

Metacognitive Awareness of Reading Strategies by Undergraduate U.S. and Chinese Students

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ABSTRACT

Since metacognitive awareness plays a crucial role in successful reading comprehension, research on metacognitive awareness of reading strategies and the conditions under which readers use those strategies is important. However, very few studies have focused on reading strategies of students from different countries. This study compares the metacognitive awareness of reading strategies of college students in the United States and China. Undergraduate students completed the Survey of Reading Strategies (SORS) designed to measure metacognitive awareness and perceived use of reading strategies while reading academic materials in English. The data, collected while students were at their home institutions, revealed remarkably similar patterns of strategy awareness and reported usage despite the fact that students were studying in two very different contexts. Differences that existed indicated that U.S. students reported using certain types of strategies more often than Chinese students. Cultural-specific instructional practices and the need for direct strategy instruction are discussed.

Given the importance of metacognitive knowledge to successful reading, research on metacognitive awareness of reading strategies in particular and the conditions under which readers use those strategies is important (Pressley & Afflerbach, 1995; Sheorey & Mokhtari, 2001;). Mokhtari and Sheorey (2002) define metacognitive awareness of reading strategies as the deliberate, conscious procedures used by readers to enhance text

comprehension. They maintain that increasing our understanding of readers' metacognitive awareness of reading strategies is necessary to develop active, constructively responsive readers. Research reveals that effective readers use a repertoire of complex reading strategies (Aarnoutse & Schellings, 2003; Alfassi, 2004; Schorzmann & Cheek, 2004; Van Keer & Verhaeghe, 2005) and that there is a strong relationship between active strategy use and

high reading proficiency (Poole, 2005). Further, Taraban, Rynearson, and Kerr (2000) investigated whether the use of reading strategies improved everyday college course performance and found a strong and consistent relationship between strategy use and grade point averages.

According to Flavell (1979), reading is a cognitive enterprise that occurs as a result of the interaction among the reader, the text, and the context in which reading takes place. Thus, the reader's metacognitive knowledge about reading and reading strategies may be influenced by a number of factors, including culture-specific instructional practices (Sheorey & Mokhtari, 2001). Unfortunately, there is a dearth of studies focusing on strategy use by readers in different contexts, and most research on the reading strategies of students is limited to low-proficiency readers and those studying at the secondary school or pre-university level (Mokhtari & Reichard, 2004). One study by Sheorey and Mokhtari (2001) examined proficient college students and found that a range of reading strategies, including planning, controlling, and evaluating one's understanding, are widely used by both first and second language readers of English. The study compared metacognitive awareness of reading strategies of non-native-English-speaking students to native-English-speaking students and found that both groups displayed awareness of almost all of the strategies included in the survey and attributed the same level of importance to different types of strategies. Additionally, for both groups of students there was higher reported strategy use by those with higher reading ability. Although subjects were from native and non-native English speaking cultures, all were studying in the U.S. when they participated in the study.

Another study by Mokhtari and Reichard (2004) investigated the metacognitive awareness of reading strategies reported by U.S. and Moroccan undergraduate students at their home institutions when reading academic materials in English. Results

indicated metacognitive awareness of reading strategies and strategy use were similar for U.S. and Moroccan students, and while both groups reported rather sophisticated reading strategy use, Moroccan students reported using some strategies more often than U.S. students. A more recent study by Karbalaei (2010) compared the metacognitive awareness of reading strategies with Indian and Iranian students studying at their respective universities. Students reported similar patterns of strategy awareness and usage when reading academic materials in English. Overall, Indians were more interested in using top-down strategies (sampling the text for information and contrasting it with one's own world knowledge) for better comprehension during reading, while Iranians were more focused on using bottom-up strategies (understanding language by looking at individual meanings or grammatical characteristics of the most basic units of the text).

Previous research studies reveal overall metacognitive awareness of reading strategy use is far from ceiling levels. For example, findings from Mokhtari and Reichard's (2004) research with U.S. and Moroccan students indicated that U.S. college students report a moderate to high metacognitive awareness of strategy use with a clear preference for using certain types of strategies over others. Poole (2005) investigated metacognitive awareness of reading strategies used by Mainland Chinese students studying English as a foreign language and found that overall strategy use was moderate with students reporting use of a variety of reading strategies. These findings underline the importance of helping all college readers develop their metacognitive awareness of reading strategies, whether English is the native language or a foreign language.

The purpose of the present study is to compare metacognitive awareness of reading strategies while reading academic materials in English for U.S. and Chinese undergraduate students. We are not aware of any research that has compared within the same study the

metacognitive awareness of strategy use for U.S. and Mainland Chinese college readers. Thus, our study is exploratory in nature, and a distinctive feature of this research is that we are investigating U.S. and Chinese students' metacognitive awareness of reading strategies with academic material in English for two groups in very different instructional contexts. Our research questions are as follows:

1. Are there significant differences between U.S. and Chinese undergraduate college students' self-report of perceived use of reading strategies while reading academic materials in English?
2. What reading strategies do U.S. and Chinese undergraduate college students report using more frequently while reading academic materials in English?

Method

Participants

Participants were 117 undergraduate students enrolled in a southeastern, urban research university in the U.S. and, by coincidence, 117 undergraduates students enrolled in a southwestern, urban teachers' university in China. The average age for the U.S. students was 22, with 14 males, 102 females and 1 student of unspecified gender. The average age for Chinese students was 20, with 20 males, 96 females and 1 student of unspecified gender. U.S. students were tested in groups of 15-29, the normal size of education classes at their U.S. university, and Chinese students were tested in groups of 40-55, the normal class size at their Chinese university. Both U.S. and Chinese students were selected from education classes at their respective university on a voluntary basis. Among the U.S. students, there were 3 freshmen, 23 sophomores, 40 juniors, 40 seniors and 11 students who did not identify their year in school. Among the Chinese students, there were 75 sophomores, 41 juniors and 1 student who did not identify his

or her year in school. While data was not collected on the number of second language speakers among the U.S. students, the participating university ranks high in ethnic diversity with an undergraduate student body composition that is far above the national average, with 38.4% Black or African American, 33.6% White, 10.7% Asian, 8.1% Hispanic/Latino, 3.8% multiracial, and 1.8% non-resident Alien students. The U.S. students in this study reflect this general population composition. To the knowledge of the researchers in this study, almost all Asian, Hispanic/Latino, and non-resident alien students in the education classes speak a second language, mostly their home language. Thus, we estimate that about 20% of the 117 U.S. students spoke a second language. Typically, Chinese students have studied English for a minimum of nine years and use English primarily by the time they enter the university.

Although participants are from universities similar in terms of location and ranking, it is important to consider the instructional practices in each country. The Alliance for Excellent Education (2002) reported that approximately six million of the U.S. secondary school students are reading well below grade level. The National Center for Education Statistics (2003) reported 11 percent of entering U.S. postsecondary school students enroll in remedial reading coursework suggesting that college students are not faring better than high school students. Additionally, struggles with text-heavy courses often may prevent U.S. college students from taking academically more challenging courses (Au, 2000). Seventy percent of students who took one or more remedial reading courses did not attain a college degree or certificate within eight years of enrollment (Adelman, 2004). Disciplinary professors in the U.S. seldom offer explicit instruction in reading comprehension, despite the fact that many students may have a limited understanding of how to read at the college level (Culver, 2011; Hermida, 2009).

In contrast to the U.S. where explicit instruction in reading is often lacking at the college level, instructors in China often teach reading strategies for comprehension of various materials in English in an effort to improve overall English language proficiency. In China, assessment of students' reading competence in both Chinese and English is a significant part of high stakes standardized tests at all entrance levels (Sun & Henrichsen, 2011; Wang, 2013; Wang & Zhang, 2012; Zhang, 2008). In addition, research has found that Chinese college students use reading strategies more frequently in English than in Chinese (Feng & Mokhtari, 1998).

Materials

The data for this study was collected through the *Survey of Reading Strategies* (SORS), designed by Mokhtari and Sheorey (2002) to measure English as a Second Language (ESL) students' metacognitive awareness and perceived use of reading strategies while reading academic materials (see Appendix A). The SORS provides an overall average indicating how often one uses reading strategies when reading academic materials. Additionally, the SORS provides averages on three subscales indicating how often one uses global, problem solving, and support strategies. Mokhtari and Sheorey (2002) provided a brief description of each subscale and the number of corresponding items as:

Global Reading Strategies (GLOB)

include items such as having a purpose for reading, activating prior knowledge, predicting what a/the text is about, confirming predictions, using context clues, text structure and other textual features to enhance comprehension. Readers intentionally use these techniques to monitor their understanding. (13 items)

Problem Solving Strategies (PROB)

include items such as reading slowly and carefully, reflecting on reading, guessing the meaning of unknown words, and rereading text to improve comprehension. Readers use these techniques to focus on

localized problems when they are having trouble understanding text. (8 items)

Support Strategies (SUP) include items such as using a dictionary, taking notes, underlining, paraphrasing information, asking self-questions, or using reference materials as aids. Readers use these techniques as support mechanisms for enhancing understanding. (9 items)

The SORS was developed based on the Metacognitive Awareness of Reading Strategies Inventory (MARSII), originally created by Mokhtari and Reichard (2002) for students who are native English speakers. The MARSII, validated with a large population (N=825) of students with reading abilities ranging from middle school to college, has a reliability of .93 for the overall scale. The internal consistency reliability coefficients (as determined by Cronback's alpha) for its three subscales, based on the results of a series of factor analyses are reported as: Global Reading Strategies (.92), Problem Solving Strategies (.79), and Support Strategies (.87). Mokhtari and Reichard provide a complete explanation of the theoretical and research foundations for the MARSII, along with its psychometric properties.

Mokhtari and Sheorey (2002) described how the SORS differs from the MARSII in three ways. First, the wording of several items is designed to be more comprehensible to ESL students (i.e., the word "preview" was changed to "take an overall view"). Second, two strategies, "when reading, I translate from English into my native language" and "when reading, I think about information in both English and my mother tongue" were added because they were considered consistent with relevant research about reading strategies used across languages. Finally, Mokhtari and Sheorey removed two strategies that were in the MARSII, "I summarize what I read to reflect on important information in the text" and "I discuss what I read with others to check my understanding" because the items "...do not specifically constitute reading strategies as conceived in the current research

literature on metacognition and reading comprehension” (Mokhtari & Sheorey, 2002, p. 4). The SORS consists of 30 items measured with a Likert Scale of 1 = “I never or almost never do this,” 2 = “I do this only occasionally,” 3 = I sometimes do this (about 50% of the time),” 4 = “I usually do this,” and 5 = I always or almost always do this.” The SORS was field-tested with ESL students at two U.S. universities with consistent results (internal reliability = .89 or better).

In our study, Chinese students received the 30-item SORS translated into Mandarin Chinese to further facilitate their ease in responding. However, the original English version of the 30-item SORS was also displayed on the White Board for students’ reference or clarification. Different Chinese scholars performed the translation and back translation to insure accuracy. The U.S. students received a 28-item adapted version of the SORS that excluded the two items related to reading in a second language (namely, “when reading, I translate from English into my native language” and “when reading, I think about information in both English and my mother tongue”).

Procedure

Participation and signed consent forms were obtained on a voluntary basis from students in both countries. The SORS was administered in each U.S. and Chinese education class by a researcher who was not the instructor of the class. The students were informed of the purpose of the study and were asked to complete a survey designed to measure how often they employed different types of reading strategies when reading academic materials in English. It was emphasized that there were no right or wrong answers, and students were instructed to circle the appropriate number ranging from 1 to 5 on the right side of each SORS statement to indicate the frequency with which they use the reading strategy. Students were told that they could take as much time as they needed to complete the survey. On average, both the

U.S. and Chinese students completed the survey in 15 minutes.

Results

Overall Strategy Use

The paired T-test, MANOVA and ANOVAs were utilized for data analysis in this study and results obtained are presented in Tables 1 and 2. With respect to our first research question, “*Are there significant differences between U.S. and Chinese undergraduate college students’ self-report of perceived use of reading strategies while reading academic materials in English?*” results in Table 1 indicate a similar pattern for overall reading strategy use by U.S. and Chinese students. Concerning students’ overall strategy use (SORS OVERALL includes GLOB, SUP, and PROB), the means were moderate for both U.S. (M=3.54) and Chinese (M=3.25) participants. U.S. students reported greater overall strategy use than Chinese students in almost all strategies but one (GLOB 24 *Try to guess the content of text*). As Table 1 also shows, for U.S. students, the means of overall strategy use (SORS OVERALL) ranged from a high of 4.25 (PROB 25 *I re-read to increase my understanding*) to a low of 3.33 (GLOB 4 *Take an overall view of the text before*) with a mean of 3.54. For Chinese students, the means of overall strategy use (SORS OVERALL) ranged from a high of 3.7 (GLOB 24 *Try to guess the content of text*) to a low of 2.03 (SUP 5 *Read aloud when text becomes hard*) with a mean of 3.25.

Despite the small number of male participants in both U.S. and Chinese contexts (14 and 20 respectively), a 2 (Gender: Male vs. Female) x 2 (Nationality: Chinese vs. U.S.) Multivariate Analysis of Variance (MANOVA) was conducted, with the three subscales of the SORS (Global, Supportive, and Problem Solving) entered as dependent variables. Results revealed a significant main effect for nationality ($F(1, 222) = 9.953, p = .000, \text{partial } \eta^2 = .120$). However, no significant main effect was found for gender

($F(1, 222) = 1.214, p = .306$, partial eta squared = .016), and no significant interaction effect was found between gender and nation ($F(1, 222) = 1.921, p = .127$, partial eta squared = .026).

Of the reported overall differences by nation, significant differences were found between U.S. and Chinese students in two of three subscales. A significant difference was found between the two groups on the Problem Solving subscale ($F(1, 222) = 11.866, p = .001$, partial eta squared = .051) and the Support subscale ($F(1, 222) = 9.500, p = .002$, partial eta squared = .041). However, no significant difference was found on the Global subscale ($F(1, 222) = .090, p = .765$, partial eta squared = .000).

Indices of the three strategy groups were the mean of the subscales for a specific student, and then the mean of the strategy index was compared in the MANOVA. There were a total of 28 items common to both the nationalities represented, and those were indicators in three strategy categories, Global (13), Support (7), and Problem Solving (8) consistent with the SORS test. On the three subscales, U.S. students reported the highest mean for Problem Solving strategies ($M = 3.90, SD = .499$) followed by Global strategies ($M = 3.49, SD = .485$) and the lowest mean for Support strategies ($M = 3.25, SD = .580$). Chinese students also reported the highest mean for Problem Solving strategies ($M = 3.44, SD = .549$) followed by Global strategies ($M = 3.32, SD = .524$) and the lowest mean for Support strategies ($M = 2.92, SD = .587$). This indicated a similar pattern for reported strategy use by U.S. and Chinese students. Concerning students' overall strategy use, the means were moderate for both U.S. ($M = 3.54$) and Chinese ($M = 3.25$) participants. Specifically, both U.S. and Chinese students were more interested in using Problem Solving strategies (rereading, getting back on track when lost concentration, paying closer attention when texts get difficult, adjusting speed, and using context clues for better comprehension) than Global strategies

(checking if guesses are correct or wrong; thinking about previous knowledge, and take an overview of the text); and both are least likely to use reference materials in the course of reading.

Nationality and Subscales

Given the significance of the overall test, univariate Analyses of Variance (ANOVAs) for each of the three subscales as dependent variables were conducted as follow-up tests to the MANOVA, with nationality as the independent variable (see Table 1). For the Global subscale, significant univariate main effects of nationality were found for seven out of 13 individual strategies. U.S. students reported significantly higher means for six of the seven strategies and Chinese students reported a higher mean on one of the strategies. For the Support subscale, significant univariate main effects of nationality were found for two out of the seven individual strategies with U.S. students reporting higher means on both strategies. For the Problem Solving subscale, significant univariate main effects of nationality were found for seven out of the eight individual strategies with U.S. students reporting a higher mean on all seven strategies.

High, Medium and Low Scores by Nationality

In examining reading strategy use among U.S. and Chinese students on the SORS scale, which ranges from 1 to 5, we identified three types of usage as suggested by Oxford and Burry-Stock (1995) for general language learning strategy usage: high (mean of 3.5 or higher), medium (mean of 2.5-3.4), and low (2.4 or lower). Sheorey and Mokhtari (2001) also used these categories and stated, "These usage levels provided a convenient benchmark which enabled us to make comparisons between the two groups of subjects with respect to their awareness of reading strategies while reading academic texts" (p. 437). We were unable to calculate an overall mean on this particular measure for 1 U.S. student and

Table 1

Significant Mean Differences Recorded on SORS for U.S. and Chinese Students

Name	Strategy	US (n= 117)		Chinese (n=117)		Total (323)	p-Value
		Mean	SD	Mean	SD		
GLOB 1	Purpose in mind when I read	3.93	0.88	3.48	1.03	12.45	0.001
GLOB 4	Take an overall view of the text before	3.33	1.28	2.78	1.15	11.56	0.001
GLOB 12	Decide what to read closely, what to ignore	3.52	1.11	3.04	1.08	11.09	0.001
GLOB 17	Use context clues to help better understand	4.09	0.86	3.60	0.91	17.61	0.000
GLOB 20	Use typographical aids (e.g. italics)	3.84	1.21	3.26	1.18	13.45	0.000
GLOB 21	Critically analyze, evaluate the information	3.40	0.92	2.98	0.97	10.93	0.001
GLOB 24	Try to guess the content of text*	3.16	1.11	3.72	0.97	16.67	0.000
GLOB 3	Think about what I know to help me understand	3.72	1.02	3.88	0.98	1.35	0.246
GLOB 6	Think about whether the content fits my reading purpose	3.21	1.15	3.23	1.11	0.20	0.887
GLOB 8	Noting characteristics like length and organization	3.17	1.27	3.20	1.09	0.03	0.852
GLOB 15	Use tables, figures and pictures	3.50	1.11	3.27	1.24	2.15	0.144
GLOB 23	Check my understanding with new information.	3.43	0.95	3.29	1.08	1.11	0.292
GLOB 27	Check to see if guesses are right or wrong	2.90	1.25	3.17	1.09	3.43	0.065
SUP 5	Read aloud when text becomes hard	3.69	1.34	2.03	0.97	115.69	0.000
SUP 18	Paraphrase to better understand	3.62	0.99	2.78	1.03	40.17	0.000
SUP 2	Take notes to help me understand what I read	2.95	1.13	3.11	1.07	1.290	0.257
SUP 10	Underline or circle information in the text	3.61	1.23	3.83	1.12	2.014	0.157
SUP 13	I use reference materials	2.87	1.28	3.03	1.16	1.033	0.310
SUP 22	Go back and forth in the text	3.04	1.08	2.92	0.94	0.831	0.363
SUP 26	I ask myself questions I like to have answered	2.91	1.19	2.64	1.12	3.19	0.076
PROB 7	Read slowly and carefully to understand	3.84	1.01	3.50	1.05	6.43	0.012
PROB 9	Get back on track when I lose concentration	4.21	0.79	3.26	1.08	59.41	0.000
PROB 11	Adjust my reading speed to what I am reading	4.09	0.93	3.50	1.15	18.42	0.000
PROB 14	Pay closer attention, when text gets difficult	4.12	0.87	3.63	1.07	14.45	0.000
PROB 16	Stop from time to time and think about text	3.42	0.98	3.15	1.00	4.35	0.019
PROB 19	Try to visualize information to help remember	3.99	0.98	3.45	0.98	17.51	0.000
PROB 25	I re-read to increase my understanding	4.25	0.89	3.48	1.09	34.27	0.000
PROB 28	Guess the meaning of unknown words or phrases.	3.24	1.18	3.43	0.90	2.01	0.158
	GLOB OVERALL	3.49	0.48	3.32	0.52	0.09	0.765
	SUP OVERALL	3.25	0.58	2.92	0.59	9.50	0.002
	PROB OVERALL	3.90	0.49	3.44	0.55	11.86	0.001
	SORS OVERALL	3.54		3.25			

7 Chinese students because they did not respond to all of the questions on the survey. Thus, reported percentages in this instance only are based on 116 U.S. students and 110 Chinese students. Among U.S. students, 67 out of 116 (57.7%) fell within the high range in terms of their overall mean, whereas among Chinese students 39 out of 110 (35.5 %) fell within the high range. However, among the Chinese students, 65 out of 110 (59.1%) fell within the medium range while among U.S.

students, 48 out of 116 (41.4%) fell within this range. Six out of 110 (5.4%) Chinese students and 1 out of 116 (0.9 %) U.S. student fell within the low range.

Most and Least Strategies Used by Nationality

With regards to our second research question, "*What reading strategies do U.S. and Chinese undergraduate college students report using more frequently while reading academic materials in English,*" Chinese and U.S. students differed in

Table 2

Reading strategies reported being used MOST and LEAST* by U.S. and Chinese students

U.S. (n=117)		Chinese (n=117)		U.S. (n=117)		Chinese (n=117)		
Strategy*	Mean	SD	Strategy*	Mean	SD	Strategy*	Mean	SD
PROB 25	Re-read to better understand	4.25	0.89	GLOB 3	Think about what I know	3.85	0.99	
PROB 9	Back on track	4.21	0.79	SUP 10	Underline or circle information	3.80	1.12	
PROB 14	Closer attention to difficult text	4.12	0.87	GLOB 24	Try to guess the content of text	3.70	0.98	
PROB 11	Adjust reading speed	4.09	0.93	PROB 14	Closer attention to difficult text	3.61	1.07	
GLOB 17	Use context clues	4.09	0.86	GLOB 17	Use context clues	3.56	0.92	
PROB 19	Visualize information	3.99	0.98	PROB 11	Adjust reading speed	3.49	1.15	
GLOB 1	Purpose in mind when I read	3.94	0.88	PROB 7	Read slowly and carefully	3.48	1.05	
GLOB 20	Use typographical aids	3.85	1.21	GLOB 1	Purpose in mind when I read	3.48	1.03	
PROB 7	Read slowly and carefully	3.84	1.01	PROB 25	Re-read to better understand	3.46	1.09	
GLOB 3	Think about what I know	3.73	1.01	PROB 19	Visualize information	3.43	1.00	
SUP 5	Read aloud for difficult text	3.69	1.34	PROB 28	Guess the meaning of unknown	3.41	0.92	
SUP 18	Paraphrase to better understand	3.62	0.99	GLOB 23	Check my understanding	3.28	1.08	
SUP 10	Underline or circle information	3.61	1.23	GLOB 15	Use tables, figures and pictures	3.27	1.23	
GLOB 12	Decide what to read closely ignore	3.52	1.11	GLOB 20	Use typographical aids	3.26	1.18	
GLOB 15	Use tables, figures and pictures	3.50	1.11	PROB 9	Back on track	3.25	1.07	
GLOB 23	Check my understanding	3.43	0.95	GLOB 6	Think about content and purpose	3.21	1.11	
PROB 16	Stop and think about text	3.42	0.98	GLOB 8	Noting characteristics	3.19	1.09	
GLOB 21	Critically analyze and evaluate	3.40	0.92	GLOB 27	Check accuracy of guesses	3.17	1.09	
GLOB 4	Take an overall view of the text	3.32	1.28	PROB 16	Stop and think about text	3.16	1.01	
PROB 28	Guess the meaning of unknown	3.24	1.18	SUP 2	Take notes to help	3.13	1.08	
GLOB 6	Think about content and purpose	3.22	1.15	SUP 13	Use reference materials	3.03	1.16	
GLOB 8	Noting characteristics	3.19	1.28	GLOB 12	Decide what to read closely ignore	3.02	1.07	
GLOB 24	Try to guess the content of text	3.16	1.11	GLOB 21	Critically analyze and evaluate	2.97	0.97	
SUP 22	Go back and forth in text	3.04	1.08	SUP 22	Go back and forth in text	2.92	0.94	
SUP 2	Take notes to help	2.95	1.23	GLOB 4	Take an overall view of the text	2.79	1.15	
SUP 26	Ask myself questions	2.91	1.19	SUP 18	Paraphrase to better understand	2.78	1.03	
GLOB 27	Check accuracy of guesses	2.91	1.25	SUP 26	Ask myself questions	2.64	1.12	
SUP 13	Use reference materials	2.87	1.28	SUP 5	Read aloud for difficult text	2.03	0.97	

*in Bold

terms of the frequency with which individual strategies were used (see Table 2).

U.S. students reported PROB 25, *I re-read to increase my understanding*, (M=4.25), PROB 9, *Get back on track when I lose concentration*, (M=4.21), PROB 14, *Pay closer attention when text gets difficult*, (M= 4.12), PROB 11, *Adjust my reading speed to what I am reading*, (M=4.09), and GLOB 17, *Using context clues*, (M=4.09) as the most frequently used strategies, while SUP 22, *Going back and forth in text*, (M=3.04), SUP 2, *Taking notes while reading*, (M=2.95), SUP 26, *Asking oneself questions*, (M=2.91), GLOB 27, *Checking accuracy of guesses*, (M=2.91), and SUP

13, *Using reference materials*, (M=2.87) were the least used. Chinese students reported GLOB 3, *Using prior knowledge* (M=3.85), SUP 10, *Underline or circle information* (M=3.80), GLOB 24, *Try to guess the content of text* (M=3.70), PROB 14, *Closer attention to difficult text* (M=3.61), and GLOB 17, *Using context clues* (M=3.56) as the most frequently used strategies, while SUP 22, *Going back and forth in text* (M=2.95), GLOB 4, *Taking an overall view of the text before reading* (M=2.79), SUP 18, *Paraphrasing to better understand* (M=2.78), SUP 26, *Asking myself questions* (M=2.64), and SUP 5, *Reading aloud for difficult text* (M=2.03) are the

least frequently used strategies. On the two items on the SORS designed specifically for the Chinese students: SUP 29, *Translate to native language*, and SUP 30, *I think about information in both languages*, reported means were moderate (3.61 and 3.3 respectively)

Discussion

In this study U.S. and Chinese college students reported on their metacognitive awareness of reading strategies when reading academic materials in English. Although both groups were studying in different instructional contexts, data indicated a similar pattern of metacognitive awareness and reading strategy use. U.S. students reported using certain strategies more often than the Chinese students. Problem Solving strategies were most used by U.S. students while Support strategies appeared to be the least used for both groups.

The data obtained concerning overall strategy use indicated that both U.S. and Chinese students demonstrated a moderate awareness level of reading strategies with the U.S. students reporting a slightly higher overall usage level than Chinese students. This is a noteworthy finding supported by previous research in the literature. Separate studies by Mokhtari and Reichard (2004) and Poole (2005) indicated overall reported strategy usage was moderate to high for U.S. students and moderate for Chinese students, respectively. Thus, both groups of students would benefit from explicit instruction focusing on increasing awareness levels of reading strategies. As the designers of the MARSI note, "Becoming aware of one's cognitive processes while reading is a first important step toward achieving the type of constructively responsive and thoughtful reading that is emphasized by current models of reading" (Mokhtari & Reichard, 2002, p. 255).

Where there was a significant difference on individual strategies between groups, U.S. students reported consistently higher means

for specific strategies than Chinese students except for one strategy where Chinese report higher means, i.e., "Trying to guess the content of text." This finding is interesting in light of the results of the Programme for International Student Assessment (PISA), an international standardized assessment to test the reading, mathematical, and scientific literacy of 15-year-olds in schools. In both 2009 and 2013 among the 65 participating countries and economies, Shanghai-China ranked first (OECD, 2010a; 2013). According to the results of the 2009 and 2012 PISA student questionnaire, students in Shanghai-China on average showed greater awareness of using effective strategies to understand, remember, and summarize information than U.S. students (OECD, 2010b). About 40% of Shanghai-Chinese students were classified as deep and wide readers, i.e., readers who have high levels of awareness about effective learning strategies and who read a large variety of materials. This number was only about 20% for U.S. students (OECD, 2010b).

A similar pattern that emerged from both groups is they attributed the same order of importance to categories of reading strategies in the survey, with a clear preference for using Problem Solving strategies, followed by Global strategies, and then Supportive reading strategies. A previous study with U.S. and non-native-English-speaking international students, all studying at universities in the United States, reported similar findings (Sheorey & Mokhtari, 2001) with both groups ascribing the same order of importance to the categories, i.e., Problem Solving, Global, and Supportive. Another study of reading strategy use when reading academic materials in English with Senior Middle School Chinese students reported a similar preference for Problem Solving, followed by Global and Supportive strategies (Li, 2010). It is intriguing that whether students are in their own country or whether they are in middle school or college, they describe a similar pattern of importance to the categories of reading strategies.

Of the three subscales, there are significant differences by nationality only on Problem Solving and Support with U.S. students reporting higher means in both instances. However, no significant differences were found on the Global subscale. Means for both the U.S. and Chinese students on the Global subscale fall within the moderate range (3.49 and 3.32 respectively) indicating a similar level of reported usage. This finding is supported by previous studies with U.S. college students indicating that they are often unable to monitor their comprehension at high levels of accuracy (Glenberg, Wilkinson, & Epstein, 1982; Lin, Zabrocky & Moore, 1997). When considering awareness of reading strategy use according to the convenient benchmarks of high, medium, or low, slightly over half of the U.S. students and approximately a third of the Chinese students fell into the high range. This view of the data also indicates dramatic room for improvement and further highlights that both groups of students would benefit from explicit instruction focusing on increasing metacognitive awareness levels of reading strategies. The need for such efforts is further supported by research with U.S. college students that found reading strategy instruction had positive effects on metacognitive strategic reading and led to significant increases in use of Global Reading Strategies (Hong-Nam & Leavell, 2011).

A comparison of the top five most and least used strategies for each group reveals interesting findings. There is a clear preference for Problem Solving strategies by U.S. students with Support strategies cited as least used for both U.S. and Chinese students. Both groups reported select Problem Solving strategies, such as paying closer attention to difficult text, adjusting reading speed, and using context clues as most used. This suggests that both groups are not well versed in employing various useful and effective strategies for better comprehension, such as going back and forth in the text and asking oneself questions about the text. These

findings support Zhang's (2003) position that it is most important that learners be made aware that flexibility and appropriateness in using different reading strategies is essential to successful reading.

Although findings of this study, as discussed, provide useful insight into student reading strategy use, there are limitations to consider. One limitation is the focus on participants' reported strategy use rather than their actual strategy use. Another limitation of this study is the small number of males, typically found in education classes in both countries, preventing investigation of any gender differences in reading strategy selection and use. Additionally, indices of self-report or measured reader proficiency would provide more information on factors that impact reading strategies. While the effects of reading ability on strategy use were not explored in this study due to practical logistics and time constraints of collecting data in another country, it is an important factor to consider when investigating strategy use. Another limitation of this study is that Chinese participants have received a significant amount of instruction in English language learning. When considering the findings of this study, one must take into account that the Chinese students' strategy use may be related to reading instruction in second language acquisition as well as cultural differences.

Instructional and Research Implications

Findings from this study have significant implications for pedagogical practice. Since both U.S. and Chinese students had a moderate awareness level of reading strategies, instructors could design activities to foster increasing awareness of reading strategies, such as the administration of the self-scoring SORS survey or discussions where students share their reading strategies for different types of tasks. While results of this study indicate U.S. students report using specific strategies more often than Chinese students,

both populations would benefit from instruction in deep processing techniques, such as answering questions that require higher level thinking skills and practicing self-testing. Since both U.S. and Chinese students report a preference for Problem Solving, followed by Global and Supportive strategies, this study provides further evidence of the need for direct strategy instruction in both countries. For example, direct instruction could be provided on the supportive reading strategies of “going back and forth in the text” and “asking oneself questions about the text,” two strategies cited as least often used for both U.S. and Chinese students. Teachers can provide explicit instruction in strategy use so that readers have a repertoire of reading strategies to select from depending on assignments and purpose for reading. Nist and Holschuh (2000) and Pressley (2000) discussed best practices for strategy instruction that include establishing a purpose for learning the strategy, modeling the strategy with think-alouds, talk-alouds (Lapp, Fisher, & Grant, 2008) and demonstration, guided and independent practice of the strategy, feedback on strategy use, and opportunities for strategy application. Thus, information provided by this study and others (Sheorey, & Mokhtari, 2001; Mokhtari & Reichard, 2004; Martinez, 2008) identifies the types of strategies that may need more attention than others and support for integrating direct instruction on various strategies into the overall reading curriculum.

This investigation also has implications for future research. Consideration of the impact of several factors, such as gender, reading ability, and motivation, would contribute significantly toward our understanding of reading strategy selection and use for U.S. and Chinese students. Previous studies of U.S. females (Sheorey & Mokhtari, 2001) and mainland China females (Poole, 2005) reported significantly higher overall strategy use, and this relationship between gender and reading strategies could be further explored. While previous research

indicates reading ability does impact reported usage of reading strategies (Sheorey & Mokhtari, 2001; Poole, 2005), findings are based on self-rated proficiency. It would be interesting to compare these findings with studies that utilize a validated measurement of reading ability. It would also be very interesting to consider the impact of motivation on strategy use for these two populations. Recent studies by Chinese researchers (Gao, 2003; Zhang, 2008; Zhang, 2010) cast doubt on the stereotypic notions of superficial and passive Chinese learners by showing that Chinese students’ attitude and motivation are closely associated with their learning and use of reading strategies. Future research could investigate whether this is also true for U.S. undergraduates and the relationship between motivation and specific strategy selection for both groups. Furthermore, to explore students’ actual, rather than reported strategy use, techniques such as think-alouds would allow observation of whether readers’ strategy use is correlated with particular reading goals (Merriam, 2001; Mokhtari & Sheorey, 2002).

Conclusion

This research makes a unique contribution to the literature because it compares the metacognitive awareness of strategy use for U.S. and Mainland Chinese college readers within the same study. It is important that the comparison of metacognitive awareness of reading strategies is for students from two very different instructional cultural-specific contexts. Whether one is reading in their first or second language, there is a dearth of studies comparing the metacognitive awareness of reading strategies of proficient second language learners compared to native speakers (Sheorey & Mokhtari, 2001). Although both U.S. and Chinese students in this study may be viewed as having language proficiency for college-level academic reading in English, one would think they are unlikely to have similar strategic awareness in handling their academic tasks because of the differences in their instructional contexts. Yet,

findings from this study indicate a similar pattern of metacognitive awareness and reading strategy. Differences that did emerge between the two groups underline the need

for direct instruction in reading strategies and creating a learning environment where background is considered as instructors and students co-construct the meaning of text.

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Appendix A.
Survey of Reading Strategies (SORS)

Gender: Age: Year: Nationality:
Directions: Listed below are statements about what people do when they read *academic or school-related materials* such as textbooks or library books. Five numbers follow each statement (1, 2, 3, 4, 5), and each number means the following:

- **1** means “I **never or almost never** do this.”
- **2** means “I do this **only occasionally**.”
- **3** means “I **sometimes** do this” (about **50%** of the time).
- **4** means “I **usually** do this.”
- **5** means “I **always or almost always** do this.”

After reading each statement, **circle the number** (1, 2, 3, 4, or 5) that applies to you using the scale provided. Please note that there are **no right or wrong answers** to the statements in this inventory.

Strategy	Scale				
1. I have a purpose in mind when I read	1	2	3	4	5
2. I take notes while reading to help me understand what I read	1	2	3	4	5
3. I think about what I know to help me understand what I read.	1	2	3	4	5
4. I take an overall view of the text to see what it is about before reading it.	1	2	3	4	5
5. When text becomes difficult, I read aloud to help me understand what I read.	1	2	3	4	5
6. I think about whether the content of the text fits my reading purpose.	1	2	3	4	5
7. I read slowly and carefully to make sure I understand what I am reading.	1	2	3	4	5
8. I review the text first by noting its characteristics like length and organization	1	2	3	4	5
9. I try to get back on track when I lose concentration.	1	2	3	4	5
10. I underline or circle information in the text to help me remember it.	1	2	3	4	5
11. I adjust my reading speed according to what I am reading.	1	2	3	4	5
12. When reading, I decide what to read closely and what to ignore.	1	2	3	4	5
13. I use reference materials(e.g., a dictionary) to help me understand what I read	1	2	3	4	5
14. When text becomes difficult, I pay closer attention to what I am reading.	1	2	3	4	5
15. I use tables, figures, and pictures in text to increase my understanding.	1	2	3	4	5
16. I stop from time to time and think about what I am reading.	1	2	3	4	5
17. I use context clues to help me better understand what I am reading.	1	2	3	4	5
18. I paraphrase (restate ideas in my own words) to better understand what I read	1	2	3	4	5
19. I try to picture or visualize information to help remember what I read.	1	2	3	4	5
20. I use typographical features like bold face and italics to identify key information.	1	2	3	4	5
21. I critically analyze and evaluate the information presented in the text.	1	2	3	4	5
22. I go back and forth in the text to find relationships among ideas in it.	1	2	3	4	5
23. I check my understanding when I come across new information.	1	2	3	4	5
24. I try to guess what the content of the text is about when I read.	1	2	3	4	5
25. When text becomes difficult, I re-read to increase my understanding.	1	2	3	4	5
26. I ask myself questions I like to have answered in the text.	1	2	3	4	5
27. I check to see if my guesses about the text are right or wrong.	1	2	3	4	5
28. When I read, I guess the meaning of unknown words or phrases.	1	2	3	4	5
29. When reading, I translate from English into my native language.	1	2	3	4	5
30. When reading, I think about information in both English and my mother tongue.	1	2	3	4	5