Gender, Academic Major, and Chinese Students' Use of Language Learning Strategies: Social and Educational Perspectives

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This study, using the adapted version of Oxford's (1990, pp. 283-291) 80-item Strategy Inventory for Language Learning (SILL), examined the relationship between gender, academic major and the self-reported language learning strategy (LLS) use of 217 university students learning English in the Chinese context. The study differed from previous SILL studies in that the data were interpreted from social and educational perspectives. Results showed that the frequency of overall strategy used by female students was significantly higher than that by male students. However, male students surpassed female students in the use of individual strategies. As regards academic major, social science students employed LLS with greater frequency than science students in the use of overall strategy, strategy categories and individual strategies. Analysis of these findings revealed some distinctive features in the students' use of learning strategies which could be linked to some factors concerning their social and educational background. Interpretation of these results and pedagogical implications are presented.

In the past three decades, researchers and teachers have shown an increasing interest in identifying the strategies used by successful language learners (Chamot & El-Dinary, 1999; Cohen, 1998; Green & Oxford, 1995; Griffiths, 2003; Takeuchi, 2003; Rubin & Thompson, 1994). However, no one most commonly occurring pattern of strategy use exists for either

successful or unsuccessful learners. For example, while a majority of research shows that students with higher language proficiency use more learning strategies (Cohen, 1998; Oxford & Burry-stock, 1995; Wharton, 2000), some others indicate that it is students with moderate proficiency who use more strategies than either high-level or low-level students (Philips, 1990, 1991; Green, 1991). A few studies (Abraham & Vann, 1987; Vann & Abraham, 1990) have even discovered that unsuccessful students also use strategies generally considered as useful, and often the same ones as those employed by the successful learners: the difference lies in the degree of flexibility the students show when choosing strategies, and how appropriately they are applied to the given situation.

To explain the strategic differences in language learning, researchers and teachers have conducted extensive studies, focusing on examining how such factors as language proficiency, motivation, gender, career orientation and educational setting affect students' choice of learning strategies (Carson & Longhimi, 2002; Ehrman, 1990; Ehrman & Oxford, 1989; Goh & Kwah, 1997; Wharton, 2000). Nevertheless, commenting on the results of studies conducted by themselves and others, O'Malley and Chamot (1990) stated that most researchers based their investigations of students' use of learning strategies on the cognitive information-processing framework. Researchers generally take the view that "strategies are perhaps the product of one's cognitive style, personality, or hemispheric preference" (Larsen -Freeman & Long, 1991, p. 199), but neglect cultural and educational factors in their studies of LLS.

The present study is part of an ongoing investigation that aims to look at how gender and academic major, two of the most discussed factors, affect students' use of LLS in the Chinese context. Unlike most of the previous studies, however, this study attempts to explore these factors from social and educational perspectives. It is hypothesized that emergence of strategies is a process directly connected to the practice of cultural groups, and that only by looking at their social and educational background can we have a clearer picture of how students' use of learning strategies is influenced by gender

and academic major in the Chinese context. Thus, the present study focuses on addressing the following two research questions:

1) Do male and female Chinese EFL students differ in their use of learning strategies and how are the gender differences in their strategy use related to their social and educational background?
2) Does academic major play a role in these students' strategy use and why do the students of various academic majors show distinctive characteristics in the use of learning strategies?

THEORETICAL FRAMEWORK

This study has built on an emerging interest in a social educational perspective in ESL/EFL acquisition research. In social psychological theory, L2 acquisition is seen as taking place in a particular social milieu, which gives rise to many expectations in the minds of teachers, parents, and students (MacIntyre, 1994; MacIntyre & Gardner, 1991). The beliefs in the community concerning cultural values, the importance and meaningfulness of learning the language, and the particular role of various individual differences in the language learning process will influence L2 acquisition. Gardner (1985) claims that an individual successfully acquiring an L2 gradually adopts various aspects of behavior which characterize members of another linguistic-cultural group. He further asserts that the learner's ethnocentric tendencies and attitudes towards the other group are believed to determine his/her success in learning a new language, and that the learner's motivation to learn is thought to be determined by his/her attitudes and orientation towards L2 acquisition.

From an educational perspective, students' educational setting emerges as a key determinant of frequency and type of strategy use. Several decades of research in social-linguistics has found that students entering the learning environment are equipped with certain preconceptions about the nature of learning, about their expectations of success, relevance and enjoyment within

it, and preferences about how to engage in the learning process (Biggs, 1993; Entwistle, 1998; Marton & Saljo, 1997; Trigwell, Prosser & Taylor, 1994). They would also have prior knowledge and skills, certain cognitive abilities and personality variables that would affect their likelihood of success. They would adapt a number of these entry characteristics continuously, in accordance with their perceptions of the teaching context and their relative success in achieving personal learning goals (Biggs, 1993; Trigwell et al., 1994). In addition, institutional factors such as a course structure, curriculum content, methods of teaching and assessment also play critical roles in determining students' use of LLS (Biggs, 1993).

REVIEW OF THE LITERATURE

Strategy Use and Gender

Research has demonstrated that females and males differ significantly in the use of LLS, with females using more strategies more frequently than males (Sunderland, 2000). Ehrman and Oxford (1989), for example, discovered that females, compared with males, reported significantly greater use of LLS in four categories: general study strategies, functional practice (authentic language use) strategies, strategies for searching for and communicating meaning, and self-management strategies. Oxford and Nyiko (1989) also found that females used more learning strategies significantly more often than males in three of the five possible categories: (1) formal practice, (2) standard study habits, and (3) the highly social category of input elicitation.

A consistent picture has also emerged with regard to gender difference in strategy use for Chinese students. Goh and Kwah (1997) used Oxford's (1990) SILL to examine the learning strategies of the 175 Chinese students learning English in Singapore. They found that their female participants used all strategies more frequently than male students did, although only the male/female difference on compensation strategies and affective strategies

reached statistical significance. Wen and Johnson (1997) found their female participants superior to males in terms of strategy use. In a recent study by Gu (2002) in a Chinese university, females also reported significantly more use of almost all vocabulary learning strategies that were found to be correlated with success in EFL learning.

Although almost all the studies on gender differences in strategy use have produced evidence of a female's superiority in strategy use, recent research reveals a more complex picture, indicating that males and females might differ in completing specific learning tasks. For example, male and female students have been found to differ in L2 reading, and male students tend to use global strategies while female students tend to use local strategies in processing L2 texts (Young & Oxford, 1997). Zhang's (2000) study on reading strategies of tertiary level English majors in China also found that male students used global and metacognitive reading strategies more frequently than female students. As far as the use of vocabulary strategies is concerned, Oxford et al. (1988) found that female students were significantly more willing to try out new vocabulary learning strategies than male students, a finding corroborated by Young and Oxford (1997). In addition, a significant gender difference was also reported in Bacon's (1992) study of students' listening comprehension strategies, in which male students were reported using translation strategy more frequently than female students when listening to authentic L2 texts, especially with the more difficult passage.

Gender differences in L2 strategy use are often explained by gender differences in personality, cognitive style or hemispheric preference. Larsen-Freeman and Long (1991) attribute females' superiority in the use of LLS to their greater social orientation, stronger verbal skills (including proper rule usage), and greater conformity to norms, both linguistic and academic. Oxford (1993b) indicates that female language learners show more interest in social activities than males; tend to prefer less aggressive interaction; are less competitive and more cooperative. Other studies reveal that females have a higher desire to please and gain approval through good grades and social behavior than males (Nyikos, 1990; Oxford et al., 1988). Cognitively, verbal

skills in the first language usually emerge earlier in females than in males (Larsen-Freeman & Long, 1991). Females also tend to show greater ability in articulation, are more fluent and utter longer and more complexly formed sentences (Oxford, 1993a, 1993b). Girls also usually score higher than boys in verbal ability and reading tests, especially from age eleven on (Slavin, 1988).

Strategy Use and Academic Major

Compared with gender, academic major has received less attention in research on the use of learning strategies. On the whole, research has revealed relationships between academic major and LLS use. Politzer and McGroarty (1985) found that field of specification (engineering/science vs. social science/humanities) had significant effect on strategy choice of ESL students, with engineers avoiding strategies that were deemed "positive" for gaining communicative language proficiency. In the research by Chamot et al. (1987), university major was shown to have a statistically significant influence on choice of L2 learning strategies, particularly in favor of humanities, social science, and education majors and to a lesser degree majors in computers, science, or math. Similar results also appeared later in Oxford and Nyikos' (1989) study. They discovered that humanities/social/education majors used two different categories of strategies—independent strategies and functional practice (authentic language use) strategies—significantly more often than did students majoring in other areas. A recent study (Gu, 2002) on vocabulary learning strategies of Chinese EFL learners, however, seemed to contradict this general tendency. In Gu's (2002) study, academic major was found to be a less potent background factor in affecting students' strategy use. Although strategy differences were also found between arts and science majors, "differences on most strategy categories were less clear-cut than were those between male and female participants" (Gu, 2002, p. 35).

In addition to university major, current career position may also influence L2 learning strategy choice. Ehrman and Oxford (1989) found that professional

linguists used a wider variety of strategies than did adult language learners and native-speaking language teachers not trained in linguistics. Specifically, professional linguists used significantly more of the following general categories of strategies: functional practice (authentic language use), searching for and communicating meaning, formal model building, and affective strategies.

One of the most important variables causing such differences in use of learning strategies by students of various academic majors is motivation. Oxford and Nyikos' (1989) study proved that students with different career orientations may result in different motivations to learn a language, which, in turn, will influence their use of LLS. Another interpretation may be related to students' learning styles. Reid (1987) found that ESL students' fields of specification influenced learning modality preferences (visual, auditory, kinesthetic, tactile), which may, then, determine their choice of LLS. As for the strategic differences exhibited by professional linguists and adult language learners, Ehrman and Oxford (1989) offered two possible explanations for advantages in strategy use enjoyed by professional linguists. First, by virtue of experience and education, professional linguists had become aware of and proficient at these strategies. Second, they were overwhelmingly intuitive, and all career groups with the intuitiveness reported a wider range of strategies than any other preference group.

THE STUDY

Participants

Survey Participants

The participants in this study were 225 university students in Jiangxi Normal University, China. They were randomly selected from the enrollment list (1125 end-of-2nd year university students enrolled in 10 departments), so

as to provide each member of the population an equal opportunity to be included in the sample. The final sample consisted of 217 students (male, 53%; females, 47%), after 8 students were rejected because their responses had missing values. The ages of the participants ranged from 18 to 23, with the mean being 19.7. Table 1 presents the distribution of participants based on their academic majors.

TABLE 1
Distribution of Participants

Social science students	Science students
Chinese	Mathematics
Education	Physics
History	Chemistry
Politics	Computer
Commerce	Geography
N = 107	N = 110

At the time of the study, these students had all had 6 years of English learning experience in middle school (932 contact hours). In university, they had just completed one year and half of English learning (797 contact hours), and their university courses covered reading, listening, and writing.

Interview Participants

Of the 217 questionnaire participants, 12 were selected for an in-depth study. Following Patton's "maximum variation sampling" (Patton, 1990, p. 200), I allowed for maximum variation in the participants' gender, academic major, frequency of strategy use and English proficiency. First of all, based on the previously completed questionnaires, I tabulated the information on the questionnaire participants. Then, I started to select participants that would represent all the variations mentioned above.

Instruments

Questionnaire

The instrument employed in the current study was adapted from Oxford's (1990, pp. 283-291) 80-item Strategy Inventory for Language Learning (SILL) (version 5.1), which is widely used all over the world and most consistent with learners' strategy use (Hsiao & Oxford, 2002). Although the SILL is cognitive in orientation, it does give attention to social-affective sides of language learning as well. These are reflected in the three strategy categories of the SILL: compensation, affective and social. The questionnaire consisted of two sections. Personal data asked the participants some general questions concerning their gender, age, academic major, English proficiency self-rating, motivation for learning English and amount of time spent on learning English out of classroom every week. Section 2 included 80 statements divided into six categories: memory strategies, cognitive strategies, compensation strategies, metacognitive strategies, affective strategies and social strategies. It was a self-scoring survey where each item was a statement "I do … " (e.g., I make summaries of information that I hear or read in English) and the participants were asked to report the frequency of use of LLS in a multiple-choice fashion using a choice of five Likert-scale response for each strategy described: never or almost never true of me, generally not true of me, somewhat true of me, generally true of me, and always or almost always true of me. Green and Oxford (1995, p. 264) quote reliability of various forms of SILL, using Cronbach's alpha for internal consistency, as .93 − .98. Reliability of the adapted SILL for this population, again using Cronbach's alph, was .94.

Semi-structured Interview

Immediately after the participants finished completing the questionnaire, I conducted this interview, whose purpose was to gain further in-depth understanding of similarity and difference in strategy use exhibited by the

male/female students and students of various academic majors. In this partially structured interview, I took up items from the questionnaire which I had previously identified as having a relation to gender and academic major. For each strategy item, the participants were asked to answer three questions: (1) Why did you choose this particular response? (2) When have you used this strategy? (3) What do you do when using this strategy? While posing these predetermined questions, I had considerable flexibility concerning follow-up questions pertinent to their learning experience. Then, I listened to their response for clues as to what question to ask next, or whether it was important to probe for additional information. Each interview, which lasted approximately one hour, was conducted in Chinese so that the participants were able to express their ideas fully. All the interviews were tape-recorded and transcribed verbatim.

Data Collection and Analysis

In January, 2001, the questionnaires were sent to 225 randomly selected Chinese university students. Before these questionnaires were administered, I held a briefing for all teachers whose students were to participate. Each teacher was given guidelines and instructions to administer the questionnaires. The teachers then took the questionnaires to class and administered them immediately after they finished their classes, using about 30 minutes. All the participants received uniform instructions as to how to fill out the questionnaires. After the data were collected, each questionnaire was examined individually and coded for statistical analysis to answer the research questions indicated above. The Statistical Package for the Social Sciences (SPSS, version 6.0) was used for the statistical analysis of the data.

First, I performed ANOVA to examine the effects of gender and academic major on learners' mean strategy use across the entire SILL and on the six SILL categories. To determine significance throughout the study, I used the standard of $p < .05$. Then, Chi-square tests were used to examine each SILL item for significant variation by gender and academic major. As regards the

analysis of the interview data, I adopted analytic induction (Bogdan & Biklen, 1992). By reading through the interview transcripts over and over again, I discovered the students' use of learning strategies and identified the recurrent themes and salient comments in regard to their strategy use. To ensure inter-reliability, I invited two of my colleagues to read the interview transcripts a second time and make their own coding. Then, we compared our coding and resolved any discrepancies through a third reading by three of us.

RESULTS AND DISDUSSION

Gender

As far as strategy use by gender was concerned, the results of the ANOVA indicated that gender had significant effect on the students' overall strategy use, with the female students (mean of the frequency of overall strategy use was 3.04) using more strategies than the male students (mean of the frequency of overall strategy use was 2.98). However, the AVOVA results revealed no gender differences for strategy categories. At the individual item level, the male students reported using 14 strategies significantly more often than the female students whereas the female students reported using 10 strategies significantly more often than the male students (see Table 2). On the whole, the results in this study coincide with the findings obtained in Wharton's (2000) study at all the three levels of strategy use: overall strategy, strategy categories and individual strategies. In Wharton's study, over 90% of the participants are also of Chinese ethnicity.

Most of students' disparities in strategy use caused by gender can be explained from social and educational perspectives, in which students' beliefs, social and educational settings help shape their use of learning strategies. As far as the present study was concerned, the students' strategy use seemed to be affected by:

1) a world-wide belief that females may be superior to males in language

learning
2) a male-dominated social structure in China
3) social position of females as obedient to authority

TABLE 2
Strategies Showing Significant Variation by Gender

	% high use (4 or 5)		
Item	Male	Female	Observed x^2
I. Used significantly more often by male (14 items)			
27. COG Speak English to myself our of class	12	1	10.35
16. MEM Copy down beautiful expressions	22	14	9.63
80. SOC Ask others to verify my understanding	35	14	8.78
29. COG Write diaries, message, or letters in English	9	6	8.29
44. COM Use gestures when stuck in conversation	25	11	7.91
65. MET Do lots of exercises before exams	53	51	7.80
7. MEM Put words with same root together to remember	39	23	7.74
49. COM Use Chinese when stuck in conversation	50	49	7.48
69. AFF Talk to someone about feelings	26	18	7.10
70. AFF Avoid being discouraged by poor exam results	75	68	6.92
30. COG Use beautiful English expressions in writing	31	28	6.58
50. MET Preview English lessons	41	38	6.69
72. AFF Continue reading even though meeting difficulties	52	41	6.27
45. COM Make up new words when stuck	24	14	6.22
II. Used significantly more often by female (10 items)			
36. COG Listen to teacher and take notes simultaneously	54	76	13.38
34. COG Read English texts aloud repeatedly	12	22	9.41
64. MET Review vocabulary, texts and notes before exams	64	81	9.12
41. COG Pay attention to the teacher's corrections	31	44	8.77
26. COG Try not to translate word-for-word	48	64	8.53
14. MEM Use flashcards or word lists to remember words	4	11	8.05
35. COG Analyze grammar rules and linguistic details	34	44	7.56
2. MEM Use new word in a sentence to remember it	38	42	7.40
25. COG Analyze grammatical structures in a sentence	54	56	7.23
5. MEM Review English lessons often	10	21	6.40

Note: Critical value of x^2 = 5.99 (df = 2), p< .05

Females Superior to Males in Language Learning

A majority of studies on LLS have reported that female students use learning strategies with greater frequency than male students (Ehrman & Oxford, 1989; Goh & Kwah, 1997; Green & Oxford, 1995; Kaylani, 1996). The results of this study are no different, with the female students significantly surpassing the male students in the use of overall strategy. In explaining the higher frequency of strategy use by females, Oxford and Ehrman (1995) argue that both learning results and learning strategies could well be a function of social expectations, attitudes, motivation, and learning styles.

In general, females are believed to be superior to males in language learning. As reviewed in the previous section (Larsen-Freeman & Long, 1991; Oxford, 1993a, 1993b; Slavin, 1988), their verbal skills in the L1 usually emerge earlier than males. They tend to show greater ability in articulation and score higher than males in verbal ability and reading tests. They are expected to succeed in language learning, and "for non-English majors in China, failure in English for female students may well be more face-threatening than male students" (Gu, 2002, p. 44). This explanation is supported by the interview data, in which the female students reported spending more extracurricular time on English learning.

Male-dominated Social Structure

Compared with the bilinguals in Wharton's (2000) study, the male students in this study preferred to use more strategies to improve their communicative competence and control their emotion in language learning. Out of the 14 strategies (see Table 2) used significantly more often by the male students, four strategies were related with functional practice (item 27, speak English to myself out of class; item 44, use gesture when stuck in conversation; item 49, use Chinese when stuck in conversation; item 45, make up new words when stuck) and three strategies belonged to affective strategies (item 69, talk

to someone about feelings; item 70, avoid being discouraged by poor examination results; item 72, continue reading even though meeting difficulties).

In terms of the use of functional practice strategies, we may offer our interpretations from the perspectives of social structure and psychological factors in China. Sociologically, China is a male-dominated society, in which males always dominate public speech. Such a phenomenon is also pronounced in Chinese schools. As Chinese students mainly learn English in classroom, it is always male students who play a major role in classroom interactions. Female students, on the other hand, usually avoid using functional practice strategies like speaking in class or starting conversations in English. Psychologically, Chinese females tend to be more restrained and shyer than males in public places (Bond, 1996). On most occasions, a woman would prefer to be a passive listener rather than active participator in a conversation. Therefore, when females are engaged in English learning, they are less likely to talk as much as male students. All these were further confirmed in the interviews, in which four of the male students tended to be talkative while only two female students elaborated on the questions they were asked.

As regards the three affective strategies, the higher use by the male students is not surprising as these strategies are related to self-encouragement. Though affective strategies embody a wider range of emotionally-based response to language learning than self-encouragement, it does play a crucial role in controlling students' emotions, attitude and motivation related to language learning. One possible explanation may be derived from unequal distribution of labor and power in Chinese society, where a man is supposed to be a major supporter of a family. From childhood onwards, a Chinese man is nurtured not to be bent in front of difficulties. No matter how difficult it would be, a man should never be discouraged and try his best to reach his goal. For women, however, things are different. A girl in Chinese society is raised to believe that she is on the pathway that ends in marriage. Her future life and happiness depend on finding a good marriage partner. Such a traditional Chinese belief makes it difficult for many Chinese women to challenge difficulties as well as men do. This could perhaps serve to explain

why the male students used these affective strategies more frequently than the female students in this study.

Social Position of Females as Obedient to Authority

One distinctive feature emerged from the strategies used more frequently by the female students. Of the 10 strategies used significantly more often by the female students, two were related to learning English by following the teacher's instructions (item 36, listen to teacher and take notes simultaneously; item 41, pay attention to the teacher's correction) (see Table 2). The qualitative data supported the statistical data in the use of these strategies. Five out of the six female students stated that they would depend largely on teachers in the process of their English learning. In contrast, only two of the six male students mentioned a heavy reliance on teachers and three said that they did so only on certain occasions. A look at Chinese women's social position and teachers' status may help interpret this phenomenon.

In China, women are socialized to be obedient to authority in the family context, whether that authority is the parents, the older brothers, or the husband (Bond, 1996; Rao, 2002a). Social pressure drives parents to try to raise their daughters to be tractable. Negative comments about a girl such as "She does not listen" or "She is a tough one" can be extremely harmful to the girl's reputation and future. Mothers of potential suitors are discouraged from seeking out such girls. Thus, the socialization of girls to exhibit obedience in both private and public domains offers one explanation for the female students' stronger reliance upon teachers in schools.

Academic Major

Consistent with results from similar studies examining influence on strategy use by academic major, this study found evidence for higher frequency of overall strategy use by the social science students (mean = 3.06) than that by the science students (mean = 2.96). Overall, the difference

between them was statistically significant. As for the use of strategy categories, the social science students used two of the six strategy categories significantly more often than the science students: compensation and metacognitive. At the individual level, the social science students reported using 15 strategies significantly more often than the science students whereas the science students reported using 6 strategies significantly more often than the social science students (see Table 3).

TABLE 3
Strategies Showing Significant Variation by Academic Major

| Item | % high use (4 or 5) | | |
	Social science	Science	Observed x^2
III. Used significantly more often by social science students (15 items)			
33. COG Make summary of new English material	15	3	13.35
50. MET Preview English lessons	28	18	10.63
75. SOC Actively participate in various classroom activities	40	19	9.78
37. COG Pay attention to listening and speaking	19	16	8.13
75. SOC Ask others to slow and repeat	44	21	8.01
55. MET Plan my schedule	43	41	7.90
29. COG. Write notes, messages, or letters in English	27	13	7.78
2. MEM Use new word in a sentence to remember it	30	29	7.56
60. MET Choose strategies for various learning tasks	34	28	7.10
48. COM Use circumlocations	55	48	6.92
31. COG Revise written work to improve writing	57	46	6.78
34. COG Read English texts aloud repeatedly	51	46	6.45
26. COG Try not to translate word-for-word	32	21	6.35
5. MEM Review English texts often	45	26	6.16
70. AFF Avoid being discouraged by poor exam results	56	37	6.09
IV. Used significantly more often by science students (6 items)			
35. COG Analyze grammar rules and linguistic details	46	67	10.19
1. MEM Associate new material with already known	54	68	8.87
20. COG Find meaning by dividing word into parts	47	53	8.52
25. COG Analyze grammatical structures in a sentence	14	24	8.12
39. COG Make a comparison between Chinese and English	45	55	7.46
9. MEM Associate word with its synonyms and antonyms	29	33	7.35

Note: Critical value of $x^2 = 5.99$ (df = 2), p< .05

The strategic differences between the two groups of students seemed to be mainly caused by their preferred ways of learning, career interests and curriculum, all of which could be associated with educational setting in China.

Preferred Ways of Learning

As noted in the previous section, students entering the learning environment are generally equipped with their own preference about how to engage in the learning process. In effect, the development of such a preference mainly originates from the learning approaches they adopt in daily study. As most of the social science majors are more closely related to language learning, the habitual ways of learning preferred by social science students are more favorable to English learning than those preferred by science students. This is evidenced by the 5 strategies (items 37, 29, 31, 34, 5) used significantly more often by the social science students (see Table 3). As for the strategies used more often by the science students, 4 out of the six strategies (items 35, 1, 25, 9) are obviously connected with logical analysis and association, which are characteristic of almost all science majors. The qualitative data also revealed striking differences in strategy use exhibited by these two groups of students. While five of the social science students reported that their English learning was facilitated by their social science studies, almost all the science students complained that their academic majors involved much abstract thinking and logical inferences which had nothing to do with language learning. This might serve to explain why the social science students could adapt themselves to various types of learning tasks by choosing appropriate learning strategies, whereas the science students were less flexible in choosing strategies (item 60). All these findings lend a support to Reid's (1987) assertion that students' fields of specification determine their choice of LLS.

Career Interest

Just as what was reviewed in the aforementioned literature, the students'

interest in English learning appears to be associated with their individual careers in the present study. For example, in the qualitative study, four of the six social science students reported that their interest in English learning was boosted by their professional orientations. For some of them, the desires to be involved in the international business, finance and education prompted them to improve their English proficiency by using a variety of learning strategies. By contrast, all the science students said that their interest in learning English was reduced by their science majors, which made them feel bored with memorization, recitation and mechanical practice in language learning. They reported that they could keep their experiments going for several hours without finding it a bit boring. But when they picked up English textbooks, they tended to feel sleepy. This could explain why the science students employed compensation and metacognitive strategy categories significantly less often than the social science students.

Curriculum

As one of the key variables related to institutional factors, curriculum also plays a vital role in shaping students' use of learning strategies. In China, social science students are, in general, burdened with relatively less amount of academic work than the science students, which allows them more time for English learning. Science students, however, seem to have endless homework and experiments to finish in their major studies. Such a contrast could make a great difference in the use of LLS. As indicated in Table 3, the social science students made a more frequent use of such time-consuming strategies as making summaries of new English material (item 33), previewing English lessons (item 50) and reviewing English lessons often (item 5) than the science students. The findings of the qualitative study are in line with these statistical data. Two thirds of the six science students said that they were always busily engaged in the major studies and could barely squeeze out one hour or so for English learning each day. Five of the social science students, on the other hand, felt that there was not much work for them to do with their

major studies, and that they devoted most of their spare time to the learning of English.

CONCLUSION AND IMPLICATIONS

This study has examined the relationship between gender, academic major and Chinese students' use of learning strategies from cultural and educational perspectives and revealed some distinctive features in their strategy use. Like most previous studies, this research found a higher use of overall strategy by the female students than by the male students. Such a tendency in the use of overall strategy by gender lends support to a world-wide belief that females are superior to males in language learning. At the specific level, the male students used some of the functional practice and affective strategies more frequently than the female students which may mainly result from the male-dominated social structure in China. As regards some of the strategies used significantly more often by the female students, we can see that they are concerned with a heavy reliance on teachers. Similarly, academic major also plays an important role in determining the students' use of learning strategies, with the social science students enjoying more advantages in English learning than the science students. The social science students' preferred ways of learning seemed to be more favorable to English learning. Their interest in English learning, which was facilitated by their major studies, was stronger. In addition, they had much more free time to study English because they were not so heavily burdened with their major studies as the science students in academic work in university. All in all, strategic differences exhibited by the male/female students and the students of various academic majors in this study could be said to be due, as discussed above, to the social and educational influences in the Chinese context.

The findings in this study have several implications for English teaching and learning in the Chinese context. First, the findings have shown variation in strategy use accounted for by gender and academic major. The explanation

of these patterns can be facilitated by further exploration of the effect of other individual variables on strategy use. Among these variables are language proficiency level, motivation, attitudes, personality type, and learning style. Second, the findings of the study have practical implications for L2 classroom instruction. Since male/female students and science/social science students have been found to have their own preferences in strategy use, a need arises for providing students with further opportunities to practice a wide variety of strategies that are appropriate to the different instructional tasks and activities that constitute an essential part of the classroom L2 learning experience. For example, science students may need more explicit instruction and practice in memory and compensation strategies (e.g., using mnemonic devices for learning new vocabulary and guessing meaning from context), whereas social science students may need more practice in using LLS related to logical analysis and association (e.g., finding meaning by dividing word into parts and associating new material with already known). Finally, the findings of the study also have implications for English learners themselves. As LLS use is likely to be affected by their gender and academic major, students should realize the importance of selecting appropriate strategies for various learning tasks. Instead of sticking to their traditional ways of learning, they should try to diversify their use of learning styles and strategies (for more details, see Rao, 2002b). This study dealt with a group of non-English majors in a Chinese university and further studies are needed for students of various English proficiency levels in different types of schools. Also, longitudinal studies are required to investigate causal relationship of strategy use to gender and academic major. More studies like these might produce some more insights for the classroom teacher.

THE AUTHOR

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