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Reading comprehension: The mediating role of metacognitive strategies

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Abstract

This study investigated the reported use of metacognitive reading strategies and their interplay with the reading comprehension of 119 tenth grade learners of English as a foreign language (EFL) enrolled in five randomly-selected public schools in South Lebanon. In addition, the study examined the relative role of the global, problem-solving, and support strategies in predicting learners' literal and higher-order reading comprehension. The study findings indicate that the participants reported high use of the problem-solving and a moderate use of the global and support strategies. In addition, problem-solving strategies positively correlated with and predicted literal as a well as higher-order comprehension. Pedagogical implications and suggestions for further research are discussed.

Keywords: reading strategies, metacognition, literal reading comprehension, higher-order reading comprehension; EFL readers

The spread of English as an instructional language in many educational systems all over the globe has created several challenges for educational researchers and practitioners alike. Chief among these challenges is how to enable English as a foreign language (EFL) learners to comprehend academic texts (e.g., Alderson, 2000; Huang, 2006; Koda & Zehler, 2008), as well as to perform procedural tasks, such as taking an examination, writing a paper, or giving a speech in a language other than their own (e.g., Shih, 1992).

The academic success of EFL learners hinges in a very major way on their reading proficiency, since they need to read several textbooks and resources in order to acquire the requisite content and procedural knowledge of their respective school content areas and fields of specializations at the college level (e.g., Eskey, 2005; Mohktari & Sheorey, 2002). Because reading is a complex problem-solving act of general and specific communication, it is currently established that proficient reading, even in one's native language, entails a successful interaction of a host of reader-related, text-based, and context-specific factors (Ghaith, 2018). These factors include automaticity and fluency in text processing, vocabulary, background knowledge, motivation for reading, a positive reading self-concept, and the effective use of cognitive and metacognitive

reading strategies. Furthermore, in second language (L2) and foreign language contexts, reading is also a primary means of developing L2 aptitude (e.g., Gorsuch & Taguchi, 2010) and is a strong determinant of academic success (e.g., Taylor, Stevens, & Asher, 2006). Consequently, L2 learners may continue to face obstacles in comprehending what they read, particularly academic texts, despite their satisfactory language proficiency, as suggested by Snow (2002). Along similar lines, Grabe and Stoller (2002) asserted that reading is indeed one of the most challenging skills needed for effective learning in L2 contexts, a proposition that is supported by Dreyer and Nel (2003). These researchers further maintained that considerable number of L2 learners may reach the tertiary education level without becoming well-prepared for the reading requirements of their academic programs. Other scholars (e.g., Bernhardt, 2011; Grabe, 2009) have underscored the role of reading strategies in L2 comprehension. Therefore, it is important to investigate the determinants of comprehension, particularly metacognitive strategies.

Literature Review

The Interplay of Reading Comprehension and Metacognitive Strategies

The problem of enabling L2 learners to become proficient readers has been a major concern for researchers and practitioners alike. For instance, many researchers have already investigated the interplay between the use of reading metacognitive strategies and reading comprehension in various international and sociolinguistic contexts. Chief among these investigations are the seminal studies of Sheorey and Mokhtari (2001) in USA, Hosseini (2006) in Iran, Hong-Nam and Leavell (2006) in China, Malcolm (2009) in Bahrain, and Park (2010) in Korea. Furthermore, the past six years have also witnessed a surge in the publication of studies on the frequency of using metacognitive strategies and their role in EFL reading comprehension, and the ascend is likely to continue.

An overview of the international studies on the reported use of the global, problem-solving, and support categories of metacognitive reading strategies and their role in EFL comprehension is provided in Appendix A. Mokhtari and Reichard (2002) defined global strategies as strategies that prepare the readers for reading (i.e., setting a purpose, previewing text characteristics, skimming, predicting, and activating prior knowledge). Meanwhile, the problem-solving strategies are employed to solve problems which come to the surface when the text becomes challenging and difficult to read. These strategies include re-reading, slowing down, reading aloud, guessing the meaning of a word, and visualizing information in the text. Finally, the support strategies are used to help the readers while they are reading. The support strategies include using outside reference aids, paraphrasing what was read, note taking, and annotating.

The results of the studies in Appendix A show inconclusive results, with some general tendencies, regarding the reported frequency of strategy use and EFL comprehension. The Appendix illustrates that 12 of the 19 studies reported problem-solving strategies as the most frequently used category. Eight of the 19 studies did not assess reading comprehension in any form. Sixteen of the studies targeted college level participants, and only the two studies (i.e., Al-Sobhani, 2018; Hong-Nam, 2014) focused on high school participants. It should also be noted that none of the studies investigated the question of whether strategy use may vary due to the

course level (i.e., beginning, intermediate, advanced) or participants' proficiency in English, as suggested by Bernhardt (1991, 2011).

The preceding studies show inconclusive results regarding the association between the use of the categories of metacognitive strategies and EFL reading comprehension. For instance, Madhumathi and Ghosh (2012) and Meniando (2016) reported significant correlations between all of the categories of metacognitive strategies (i.e., global, problem-solving, support) and the reading comprehension of Indian engineering students and the preparatory year program Saudi EFL learners, respectively. Conversely, Zuweldi, Ratmanida, and Marlina (2018) found no significant correlations between the three strategy categories and the reading comprehension of Indonesian college students learning EFL. Furthermore, some studies have reported significant associations between problem-solving and global strategies and no association between the support strategies and the reading skills (e.g., Al Sobhani, 2013).

Likewise, the results are contradictory when it comes to the reported frequency of metacognitive reading strategies use by EFL learners across various sociolinguistic and international contexts. For instance, Jafari and Shokrpour (2012) and Tavakoli (2014) maintained that Iranian learners use support strategies the most, followed by global, and then problem-solving strategies. Conversely, the problem-solving strategies were reported to be the most frequently used strategy by Indian learners (Madhumathi & Ghosh, 2012), Turkish learners (Yuksel & Yuksel, 2012), Yemeni learners (Al-Sobhani, 2013), and English language learners (ELLs) in USA (Hong-Nam & Leavell, 2006). Likewise, a number of other studies have also reported that the problem-solving category is the most frequently used, but the studies disagree regrading whether the support category is used more often than the global category. Specifically, Maasum and Maarof (2012), Ahmadian and Passand (2017), Koshima and Samani (2014), and Shang (2017) reported that EFL learners use the global category more frequently than the support category respectively in Malaysia, Iran, and Taiwan. Conversely, Ghewali, Rosniah, and Noorzah (2017), Pammu, Amir, and Maasum (2014) and Meniado (2016) concluded that the EFL learners use support category more frequently than the global one in Libya, Indonesia, and the Kingdom of Saudi Arabia, respectively.

The preceding line of research into the interplay of metacognitive reading strategy use and reading comprehension indicates that the reading comprehension of EFL learners may be regulated by certain context-specific and sociocultural and linguistic factors that merit further investigation. Furthermore, the preceding studies conceptualized reading comprehension as one variable and did not consider comprehension as a multifaceted construct which entails the literal comprehension and higher-order types of comprehension. Consequently, it is important to study the interplay between literal comprehension of stated ideas in the text and higher-order comprehension, which entails getting the implied meaning (i.e., inferential comprehension), assessing what is read (i.e., critical comprehension), reading beyond the text (i.e., creative comprehension) and the use of metacognitive strategies. Specifically, we investigated the reported prevalence and role of the three types of reading strategies (i.e., global, problem-solving, and support) and the literal and higher-order comprehension of EFL learners in Lebanese public schools. A basic assumption behind the study is that literal comprehension requires text recognition, automaticity, and fluency skills. Literal comprehension is also a pre-requisite for higher-order comprehension which depends more on synthesis, analysis, and critical thinking. As

such, we hypothesized that there is a statistically significant interplay among the metacognitive global, problem-solving, and support reading strategies and literal and high-order comprehension.

Metacognition and Reading Strategies

The concept of metacognition has been used to denote a variety of epistemological and thought processes. Metacognition was originally perceived as one's knowledge about a number of thinking characteristics, as described by Moore (1982). Later on, the concept was expanded to encompass psychological, as well as affective aspects that include knowledge or cognition about one's personal emotions or intentions regarding a cognitive initiative (Flavell, 2000). More specifically, Paris and Winograd (1990) explicated that "meta-cognition holds two vital traits: self-appraisal and self-management of cognition" (p. 17). Self-appraisals signify learners' individual images about their own knowledge conditions and capacities, and their affective conditions regarding their knowledge, capabilities, motivation, and features as learners. Such thoughts pertain to questions related to "what you know, how you think, and when and why to implement knowledge policies" (Paris & Winograd, 1990, p.17). Self-management denotes metacognition in action. This is related to mental procedures that take part in "coordinating facets of problem solving" (Paris and Winograd, 1990, p.17). This comprises planning before the task, modifying during the task, and revising after the task.

Reading Comprehension

Roe and Smith (2012) conceptualized reading comprehension as an act of general and specific communication which involves literal and higher-order comprehension. Literal comprehension is defined as the ability to comprehend the ideas that are directly stated in the text. This includes following written directions, spotting details and sequences, and understanding cause-effect relationships. Meanwhile, higher-order comprehension depends on thinking processes and entails interpretation, analysis, and synthesis of information. Specifically, it comprises making inferences about main ideas, implied cause-effect relationships, understanding pronoun and adverb referents, determining mood and purpose, drawing conclusions, as well as problem-solving and assessment of the accuracy, appropriateness, bias, and timeliness of information.

The Current Study

To date, scholars have investigated the use of metacognitive reading strategies in various international and sociolinguistic contexts under multiple contextual settings and varying native languages, limiting any conclusive results regarding the frequency, type, and role of these strategies in foreign language reading, although we can see tendencies in patterns of use, such as the preferred use of problem-solving strategies In addition, more than a third of the studies did not assess reading comprehension to determine the interplay between the type and frequency of strategy use and reading comprehension performance. Our study does account for reading comprehension. This underscores the importance of possible context-specific variables as mediators of strategy use and reading comprehension, such as limited opportunities for using the target language (i.e., English) for social and communicative functions outside of schools, despite its perceived importance and vitality as an instructional language. Furthermore, previous studies

did not seem to have dealt with reading comprehension as a multifaceted and complex act of communication, which may invoke language proficiency or course level, text type. Additionally, there is currently a paucity of research on metacognitive strategy use that have focused on its relation to reading comprehension of high school EFL learners (i.e., only two studies). Consequently, the present study set to investigate the following questions:

1. What are the perceptions of the study participants regarding their use of metacognitive reading strategies?
2. Is the participants' reported use of the metacognitive global, problem-solving, and support reading strategies significantly related to literal and higher-order reading comprehension?
3. What is the mediating role of the reported metacognitive global, problem-solving, and support reading strategies in predicting literal and higher-order reading comprehension?

Theoretical Framework

The present study is framed in Flavell's (1979, 2000) model of metacognition, which comprises the four categories of (a) metacognitive knowledge, (b) metacognitive experiences, (c) goals/tasks, and (d) actions/strategies. According to Flavell, cognitive practices are detected by using mechanisms defined in these four categories. Specifically, metacognitive knowledge indicates one's knowledge about the factors that affect cognitive initiatives. It is the knowledge that one learns about cognitive processes and the varied cognitive tasks, goals, actions, and experiences, and it has three variables: person, task, and strategy. The person variable is related to learners' consciousness about how they learn and process their cognitive actions. The person variable also involves the learners' awareness of their strengths and weaknesses in reading. The second variable in metacognitive knowledge is the task variable. This is related to the nature and requirements of the task. For instance, a learner may be aware of his or her need for more time to understand an expository text than others. The third variable, which is the strategy variable, includes the strategies required to achieve the objectives. All of these three variables are inter-related when learners are involved in metacognitive activities. In other words, metacognitive strategies enable learners to control cognitive growth and thinking activities, and to determine if their cognitive objectives are met.

Methodology

Participants

Participants were 119 EFL learners enrolled in five public schools (three female-only schools and two mixed gender schools) in the Saida district in South Lebanon. Specifically, there were 26 female students in school A, 28 female students in school B, and 22 female students in school C. Meanwhile, the mixed gender school D included 22 students (10 males and 12 females), and the mixed gender school E included 21 students (8 males and 13 females). Consequently, a total of 101 (84.87%) female students and 18 (15.12%) male students participated in the study. The

age of the participants ranged from 16 to 18 years old (*M* = 16.4, *SD* = .98). The study context is typical of all public schools in the country which enroll students mostly from low socioeconomic backgrounds and is characterized by limited exposure to English, particularly for communicative and social functions, outside the classroom and school setting.

Materials

The materials used in this study were the Survey of Reading Strategies (SORS) (Mokhtari & Sheoery, 2002) and a retired version of the English as a Foreign Language (TOEFL) reading comprehension test.

Strategies. SORS is a self-reported instrument which examines one's awareness and use of metacognitive reading strategies. This instrument is considered appropriate for the purpose of the present study, as it is particularly designed to measure L2 learners' metacognitive awareness of reading strategies. The survey has been widely utilized in previous studies, with an acceptable internal consistency (α = 0.89) as reported by its developers. It is provided with a key to interpret the results: 3.5 or higher = high mean item; 2.5 to 3.4 = medium mean item; and 2.4 or lower = low mean item. SORS measures the following three subcategories of strategies.

Global reading strategies: These strategies are intentional reading strategies used to set the stage for the reading act (e.g., assessing what to read or ignore, noticing text characteristics, guessing what the material is about). They include 13 items, such as "*I think about what I know to help me understand what I read*", "*I take an overall view of the text to see what it is about before reading it*", and "*I check my information when I come across new information*".

Problem-solving strategies*:* These strategies are localized, focused problem-solving or repair strategies used when problems arise in comprehending textual information (e.g., re-reading for more understanding, going back to a previous section when losing concentration, taking a pause and thinking about reading). They include 8 items, such as "*I read slowly and carefully to make sure I understand what I am reading*", "*When text becomes difficult, I re-read it to increase my understanding*", and "*When text becomes difficult, I pay closer attention to what I am reading*".

Support reading strategies: These strategies offer the support mechanism used to sustain responses to reading (e.g., underlining or circling information, paraphrasing for more understanding, going back and forth in the text). They include nine items, including "*When reading, I translate from English into my native language*", "*I underline or circle information in the text to help me remember it*", and "*I go back and forth in the text to find relationships among ideas in it*".

Each of these items is measured by a 5-point, Likert-type scale: 1 (*I never or almost never do this*), 2 (*I only occasionally do this*), 3 (*I sometimes do this*), 4 (*I usually do this*), and 5 (*I always or almost always do this*). In the present study, the overall and the sub-scale internal consistency values of the instrument were as follows: overall, α = 0.81; global, α = 0.68; problem-solving, α = 0.67; and support, α = 0.53.

Reading comprehension. In the present study, reading comprehension was assessed through a

retired version of the TOEFL test and focused on the two domains of literal and higher-order comprehension (see Appendix B). The test included a total of 19 multiple-choice items. These items were classified into two domains of comprehension, based on the conceptualization of comprehension types proposed by Roe and Smith (2012). Specifically, the test included seven literal comprehension questions (items 3, 8, 10, 11, 14, 17, 18) and 12 higher-order questions (items 1, 2, 4, 5, 6, 7, 9, 12, 13, 15, 16, 19), unanimously determined by three raters and specialists in foreign language education. The raters established the test content validity focusing on content relevance and content coverage, as suggested by Bachman (1990).

Procedure

One of the researchers took the consent of the principals of the participating schools, teachers, parents, and the participants in accordance to approved Institutional Research Board (IRB) regulation and ethical research standards. Specifically, the researcher introduced herself to all parties involved in the study and explained the ethical procedures, the IRB regulations, and the purpose of the study. The researcher also informed them about the potential benefits, duration, confidentiality, and freedom to participate in the study.

The participants took the TOEFL reading comprehension test specifically chosen for the purpose of the study within a maximum period of 60 minutes. After a short break, the SORS was administered to them within a period of 40 minutes. Data collection was conducted over a period of five different days. Only one school was visited each day. There was neither compensation nor any other incentives associated with participation in the study. Students who opted not to take part in the study were accompanied by their regular teachers to the school library to have free reading sessions.

Data Analysis

The reading comprehension test was scored and yielded two scores for literal and higher order questions. Responses obtained from the SORS survey were calculated and sub-scores for the different types of strategy use were obtained by adding up scores on the three subscale items that correspond to each strategy type: global, problem-solving, and support. Descriptive statistics (*M* and *SD*) and a rank order of mean scores was conducted in order to address the first research question regarding the frequency of strategy use by the participants. In addition, Pearson correlation (*r*) values were calculated to address the second research question regarding the relationship between the participants' overall use of metacognitive reading strategies and each of the global, problem-solving, and support types and their literal and higher-order reading comprehension scores. Finally, a regression analysis was conducted in order to address the third study question regarding the role of overall strategy use and each metacognitive reading strategies in predicting literal and higher order reading comprehension. The reading strategy types were entered as independent (predictor) variables and the types of comprehension (i.e., literal and higher-order) as dependent variables.

Results

The first research question aimed at investigating the participants' perceptions on their use of metacognitive reading strategies. To address this question, descriptive statistics (*M*s and *SD*s) were computed and a mean rank order was conducted. Table 1 presents the results as follows:

Table 1. *Descriptive statistics and mean rank order of the types of strategies used by participants*

	N	*M*	*SD*	Rank
Problem-solving	119	3.56	0.66	High
Support	119	3.31	0.61	Medium
Global	119	3.18	0.55	Medium
Valid *N* (list wise)	119			

Table 1 reveals a high use of the problem-solving category of reading strategies (*M* = 3.56, *SD* = 0.66), followed by a medium use of the support category (*M* = 3.31, *SD* = .61) and finally the global reading strategies category with a (*M* = 3.18, *SD* = .05).

To address the second research question regarding the relationship between the participants' use of metacognitive reading strategies and their literal and higher-order reading comprehension, Pearson product moment correlation coefficient (*r*) values were computed. Table 2 presents the results of the correlation analysis and shows the following aspects of interest:

Table 2. *Pearson correlations of strategy types and literal and higher-order comprehension*

Metacognitive Strategies	Reading Comprehension		Metacognitive Strategies		
	Literal	Higher-order	Global	Problem-solving	Support
Global	0.025	0.075	-		
Problem-solving	0.304**	0.232*	.505**	-	
Support	-0.027	0.117	.587**	.434**	-

Note. ** $p < .01$ level (2-tailed); *$p < .05$ level (2-tailed).

First, there was a statistically significant relationship between problem-solving strategy and literal reading comprehension ($r = .304$, $p <. 01$). However, the global, and support categories were unrelated to literal comprehension. Second, the results also showed a statistically significant relationship between the problem-solving type and higher-order reading comprehension ($r = .232$, $p <. 05$), while there was no statistically significant relationship between the global and support strategies and higher-order reading comprehension. Third, the results revealed that the three metacognitive strategies were internally related. Specifically, there was a statistically significant relationship between the global and problem-solving strategies ($r =.505$, $p < .01$), the global and the support strategies ($r = .587$, $p < .01$).

The results of the regression analysis are shown in Table 3 below:

Table 3. *Regression analysis predicting literal comprehension*

Variables	Literal Comprehension				
	ΔR Square	*F*	*β*	*t*	*p*
Problem-solving			0.30	3.446	0.00
Support			-0.74	-0.43	0.66
Global			-0.17	-1.7	0.09
Model	0.092	11.87			0.00

Tables 3 indicates that the problem-solving strategies explain 9.2% of the variance (R^2 = .092, F = 11.878, p = .00), and are a statistically significant determinants of literal comprehension (β = 0.30, p = .00). In addition, Table 3 reveals that the support and global strategies were excluded as predictor variables of literal comprehension, β = -.74, p = .66, and β = -.17, p = .09, respectively.

Finally, the results of the regression analysis examining the roles of the reading strategy types (global, problem-solving, support) on higher-order comprehension are shown in Table 4 below:

Table 4. *Regression analysis predicting higher-order comprehension*

Variables	Higher-order Comprehension				
	ΔR Square	*F*	*β*	*t*	*p*
Problem-solving			0.23	2.58	0.01
Support			-0.02	-0.54	0.58
Global			-0.05	-1.70	0.09
Model	0.054	6.67			0.01

The results indicate that the predictor variable of the problem-solving strategies explained 5.4% of the variance (R^2 = .054, F = 6.67, p = .01) and are statistically significant determinants of higher-order comprehension (β = .23, p =.01). In addition, Table 4 shows that the support and global strategies did not predict higher-order comprehension, β = -.02, p = .58, and β = -.05, p = .09, respectively.

Discussion

This study investigated the interplay of metacognitive reading strategies and the reading comprehension of the Lebanese EFL 10th grade learners. The study aimed to determine which categories of the reading metacognitive strategies are reported to be more frequently used by the participants and which ones are significant determinants of their literal and higher-order comprehension. The findings revealed that the problem-solving strategies were reported to be highly used, while the global and the support strategies were reported to be moderately used. Moreover, the problem-solving category of strategies was found to be a significant predictor of both literal and higher-order comprehension.

The preceding findings agree with those of the majority of other EFL studies on strategy preference, particularly at high school and college level where students read challenging texts. Specifically, the findings of the present study corroborate those of Shang (2017) and Yuksel and Yuksel (2012) who reported that advanced EFL students use the problem-solving strategies more frequently than the support and global strategies, respectively in Taiwan and in Turkey. Similarly, the high school ELLs in USA (Hong-Nam 2014), and college EFL students in Indonesia (Pammu et al., 2014; Zuledwi et al., 2018), India (Madhumathi & Ghosh, 2012), Malaysia (Maasum & Maarof, 2012), and Libya (Ghwela et al., 2017) also reported that they use the problem-solving strategies more frequently than the two other categories of the support and global strategies. This suggests that the use of metacognitive strategies may be regulated by the readability level and types of texts that EFL students are required to process at the advanced high school and college level. Such texts require a sophisticated standard of literacy competency; and comprehending them cannot be simply defined by the ability to decode and paraphrase written texts. This is especially so, given that the extant research tends to indicate that preference for using the support strategies (i.e., note taking, annotating, paraphrasing, and using reference aids) is associated with reading at the medium level of proficiency (Tavakoli, 2014) and English for specific purposes texts (Jafari & Shokrpour, 2012). Consequently, learners at the advanced level of reading proficiency may resort to the most appropriate problem-solving strategies (i.e., re-reading, slowing down and reading carefully, guessing the meaning of unfamiliar words and phrases, visualizing comprehension, and paying closer attention to difficult passages) in order to read for the meaning and comprehend challenging texts.

In addition, the findings revealed that the problem-solving strategies were the only predictor of the literal and higher-order comprehension for the participants in this study. This underscores the importance of using these strategies in order to enhance the abilities of the EFL advanced learners to understand the details of challenging texts, reading between the lines to get implied meaning, and to critique assigned texts.

Implications

The findings of the present study have a number of pedagogical implications for teachers, curriculum developers, and designers of teaching and learning materials. Specifically, the findings suggest that metacognitive strategy use by EFL learners seems to be related to the readability levels of texts, given that advanced learners tend to use the problem-solving strategies in order to process difficult texts. Consequently, EFL learners would benefit from integrating a well-designed scope and sequence of strategy instruction into the existing curricula. Likewise, teachers could enhance the reading proficiency of their advanced readers through deliberate instruction in using the problem-solving metacognitive strategies as a mechanism for enhancing self-monitoring and reading for meaning, particularly when reading challenging texts. These strategies are widely-preferred and are proven to be effective in reading challenging texts. Therefore, it would be in order to include them in the official curricula, teach them, and include them in textbooks. The strategies can also form the basis of in-service professional development programs to support teachers in enhancing their learners' reading comprehension by enabling them to develop intellectual knowledge of their minds and make conscious efforts to monitor and control their reading outcomes.

The findings of the present study also suggest the need for further research into the prevalence and frequency of using metacognitive reading strategies in Lebanese schools and in other similar multi-lingual contexts characterized by the high vitality of English as a medium of instruction, despite its limited use in social and communicative functions. Of particular importance in this regard would be conducting further mixed-methods studies to investigate the question of whether metacognitive strategy use in EFL reading changes with growth of English proficiency. It is also important to investigate the interplay of the use of the various types of metacognitive strategies (i.e., global, problem-solving, support) and the types of texts read by EFL learners. Such studies will shed more light on the question of whether metacognitive strategy-categories are malleable based on learners' proficiency and the types of the texts they read. Likewise, future research may determine whether the same strategies from the three categories of metacognitive strategies are needed when EFL readers process texts of various difficulty levels.

Limitations

The findings of the present study should be interpreted with some caution given that the frequency of strategy use was self-reported by the participants and was not based on classroom observation of actual use, content analysis of teaching and learning materials, or triangulated interview data from teachers and learners.

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Appendix A

International Studies on Reading Metacognitive Strategies

Researchers/ Year	Native Language	Participants	Region	Reading Comprehension	Metacognitive Strategies	Findings
Present study	Arabic-speaking students learning EFL	*N* = 119 high school EFL learners (101 females and 18, males); Age 16–18; Low-socioeconomic strata; Limited exposure to English	5 public schools - South Lebanon School A: 26 School B: 28 School C: 22 School D: 21 School E: 22	Literal & Higher-order comprehension types, based on TOEFL reading scores	• Global • Problem-solving • Support	Mean rank order showed high use of problem-solving strategies and moderate use of global and support strategies. Regression analysis showed problem-solving strategies as best predictor of literal and higher-order comprehension scores.
Jafari & Shokrpour (2012)	Persian-speaking students learning English for Specific Purposes (ESP)	*N* = 81 university sophomore students studying environmental health, occupational health and safety, and midwifery	Shiraz University of Medical Sciences in Iran	Did not assess	• Global • Problem-solving • Support	Frequency and mean rank order analyses showed high use of the support and then the problem-solving strategies and a moderate use of the global strategies. ANOVA showed that academic major affects the use of strategies.

Maasum & Maarof (2012)	Malay-speaking students learning EFL	*N* = 41 college students. (30 females and 11 males)	Public university in Malaysia	Did not assess	• Global • Problem-solving • Support	Mean rank order showed high use of problem-solving category of strategies, followed by high use of global and support categories of strategies
Madhumathi & Ghosh (2012)	Hindi-speaking students learning EFL	*N* = 52 first year engineering college students Age: 18–21	Private university in South India	TOEFL reading test	• Global • Problem-solving • Support	The results of *t* test showed preference of problem-solving strategies over both global and support strategies. Pearson correlation analysis showed significant association between all the categories of the problem-solving, support, and global strategies and reading proficiency.
Yuksel & Yuksel (2012)	Turkish-speaking students learning EFL	*N* = 16 college students	Anadolu University, Turkey	Did not assess	• Global • Problem-solving • Support	Frequency and mean rank order analyses showed high use of the problem-solving and then the global strategies and a moderate use of the support strategies.

Al-Sobhani (2013)	Arabic-speaking Yemeni students learning EFL	*N* = 100 (70, females and 30 males) Age: 22–23	Ibb University, Yemen	Teacher-made reading skills exam	• Global • Problem-solving • Support	Mean rank order analysis showed high use of all categories of strategies. Pearson correlation analysis showed significant association between the categories of problem-solving and global strategies. There was no association between the support strategies and reading skills.
Karbalaee (2013	Persian-speaking students learning EFL	N = 114 (60 females and 54 males)	Iran Language Institute, Iran	Reading comprehension test	• Global • Problem-solving • Support	Pearson correlation analysis showed significant association between the global, as well as problem-solving strategies and reading comprehension. No significant association was found between the support strategies and reading comprehension. Regression analysis showed that the global strategies predicted reading comprehension.

Zare (2013)	Persian-speaking students learning EFL	*N* = 80 (38 females and 42 males) IELTS candidates	Two language institutes in Shiraz, Iran	Retired IELTS reading test	• Global • Problem-solving • Support	Overall mean score showed that the combined categories of problem-solving, support, and global strategies is of high use. Pearson correlation analysis showed significant, strong association between reading strategy use and reading comprehension. *t* test showed no significant difference in reading strategy use by gender.
Hong-Nam (2014)	66 Spanish-speaking students, 25 English-speaking students, 3 Korean-speaking students, and 2 Vietnamese-speaking students	*N* = 96 high school learners	Two Suburban high schools in Southwestern United States	Texas Assessment of Knowledge and Skills (TAKS); Self-rated reading proficiency	• Global • Problem-solving • Support	ANOVA showed higher use of the problem-solving compared to the global and support strategies. ANOVA showed curvilinear relationship between strategy use and proficiency. Average proficiency students reported more strategy use than low and high proficiency students.

Koshima & Samani (2014)	Persian-speaking students learning EFL	*N* = 56 Iranian college students Age: 19–27	Two colleges in Iran: Chabhar Maritime University:26 Sharekord Elmi Karbordi: 30	Did not assess	• Global • Problem-solving • Support	Mean rank order analysis showed that all categories of strategies were of medium use, with the problem-solving category most frequently used followed by global and support strategies.
Pammu, Amir, & Maasum (2014)	Bahasa Indonesia speaking low English-proficient College EFL learners	*N* = 40 Indonesian college students	Hasanuddin University, Indonesia	Did not assess	• Global • Problem-solving • Support	Mean rank order showed high use of problem-solving strategies, moderate use of support and lastly global.
Tavakoli (2014)	Persian-speaking students learning EFL	*N* = 100 Persian college students (69 females and 31 males) Age: 20–27	Islamic Azad University. Iran	Michigan test of English language proficiency	• Global • Problem-solving • Support	Mean rank order showed moderate use of support strategies, followed by global, and lastly problem-solving. Pearson correlation analysis showed significant association between all strategies and reading proficiency
Chen (2015)	Taiwanese-speaking students learning EFL	*N* = 94 Taiwanese college students Age: 19–26	Undergraduate and graduate students reading hypermedia texts	Did not assess	• Global • Problem-solving • Support	None of the top ten frequently used strategies were from the three categories of global, problem-solving and support strategies.

Meniado (2016)	Arabic-speaking students learning EFL	*N* = 60 Saudi Arabian college students	Preparatory year program at industrial college in Saudi Arabia	QIYAS: A reading comprehension component of the Standardized Test of English Proficiency (STEP)	• Global • Problem-solving • Support	Mean rank order analysis showed that the problem-solving, support and global strategies were all of medium use. Pearson correlation and *t* test analyses showed significant association between all three strategies and reading proficiency.
Ahmadian & Pasand (2017)	Persian-speaking students learning EFL	*N* = 63 Iranian college students	Arak University, Iran	Did not assess	• Global • Problem-solving • Support	Mean rank order and MANOVA showed that the problem-solving strategies are the most frequently used, followed by global and support strategies. Pearson correlation analysis showed significant association between all three strategies and self-efficacy.
Ghwela, Rosniah, & Noorizah (2017)	Arabic-speaking students learning EFL	*N* = 40 (40 females and 0 male) Libyan college students Age: 18–19	Al-Samiriyah Islamic University, Libya	Did not assess	• Global • Problem-solving • Support	Mean rank order showed high use of problem-solving strategies, moderate use of support, and lastly global strategies.

Shang (2017)	Taiwanese-speaking students learning EFL	*N* = 37 Taiwanese college students Age: 19–23	Private university in Southern Taiwan	A 15-item multiple-choice test (8 literal and 7 inferential) questions to assess factual main idea and details information	• Global • Problem-solving • Support	Mean rank order analysis showed that the problem-solving strategies are used most frequently, followed by global and support strategies. Regression analysis showed that reading slowly (i.e., problem-solving) and guessing content (i.e., global) predict reading comprehension.
Al-Sobhani (2018)	Arabic-speaking Grade 10, 11, and 12 Yemeni students learning English	*N* = 83 (43 females and 40 males) Age: 16–18	Turkish International School, Sanaa, Yemen	Self-reported reading scores	• Global • Problem-solving • Support	Mean rank order analysis showed higher use of the combined categories of metacognitive strategies than cognitive strategies. Pearson correlation analysis showed significant association between the use of metacognitive strategies use and reading achievement. *t* test showed no significant difference in metacognitive strategy use by gender.

Zuledwi, Ratmanida, Marlina (2018)	Indonesian college students learning EFL	*N* = 155, Sixth semester college students (Demographic details not reported)		Reading achievement test	• Global • Problem-solving • Support	Frequency analysis showed that the problem-solving strategies are most frequently used, followed by the support and lastly global strategies. Pearson correlation analysis showed no significant association between the use of metacognitive strategies use and reading achievement.

Appendix B

Test of Reading Comprehension

Reading Comprehension

Please answer questions based on following passage.

From the article "Against the Undertow: Language-Minority Education Policy and Politics in the 'Age of Accountability'" by Terrence G Wiley and Wayne E. Wright

Language diversity has always been part of the national demographic landscape of the United States. At the time of the first census in 1790, about 25% of the population spoke languages other than English (Lepore, 2002). Thus, there was a diverse pool of native speakers of other languages at the time of the founding of the republic. Today, nationwide, school districts have reported more than 400 languages spoken by language-minority students classified as limited English proficient (LEP) students (Kindler, 2002). Between 1991 and 2002, total K-12 student enrollment rose only 12%, whereas LEP student enrollment increased 95% during this same time period (National Clearinghouse for English Language Acquisition, 2002b). This rapid increase and changing demographics have intensified the long debate over the best way to educate language-minority students.

Historically, many groups attempted to maintain their native languages even as they learned English, and for a time, some were able to do so with relatively little resistance until a wave of xenophobia swept the country during World War 1 (Kloss, 1977/1998). Other groups, Africans, and Native Americans encountered repressive politics much earlier. During the 1960s, a more tolerant policy climate emerged. However, for the past two decades there has been a steady undertow of resistance to bilingualism and bilingual education. This article provides historical background and analyzes contemporary trends in language-minority education within the context of the recent national push for accountability, which typically takes the form of high-stakes testing.

The origins of persistent themes regarding the popular antagonisms toward bilingual education and the prescribed panaceas of "English immersion" and high-stakes testing in English need to be scrutinized. As background to the contemporary context, we briefly discuss the history of language politics in the United States and the ideological underpinnings of the dominant monolingual English ideology. We analyze the recent attacks on bilingual education for what this attack represents for educational policy within a multilingual society such as the United States. We emphasize multilingual because most discussions of language policy are framed as if monolingualism were part of our heritage from which we are now drifting. Framing the language policy issues in this way masks both the historical and contemporary reality and positions non-English language diversity as an abnormality that must be cured. Contrary to the steady flow of disinformation, we begin with the premise that even as English has historically been the dominant language in the United States since the colonial era, language diversity has always been a fact of life. Thus, efforts to deny that reality represent a "malady of mind" (Blaut, 1993) that has resulted in either restrictionist or repressive language policies for minorities.

As more states ponder imposing restrictions on languages of instruction other than English-as California, Arizona, and Massachusetts have recently done-it is useful to highlight several questions related to the history of language politics and language planning in the United States. Educational language planning is frequently portrayed as an attempt to solve the language problems of the minority. Nevertheless, the historical record indicates that schools have generally failed to meet the needs of language-minority students (Deschenes, Cuban, & Tyack, 2001) and that the endeavor to plan language behavior by forcing a rapid shift to English has often been a source of language problems that has resulted in the denial of

language rights and hindered linguistic access to educational, social, economic, and political benefits even as the promoters of English immersion claim the opposite.

The dominance of English was established under the British during the colonial period, not by official decree but through language status achievement, that is, through "the legitimization of a government's decisions regarding acceptable language for those who are to carry out the political, economic, and social affairs of the political process" (Heath, 1976, p.51). English achieved dominance as a result of the political and socioeconomic trade between England and colonial administrators, colonists, and traders. Other languages coexisted with English in the colonies with notable exceptions. Enslaved Africans were prohibited from using their native tongues for fear that it would facilitate resistance or rebellion. From the 1740s forward, southern colonies simultaneously institutionalized "compulsory ignorance" laws that prohibited those enslaved from acquiring English literacy for similar reasons. These restrictive slave codes were carried forward as the former southern colonies became states of the newly United States and remained in force until the end of the Civil War in 1865 (Weinberg, 1977/1995). Thus, the very first formal language policies were restrictive with the explicit purpose of promoting social control.

1. What is the primary purpose of including the statistic from the 1790 census in the introductory paragraph? (Interpretive)

- A) To explain how colonizing the US eradicated language diversity
- B) To show concrete evidence that language diversity in the US is not a new phenomenon
- C) To note that before that time, there was no measure of language diversity in the US
- D) To demonstrate that census data can be inaccurate

2. The article compares two sets of statistics from the years 1991-2002, increases in K-12 enrollment and increases in LEP students, to highlight. (Critical)

- A) That the two numbers, while often cited in research, are insignificant
- B) That while many people with school-age children immigrated to the US during this time, an equal amount left the country as well
- C) That language diversity had no impact on US student enrollment during this time
- D) That while the total amount of students enrolled in US schools may have grown slowly, the amount of those students who were LEP increased dramatically

3. According to the second paragraph, many groups maintained their native languages without resistance into the 20th century EXCEPT… (Literal)

- A) Native Americans and African Americans
- B) Irish Americans and African Americans
- C) Mexican Americans and Native Americas
- D) Native Americans and Dutch Americans

4. Why is the word "undertow" emphasized in the second paragraph? (Interpretive)

- A) To explain how certain groups continued to carry their native languages with them despite the opposition from those against language diversity
- B) To show the secretive and sneaky nature of those opposed to language diversity

C) To call attention to the ebb and flow of language resistance during the 20th century, experiencing periods of both rest and extremism

D) To explain that, while many groups tried to maintain their native languages, many gave in to social and political pressure to use only English

5. What is the best way to describe the function of the third paragraph in this excerpt? (Critical)

A) The paragraph provides its primary thesis as well an outline of the article's main points

B) The paragraph is an unnecessary and irrelevant inclusion

C) The paragraph serves to reveal the conclusions of the article before detailing the data

D) The paragraph firmly establishes the article's stance against language diversity

6. What is the best summary of why the phrase "multilingualism" is emphasized in the third paragraph? (Interpretive)

A) Language repression stems from the US's unwillingness to recognize the languages of its foreign allies

B) Because language is constantly changing and often goes through multiple phases over time

C) The authors firmly believe that speaking more than one language gives students a substantial benefit in higher education.

D) Language policy discussions often assumes that the US has a monolinguistic history, which is untrue and poses language diversity as threatening

7. Phrases such as "prescribed panaceas" and "malady of the mind" are used in the third paragraph to … (Interpretive)

A) Defend the point that the US must standardize its language education or there will be severe results

B) Point out that language is as much a physical process as an intellectual one

C) Illustrate how certain opponents of language diversity equate multilingual education with a kind of national disease

D) Demonstrate how the stress of learning multiple languages can make students ill

8. According to the fourth paragraph, all of the following are potential negatives of rapid English immersion EXCEPT… (Literal)

A) It can lead to a denial of language rights for particular groups

B) Students become more familiar with conversational expressions and dialect

C) It can prevent access to certain benefits that are always available to fluent speakers

D) It can promote feelings of alienation among groups that are already in a minority status

9. The best alternate definition of "language status achievement" is … (Interpretive)

- A) When enough scholarly work has been produced in a language, it is officially recognized
- B) Those who are in power socially and economically determine the status of a language
- C) Languages fall into a hierarchy depending upon the numbers of populations that speak them
- D) The position of a language in which no others may coexist with it

10. From the context of the final paragraph, what does "compulsory ignorance" mean? (Literal)

- A) Populations at the time were required only to obtain a certain low level of education
- B) Slave populations were compelled to only speak in their native languages and not learn English
- C) That slaves were forcibly prevented from developing their native language skills out of fear that they would gain power
- D) Slave owners would not punish slaves who did not wish to learn and speak only English

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