and Fraser (1999). In this way, anxious learners may gradually become able to use more types of various FL reading strategies, and to use them more frequently, when confronting a FL reading task. Ultimately, students' performance in FL reading may be improved.

Meanwhile, both FLRAS and FLRSUS were generally significantly correlated with the students' FL reading comprehension performance, as happened

in numerous studies on general FL anxiety and strategy use (Cohen, 1998; Collier, 2010; Grenfell & Macaro, 2007; O'Malley & Chamot, 1990; Oxford, 1996; Takeuchi et al., 2007). Stepwise regression analyses showed that FLRAS (overall FL reading anxiety), FLRAS1 (general anxiety about FL reading), and FLRSUS5 (predicting strategies) were good predictors of FL reading comprehension proficiency. Contrary to the results of correlation analyses presented in Table 4, FLRSUS5 became a negative contributor to the students' performance in reading English. It might be that, when working alone, the use of predicting strategies positively affected students' performance in reading English, as found in numerous studies reviewed before. However, when interacting with other variables, it might become a negative factor, as found in Liu and Zhang (2011). For this reason, the role of FL reading anxiety and strategy use in the learning of FL reading calls for continuous research. Future research can also focus on the causes of anxiety when handling a FL reading activity and strategies to help SL/FL learners to become less anxious and use better strategies during the FL reading process, as suggested by Mak (2011), Ewald (2007), and Dreyer and Nel (2003).

Meanwhile, it is worth noting that most coefficients in the present study were small though significant, and the effect size of the difference between male and female students, of the coefficients between FLRAS and FLRSUS scales and reading test scores, and of the regression coefficients was largely small or medium but to the lower end. This indicates that the difference between male and female students, and the relations between FLRAS, FLRSUS, and FL reading comprehension performance were weak, though statistically significant, which might be due to the large number of participants involved in the study. Whether the situation is the same in this case needs to be researched in future studies, to better understand gender difference in the measured variables, the relation between FL reading anxiety and FL reading strategy use, and their predictive effect on students' performance in reading tests. Although caution is needed when interpreting the findings, it is important to note that these variables can make a huge difference when a large number of participants are targeted, as shown by the effect sizes of the coefficients and *t* values in the present study.

4. Conclusions

The present study investigated the interrelations between FL reading anxiety and FL strategy use and their effect on FL reading comprehension performance at the tertiary level. The following conclusions resulted from the study:

1. FLRAS and FLRSUS were significantly correlated with each other.

2. More than half of the students generally did not feel anxious when reading English and were confident in and satisfied with their English reading proficiency. Meanwhile, more than half of them usually moderately used different types of reading strategies such as planning, checking and confirming, predicting and assessing, when reading English.
3. Compared with their female counterparts, male students felt significantly more anxious when facing reading activities, were less satisfied with their English reading proficiency, and used planning (FLRSUS4) and other specific analyzing strategies during a reading activity significantly less often.
4. The students' FL reading anxiety was significantly inversely related to their FL reading strategy use, both of which were generally significantly correlated with the students' FL reading comprehension performance.
5. FLRAS (overall FL reading anxiety), FLRAS1 (general anxiety about FL reading), and FLRSUS5 (predicting strategies) were good predictors of the latter.

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