SSLA, **23**, 469–495. Printed in the United States of America.

THE ROLE OF THE FIRST LANGUAGE IN SECOND LANGUAGE READING

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Reading in a second language (L2) is not a monolingual event; L2 readers have access to their first language (L1) as they read, and many use it as a strategy to help comprehend an L2 text. Owing to difficulties in observing the comprehension process, little research has been conducted to determine what role the L1 plays in the reading strategies of L2 readers. Using think-aloud protocols and retrospective interviews with 20 native speakers of Chinese and Japanese at three levels of language proficiency studying in the United States, this study explores further the question of when L2 readers use their L1 cognitive resources and how this cognitive use of the L1 helps them comprehend an L2 text. We conclude by suggesting that the results support a sociocultural view of the L2 reading process.

It is well recognized that individuals can differ dramatically in both how they process a text they are reading and their ultimate understanding of what they have read (Bernhardt, 1991a; Daneman, 1991; Spiro & Myers, 1984). Research in the field of L2 reading has begun to identify some of the many variables that are involved in and influence the L2 reading process, including strategy

We would like to thank Andrew Cohen and the anonymous *SSLA* reviewers for their thoughtful comments on previous drafts of this paper. This research was supported by a grant from the School of Liberal Arts at Indiana University Purdue University Indianapolis.

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https://doi.org/10.1017/S0272263101004028 Published online by Cambridge University Press

choices (e.g., Barnett, 1988; Block, 1986; Kern, 1989), background knowledge and cultural schemata (e.g., Bernhardt, 1991b; Carrell, 1983, 1987; Levine & Haus, 1985; Pritchard, 1990), and L1-L2 reading proficiency (e.g., Bernhardt & Kamil, 1995; Carrell, 1991; Carson, Carrell, Silberstein, & Kuehn, 1990; Sarig, 1987; Swaffar, 1988).

One variable that appears to influence reading comprehension is mental translation, defined by Kern (1994) as the "mental reprocessing of L2 words, phrases, or sentences in L1 forms while reading L2 texts" (p. 442). Studies have shown that mental translation is a common cognitive strategy for high school and adult language learners (e.g., Chamot & Kupper, 1989; Kern). Cook (1992) argued further that all L2 learners in fact access their L1 while processing the L2. He suggested that "the L2 user does not effectively switch off the L1 while processing the L2, but has it constantly available" (p. 571). Cook also maintained that when working with L2 learners, teachers must not treat the L2 in isolation from the L1. Indeed, according to Cook, one cannot do so: "The L1 is present in the L2 learners' minds, whether the teacher wants it to be there or not. The L2 knowledge that is being created in them is connected in all sorts of ways with their L1 knowledge" (p. 584).

Mental translation is related to what Vygotsky (1986) has called "inner speech," an internalized language that is for oneself, as opposed to external, social speech produced for others. The role of inner speech in thought is a critical one for Vygotsky; he argued that thought and language cannot be regarded as "two unrelated processes, either parallel or crossing at certain points and mechanically influencing each other" (p. 211). Instead, he noted that the meaning of a word represents such a close admixture of thought and language that it is not possible to categorize meaning as merely a product of thought or language but as a marriage of the two. Vygotsky further noted that the relationship of thought to language requires a conceptual understanding of inner speech as a language of images, wherein images are shaped by external language rather than isolated from it.

The key argument that Vygotsky (1986) made that is relevant to this study is that thought and language must be viewed as interacting, that higher thought is impossible without language. Vygotsky's views on the interplay of language and thought have been extended most recently by Wertsch (1985, 1991), Frawley (1987), and Harré and Gillett (1994), among others. Indeed, in recent studies looking at L2 acquisition through the Vygotskyan lens of sociocultural theory, the cognitive influence of one's L1 on L2 acquisition has been clearly shown (Anton & DiCamilla, 1999; Cohen, 1994; de Guerrero, 1999, Roebuck, 1998).[1]

As noted earlier, despite the observation that L2 learners make use of their native language to comprehend the L2—at least in the early stages of language acquisition—Cohen (1995) pointed out that there has been little research on the "extent to which non-natives' thoughts are in the LT [target language] and the effectiveness of 'thinking in the LT' as opposed to thinking in the L1" (p. 100). Consequently, this study addresses the question of how the

https://doi.org/10.1017/S0272263101004028 Published online by Cambridge University Press

native language influences the reading and comprehension processes of L2 readers.

PREVIOUS RESEARCH

Only a few studies have begun to look at the role of the L1 in L2 reading comprehension. Cohen (1995) used a survey given to bilingual and multilingual university students to explore factors influencing language of thought. He found not only that people with access to two or more languages frequently shift between them, but also that these shifts can be either unintentional (e.g., it is easier to think in one language than another and so the brain automatically shifts languages) or intentional (e.g., using another language to help understand the grammar or vocabulary of the target language).

Kern (1994) looked at the role of mental translation as a cognitive strategy in the L2 reading comprehension process using verbal report interviews. In his study, 51 students (L1 = English) in a third-semester college French class reported what they were thinking as they read a text in French, as well as how they went about making sense of what they read. Kern not only found that these subjects make frequent use of translation as a strategy to understand the L2 text, but also that mental translation during L2 reading seemed to serve the functional purpose of facilitating the generation and conservation of meaning. He also found that L2 readers most frequently used mental translation in response to specific obstacles to comprehension, such as unfamiliar words and structures. Hawras (1996, discussed in Cohen, 1998) replicated Kern's study using 27 beginning-, intermediate-, and advanced-level Spanish students. Hawras's findings were similar to Kern's, but he also observed that mental translation was much more likely to benefit the more advanced learners than the less advanced.

Most recently, Upton (1997, 1998) asked 11 native speakers of Japanese studying at a U.S. university to think aloud as they read an expository text in English. He observed, first of all, that reliance on the L1 as the language of thought decreased as proficiency in the L2 increased. Further, he noted that L2 readers with lower L2 proficiency used their L1 more frequently when (a) wrestling with vocabulary they did not know or were not sure about, (b) seeking to gain a more global understanding of the L2 text, and (c) attempting to summarize or confirm what was understood.

To summarize the above discussion, whereas Kern's (1994) study moved us forward in our understanding of how L2 readers use mental translation, work by Cohen (1995) and Upton (1998) suggested that many L2 readers use the L1 for more than just mental translation. It appears the L1 is also often used to think about and process what is being read in the L2; that is, these readers are doing more than just translating. Although mental translation—the reprocessing of L2 words, phrases, or sentences into L1 forms—occurs frequently, many L2 readers also appear to tap their L1 to help them wrestle with and reflect on meaning as they read an L2 text.

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From this overview of previous think-aloud research, it can be seen that reading in an L2 is not a monolingual event. L2 readers have access to their L1 and use this resource as a strategy to help them comprehend an L2 text. Nevertheless, the overall role of the L1 in the L2 reading process, other than for mental translation, has not been carefully studied and little is really known about the various ways that the L1 is used by L2 readers. Consequently, the purpose and contribution of this study is to outline the ways in which L2 readers use their L1 in the L2 reading process beyond just mental translation, and how this use of the L1 may benefit them. The research questions addressed in this paper are as follows:

1. How do university-level L2 readers with different L2 proficiencies use their L1 as an aid to understanding an L2 general expository text?
2. In what contexts does the cognitive use of the L1 facilitate L2 comprehension?

METHOD

Participants

The 20 participants for this study included 10 native speakers of Chinese and 10 native speakers of Japanese enrolled in a Midwestern U.S. university. Although this number is not extensive, it is large with respect to the qualitative methodology we are using (as described later in this section) and is in line with other studies that have used a similar methodology (e.g., Anton & DiCamilla, 1999; Block, 1986; Cohen, 1998; McQuillan & Rodrigo, 1995; Roebuck, 1998). Subjects were divided into three groups based on their scores on the Michigan Test of English Language Proficiency (MTELP). This division was made for two reasons. First, it is clear that L2 proficiency influences overall L2 reading ability (Carrell, 1991; Lee & Schallert, 1997). Second, these divisions represent the ranges of scores used by the university ESL program for placing students into various levels of ESL classes.[2]

Eight students (one graduate and seven undergraduate) scored below 70 on the MTELP and were placed into intermediate-level ESL classes. All of these students were also taking one academic class. These students were placed into the first group, intermediate ESL students, which included four native speakers of Chinese and four native speakers of Japanese. Seven students (two graduate and five undergraduate) scored between 70 and 85 on the MTELP and were enrolled in at least one ESL class while taking academic courses required for their major or general education requirements. These students were placed into the second group, the advanced ESL students, which included three native speakers of Chinese and four native speakers of Japanese. Five students (all graduate students) scored above 85 on the MTELP and needed no further ESL classes; they were all taking a full load of academic courses. These students were placed into the third group, the post-ESL students, which included three native speakers of Chinese and two native speak-

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ers of Japanese. (See Appendix A for complete demographic information on all participants.)

Bernhardt and Kamil (1995, p. 31) noted that the contribution of L1 reading performance and L2 knowledge must be accounted for before any conclusions can be made about aspects of the L2 reading process. This study sought to control the contribution of L1 reading performance by using international students who had been admitted for degree work at an American university. University admission is based, to a large extent, on previous academic success, which in China, Taiwan, and Japan (the home countries of participants) requires strong reading skills. Furthermore, all 20 subjects self-rated their L1 reading proficiency as either good (8) or excellent (12); none of them self-rated their L1 proficiency as either fair or poor (see Appendix A). We also attempted to account for L2 knowledge by grouping students based on their L2 proficiency as reflected by a widely used objective test of English language proficiency, the MTELP (see Appendix A for scores).

Procedure

There were two stages to the data collection in this study. To get the best picture of the role of language in the L2 reading process, both think-aloud verbal protocols and retrospective interviews on the think-aloud protocols were used as a means for looking at how students use their L1 and their L2 during the actual act of reading. Think-aloud protocols have the advantage of giving a more direct view of how readers process a text because they indicate what they are doing at the moment they are doing it (Cohen, 1987b). Retrospective interviews, in turn, provide an opportunity for investigators to ask directed questions to gain clarification of what was reported during the think-aloud.[3]

Participants were trained on how to give verbal reports by watching a video clip of someone modeling a verbal report. They were then asked to practice, with feedback given, until the researchers and each participant felt he or she understood the procedure. Training generally lasted about 10 minutes. Participants were instructed to verbalize everything they were thinking about and doing as they read and to do so in the language (L1 or L2) they were thinking in as they read the text. That is, if they were thinking in their L1 (Chinese or Japanese), they were asked to think aloud in their L1; if they were thinking in English, they were asked to think aloud in English. If participants were silent for more than 8 seconds, the researchers prompted them to indicate what they were thinking about or doing to understand the text. Otherwise, the researchers did not interact with the participants while they read. One of the researchers, a native speaker of Chinese, conducted all the interviews with the Chinese students; a research assistant, a native speaker of Japanese and a Ph.D. candidate in linguistics, conducted all the interviews with the Japanese students. The second researcher, a native speaker of English, was present for all of the interviews.

The passage that the participants read was taken from *Aide Magazine* (Feb-

https://doi.org/10.1017/S0272263101004028 Published online by Cambridge University Press

ruary, 1992), a quarterly magazine put out by the insurance organization USAA. The text, 231 words long, is titled "The Problem with Lead-Based Paint" and discusses some of the harmful health effects of lead-based paint as well as some suggestions for dealing with the problem. This text was chosen for two reasons. First, it was written for a general audience and had a fairly simple linguistic and rhetorical structure. That is, it was a text that could be read by L2 students at various levels of language proficiency. Second, because background knowledge, or lack thereof, has been clearly shown to influence comprehension (Johnson, 1982; Lee, 1986; Levine & Haus, 1985), an effort was made to control this variable. The article chosen discussed a topic that most Chinese and Japanese students are not very familiar with. (Indeed, none of the subjects tested had previous knowledge of the issue of lead poisoning.) Given that none of the subjects was familiar with the problems of lead-based paint, all subjects would be at least slightly challenged by the text in their efforts to comprehend it, regardless of proficiency level. The three-paragraph article generally took participants 20 minutes or more to complete; it was consistent in length with text prompts used in similar studies (e.g., Carrell, 1992; Kern, 1994; Roebuck, 1998) and was long enough to elicit usable data without tiring the participants. A red dot was placed at the end of each sentence to visually prompt the students to think aloud (Afflerbach, 1990; Olshavsky, 1976; Pritchard, 1990).

The think-aloud protocols were recorded on tape. Immediately upon completing the think-aloud, students were asked to listen to their protocols. While listening to comments that they had made about their reading processes, the tape was stopped after each comment and the students were asked to explain (do a self-observation of) what they were doing as they were reading, including why they were thinking in either English or their L1. Students were also asked whether the strategies that they used while doing this study reflected general strategies that they commonly used when reading other L2 texts. The interviewing was done in the native language of the participants, unless they chose to answer in English. The data-collection sessions took about 1½ hours for each student, including the training, think-aloud protocol, and retrospective interview.

Data Analysis

Pressley and Afflerbach (1995) set out to identify and describe the many processes that readers carry out consciously as they read, including strategies and responses. Scouring the literature for studies using the think-aloud protocols that best reflect the conscious "online" reading processes of readers, they reviewed 38 widely diverse primary research studies to develop and categorize a list of over 150 conscious activities that readers may use when working to comprehend a text. Their rubric is by far the most comprehensive one that has been developed to describe the process of L1 reading comprehension, encompassing data from dozens of studies. As it is recognized that the

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L2 reading process shares much in common with the L1 reading process, we chose to use this rubric in an effort to evaluate how L2 readers use their language resources to help them comprehend a text.

Pressley and Afflerbach (1995) grouped reading strategies (they use the term "activities") into three types: identifying strategies, which help in constructing the meaning of the text (type A); monitoring strategies, which serve to regulate comprehension and learning (type B); and evaluating strategies, by which readers reflect or respond in some way to the text (type C). For this study, the conscious verbalized strategies that students expressed in their think-aloud protocols were classified as falling into one of these three categories. (See Appendix B for a simplified rubric of reading strategies.)

Type A Strategies. The first broad category of strategies that Pressley and Afflerbach (1995) saw readers engaging in includes those in which the reader is seeking to identify, learn, and understand the ideas in the material they are reading. These are the "identifying and learning text content strategies," and they can occur before, during, and after a reader reads a text. Because most of the strategies that our readers expressed occurred while they read, we included two general subcategories as described by Pressley and Afflerbach: identifying ideas and constructing meaning. Strategies for identifying ideas include those that readers use to read the text initially and to get a general understanding of the key ideas and text organization; these strategies focus on ideas expressed directly in the text. Two examples of the strategies that readers might use to aid in identifying ideas include (a) "explicitly looking for related words, concepts, or ideas in text and using them to construct a main idea, gist, or summary" (p. 35) and (b) "deciding which pieces of information in text are important" (p. 43). Constructing meaning strategies are those that go beyond the information given in a text, including inferencing, integrating, and interpreting strategies. Relating information encountered in a text to prior knowledge is an example of one of the constructing meaning strategies noted by Pressley and Afflerbach. Altogether, they identified 76 identifying and learning text content strategies that readers have been shown to use.

Type B Strategies. The second broad category of strategies that readers engage in while reading encompasses the "monitoring strategies," which are the metacognitive processes that readers use to check comprehension. These can be employed both during and after the text is read. As the participant reads, these monitoring strategies may include a simple observation of general text characteristics or reading behavior, or a specific action taken in response to text characteristics or reading demands. An example of the former includes seeing the "relation of this text to other sources, including whether material in this text is taken from another source" (Pressley & Afflerbach, 1995, p. 63). An example of the latter includes the decision to reread material in one section because it is not yet understood (p. 68). Pressley and Afflerbach identified a total of 65 possible monitoring strategies.

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Table 1. Language of thought of reading strategies in think-aloud protocols by group

Groups	English	L1	Both	Total	L1 + both
Intermediate ESL students (1–8)					
# of reading strategies	200	197	112	509	309
% of activities	39%	39%	22%	100%	61%
Advanced ESL students (9–15)					
# of reading strategies	234	98	79	411	177
% of activities	57%	24%	19%	100%	43%
Post-ESL students (16–20)					
# of reading strategies	147	22	3	172	25
% of activities	85%	13%	2%	100%	15%

Type C Strategies. The third broad category of cognitive processes identified by Pressley and Afflerbach (1995) includes the "evaluating strategies" that readers may engage in as they make evaluations about what they are reading in general or in particular. For example, expressing "approval/disapproval of the content, arguments, and so on" (p. 77) is one of the 11 evaluating activities they noted.

In summary, it is important to recognize that these three types of cognitive activities "do not occur in a linear sequence but rather are interwoven and relate to one another" (Pressley & Afflerbach, 1995, p. 34). Furthermore, no reader uses all or even most of these cognitive strategies; they only constitute possible strategies that are available to readers, with the use of any particular strategy dependent on, among other things, the reading proficiency and motivation of the reader, the purpose of the reading task, and the type of text being read.

After the verbal reports were transcribed for all participants (both the think-aloud protocol and the retrospective interview), each was analyzed to identify the processes that the readers followed to make sense of a challenging text. The two researchers independently coded the 20 verbal reports using the Pressley and Afflerbach (1995) rubric in Appendix B, noting as well which language (L1 or L2) the thought processes were occurring in as reflected in the think-aloud protocol. The rate of agreement between the two researchers was very high (93%) with any disagreements resolved through discussion.

RESULTS

The first research question, relating to how university-level L2 readers of differing L2 proficiency use the L1 as an aid to understanding an L2 general expository text, was addressed in two steps. First, the total number of reading activities used by each reader and the language in which the activities were expressed during the think-aloud reading (English, L1, or both) were tallied for each group of students. These figures are provided in Table 1.

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These results show first of all that the intermediate ESL students tended to think about and process the L2 reading task using their L1 (Chinese or Japanese) more frequently than the advanced ESL students, who in turn used their L1 much more frequently than the post-ESL students. Combining the percentages for when the language of thought was in either the L1 alone or a mix of the L1 and English, the intermediate ESL students used their L1 (in whole or in part) 61% of the time and the advanced ESL students did so 43% of the time; the post-ESL students used their L1 (in whole or in part) only 15% of the time. This relative preference for and reliance on the L1 as a tool to assist in comprehension is also reflected in the retrospective interviews that were conducted immediately after the think-aloud protocols. The excerpts in (1) represent the most clearly articulated statements from students in each of the proficiency levels, which indicate the extent of their reliance on the L1 as a tool to assist in comprehension:

(1) a. Responding to a question about whether she tended to translate into Chinese while reading, Student 3, an intermediate ESL student, indicated:
Usually I do. I usually write important or key points in Chinese in the margin. This improves my understanding. So when I need to review I'll just read the Chinese notes.

b. Commenting on why she frequently used Chinese when thinking aloud about the text she was reading, Student 4 said:
Usually after I finish reading the whole passage, I will try to use Chinese to summarize the passage. Thinking in Chinese is faster. . . . It is easier to use Chinese to remember the key points.

c. Student 8, an intermediate ESL student, was also asked if he translated into his L1 when he read and why. He responded:
When I read in English, I translate the sentences into Japanese. . . . It's my habit. I've been thinking in Japanese all my life.

d. Student 10, an advanced ESL student, had the following thoughts about his habit of thinking in Chinese when reading in English:
Usually if I know most words in a sentence, I don't need to translate into Chinese. But if I have difficulty understanding a lot of words in a sentence, I usually translate the words I know into Chinese and then connect them to the unknown words. Translating into Chinese is easier for me to gain more understanding.

e. Student 11, when asked which language he tended to think in when reading in English answered:
In both languages. I think in Japanese when I come across difficult words and complicated sentence structures, but I understand sentences and words as they are in English when they are easy.

The other intermediate and advanced ESL students made similar comments during their retrospective interviews, which clearly showed that much of their thought while they read was in their L1.

During the retrospective interviews, the post-ESL students also reflected on the use of their L1 when reading in their L2. Their comments clearly underscored the fact that they tend to rely on their L1 to help with comprehension much less frequently than the ESL readers, as illustrated by the excerpts in (2).

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(2) a. Student 20 noted:
I think if you are confused, you use your native language to clear your mind. . . . [However] If it is not necessary, I don't want to [translate] and I always want to read fast, so I don't want to stop for a certain sentence and translate word by word into Chinese.

b. Student 17, when asked whether she tended to translate what she was reading into her L1 to help with comprehension, responded:
What you are reading is in English, so if you think about it in English, it will be faster and direct. If you read in English and translate into Chinese, it will be more troublesome.

c. Student 17 later noted:
When encountering something difficult, I think in Chinese. When encountering something I understand, I think in English.

The other post-ESL students all had similar reflections on their use of the L1 when reading in their L2.

Clearly, for both the intermediate and advanced ESL students, the L1 plays a critical role in L2 reading comprehension. For the post-ESL students the L1 is not nearly as important but does serve as a useful comprehension tool from time to time. Nevertheless, even the post-ESL students will use their L1 as the language of thought when they experience comprehension difficulties when reading in the L2.

The first research question was then explored from a second perspective: Each reading strategy type verbalized by the students (A, B, or C) was classified according to the language of thought (English, L1, or both). Tables 2, 3, and 4 show the totals for reading strategy type and the language of thought in the think-aloud protocols of the intermediate ESL students, the advanced ESL students, and the post-ESL students, respectively. Together these tables reflect the relationship of language of thought to L2 reading proficiency.

In Table 2 we see that 76% (386/509) of all the reading strategies used by the intermediate ESL students during the think-aloud protocol served to help them identify and learn text content (strategy type A). Of these, 42% were expressed in English, and 58% were expressed either completely in the L1 (34%) or a combination of the L1 and L2 (24%). Notice that almost all of this type of strategy (367/386) was simply the act of identifying ideas in the text while reading. The remaining 24% (123/509) of the reading strategies used by the intermediate ESL students were metacognitive monitoring strategies (strategy type B). For these, the L1 was used wholly or partly 70% (86/123) of the time (55% L1 only; 15% combining L1 with L2).

Table 3 shows that 62% (256/411) of all the reading strategies used by the advanced ESL students during the think-aloud protocol served to help them identify and learn text content (strategy type A). Of these, 52% were expressed in English, and 48% were expressed either completely in the L1 (24%) or a combination of the L1 and L2 (24%). For the advanced ESL students, as for the intermediate ESL students, almost all instances of this type of strategy (247/256) fell under the subcategory of identifying ideas in the text while reading. The remaining 38% (155/411) of the reading strategies used by the advanced

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Table 2. Intermediate ESL students (1–8): Reading strategy type and language of thought in think-aloud protocol

Strategy type	English	L1	Both	Total	% of all strategies
A. Identifying/learning text content strategies					
Before reading	0	0	0	0	0%
During reading					
Identifying ideas	161	123	83	367	72%
	(44%)	(33%)	(23%)		
Constructing meaning	2	4	10	16	3%
	(13%)	(25%)	(62%)		
After reading	0	2	1	3	1%
		(67%)	(33%)		
Totals	163	129	94	386	76%
	(42%)	(34%)	(24%)		
B. Monitoring strategies					
During reading					
Observation of text/ behavior	15	50	13	78	15%
	(19%)	(64%)	(17%)		
Response to observation	22	18	5	45	9%
	(49%)	(40%)	(11%)		
After reading	0	0	0	0	0%
Totals	37	68	18	123	24%
	(30%)	(55%)	(15%)		
C. Evaluating strategies	0	0	0	0	0%
Total by language	200	197	112	509	100%
	(39%)	(39%)	(22%)		

ESL students were metacognitive monitoring strategies (strategy type B). For these, the L1 was used wholly or partly 35% (55/155) of the time (23% L1 only; 12% combining L1 with L2).

Table 4 reveals that 70% (120/172) of all the reading strategies used by the post-ESL students during the think-aloud protocol served to help them identify and learn text content (strategy type A). Of these, 89% were expressed in English, and only 11% were expressed either completely in the L1 (10%) or a combination of the L1 and L2 (1%). As with the first two groups of ESL students, nearly all of this type of strategy (106/120) fell under the subcategory of identifying ideas in the text while reading. The remaining 30% (52/172) of the reading strategies used by the post-ESL students were metacognitive monitoring strategies (strategy type B). For these, the L1 was used wholly or partly 23% (12/52) of the time (19% L1 only; 4% combining L1 with L2).

In summary, the intermediate and advanced groups of ESL students relied to a great extent on their L1 while completing this L2 reading task, with 61% and 43% of the verbalized reading strategies expressed in the L1 alone or a mixture of the L1 and L2 for the intermediate and advanced ESL students, re-

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Table 3. Advanced ESL students (9–15): Reading strategy type and language of thought in think-aloud protocol

Strategy type	English	L1	Both	Total	% of all strategies
A. Identifying/learning text content strategies					
Before reading	0	0	0	0	0%
During reading					
Identifying ideas	130 (53%)	60 (24%)	57 (23%)	247	60%
Constructing meaning	3 (38%)	2 (25%)	3 (38%)	8	2%
After reading	1 (100%)	0	0	1	0%
Totals	134 (52%)	62 (24%)	60 (24%)	256	62%
B. Monitoring strategies					
During reading					
Observation of text/ behavior	39 (48%)	29 (36%)	13 (16%)	81	20%
Response to observation	61 (49%)	7 (40%)	6 (11%)	74	18%
After reading	0	0	0	0	0%
Totals	100 (65%)	36 (23%)	19 (12%)	155	38%
C. Evaluating strategies	0	0	0	0	0%
Total by language	234 (57%)	98 (24%)	79 (19%)	411	100%

spectively. On the other hand, the post-ESL students had relatively minimal reliance on their L1; only 15% of their verbalized reading strategies were expressed in their L1 or a combination of L1 and L2. Furthermore, moving from the least to the most L2 proficient group, there is a clear and consistent trend across all reading strategy types in the shift from reliance on the L1 as the language of thought to the L2. It would appear that reliance on the L1 as a reading strategy when processing an L2 text persistently declines as L2 proficiency increases.

To answer our second research question, relating to the contexts in which the cognitive use of the L1 facilitates L2 comprehension, we reexamined the expressed reading activities from a different perspective. First, we only looked at those reading strategies in which the readers used the L1, either in whole or in part, to help them identify and learn text content—that is, type A strategies. For the intermediate ESL students, 58% (223/386) of this strategy type used in the think-aloud protocols were expressed either in whole or in part in the L1. This figure decreases to 48% (122/256) for the advanced ESL students and then again to 11% (13/120) for the post-ESL students. All the students,

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Table 4. Post-ESL students (16–20): reading strategy type and language of thought in think-aloud protocol

Strategy type	English	L1	Both	Total	% of all strategies
A. Identifying/learning text content strategies					
Before reading	0	0	0	0	0%
During reading					
Identifying ideas	93 (88%)	12 (11%)	1 (1%)	106	62%
Constructing meaning	14 (100%)	0	0	14	8%
After reading	0	0	0	1	0%
Totals	107 (89%)	12 (10%)	1 (1%)	120	70%
B. Monitoring strategies					
During reading					
Observation of text/ behavior	28 (78%)	6 (17%)	2 (5%)	36	21%
Response to observation	12 (75%)	4 (25%)	0	16	9%
After reading	0	0	0	0	0%
Totals	40 (77%)	10 (9%)	2 (4%)	52	30%
C. Evaluating strategies	0	0	0	0	0%
Total by language	147 (85%)	22 (13%)	3 (2%)	172	100%

except for one of the post-ESL students (Student 18), verbalized in their L1 at some point when thinking aloud while reading the general expository text.

When we analyzed these verbalizations, distinct patterns of L1 use emerged. In general, the L1 was used to "wrestle with" or try to confirm text meaning in five ways. First, readers simply translated what they felt a word or phrase meant. Second, they expressed some doubts about word or phrase meaning and used their L1 to help them wrestle with this meaning—that is, they showed uncertainty about text meaning as they thought about it in their L1. Third, they used the L1 to confirm their comprehension of larger chunks of text, beyond the phrase level. Fourth, they used the L1 to wrestle with the meaning of chunks of text beyond the phrase level. Fifth, they used the L1 in an attempt to predict or anticipate text structure and content.

The use of the L1 when wrestling with or confirming the L2 text meaning in these five ways was categorized as either "supportive" or "nonsupportive" (i.e., either facilitating or failing to facilitate comprehension). For the purposes of this study, whether a strategy was supportive of comprehension or not was determined by the researchers, based on whether we felt it reflected the in-

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tended meaning of the text.[4] Examples of supportive and nonsupportive uses of the L1 for each of these five categories are provided in (3)–(20). Words spoken in the L1 during the think-aloud protocol are underlined.

Translating Word or Phrase Meaning

The participant translates English words or phrases (semantic units) into their L1. Examples of supportive uses are given in (3)–(4); nonsupportive uses are given in (5)–(6).

(3) Text: "But authorities are learning that health problems associated with lead-based paint are far more widespread than previously thought."
Student 4: *And it widespread. It spreads very widely.*
(4) Text: "The most harmful exposure to lead comes from inhaling or ingesting the lead dust that is created as the paint comes loose from the worn surfaces."
Student 5: *. . . It is created, it is created, it is produced.*
(5) Text: "In pregnant women, even very low levels can retard fetal development."
Student 5: *Fatal development.*
(6) Text: "You can also reduce your exposure to lead-based paint by covering it with a sealant or wallboard."
Student 6: *And wallboard, wallpaper.*

Wrestling with Word or Phrase Meaning

The student attempts to translate unknown English words or phrases into their L1. See (7)–(8) for examples of supportive uses and (9)–(10) for nonsupportive uses.

(7) Text: "However, perfectly intact lead paint can generate lead dust as it deteriorates, even when covered with new paint."
Student 9: *deteriorates, I don't know what it means but I'm thinking it might mean "decay slowly."*
(8) Text: "The stereotype is of inner-city youngsters eating paint chips that have peeled off the walls of crumbling houses."
Student 20: *Crumbling could mean collapsing.*
(9) Text: "The stereotype is of inner-city youngsters eating paint chips that have peeled off the walls of crumbling houses."
Student 10: *Paint, paint is a kind of, I am thinking, is a kind of plant, something is edible.*
(10) Text: "But authorities are learning that health problems associated with lead-based paint are far more widespread than previously thought."
Student 4: *authorities, is it a kind of theory?*

Confirm Comprehension of Larger Portions of Text Beyond Word or Phrase Level

The participant summarizes or translates a larger portion of the text into their L1 to confirm comprehension. Examples of supportive uses are provided in (11)–(12) and nonsupportive uses in (13)–(14).

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(11) Text: "In children, lead poisoning can cause irreversible brain damage and impair mental functioning. In adults, it can increase blood pressure. In pregnant women, even very low levels can retard fetal development."
Student 20: *It's talking about the effect of lead on children, adults, pregnant women.*
(12) Text: "The stereotype is of inner-city youngsters eating paint chips that have peeled off the walls of crumbling houses."
Student 17: *This is paint chips peeled from the walls of houses, the bits and pieces of paint.*
(13) Text: "In pregnant women, even very low levels can retard fetal development."
Student 1: *In pregnant women, very low levels can cause tired fetus discovery.*
(14) Text: "In pregnant women, even very low levels can retard fetal development."
Student 4: *It will be fatal to the pregnant women.*

Wrestling with Meaning of Larger Portions of Text Beyond Word or Phrase Level

The participant has difficulty and attempts to understand a sentence or paragraph. See (15)–(16) for supportive uses and (17)–(18) for nonsupportive uses.

(15) Text: "You can also reduce your exposure to lead-based paint by covering it with a sealant or wallboard."
Student 17: *I'm guessing that it tells how to protect you from lead pollution.*
(16) Text: "In children, lead poisoning can cause irreversible brain damage and impair mental functioning."
Student 4: *But I'm thinking that the brain will be damaged, mental functioning, it will cause problems to the functions of some body parts.*
(17) Text: "The most harmful exposure to lead comes from inhaling or ingesting the lead dust that is created as the paint comes loose from the worn surfaces."
Student 3: *This sentence might mean lead dust has increased . . . increased viruses.*
(18) Text: "Because these symptoms also occur in many other illnesses, prompt medical testing is crucial if you suspect lead-based paint in your home."
Student 10: *This kind of material often occurs in many illnesses or symptoms, something like that.*

Predicting or Anticipating Text Structure and Content

The participant expresses in their L1 predictions or anticipations of what content or text structure will occur in the succeeding portions of text. Examples of supportive uses are provided in (19)–(20). There were no instances of nonsupportive uses of the L1 for this category.

(19) Text: "Lead poisoning can cause serious health risks, especially for children, pregnant women and individuals with high blood pressure."

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Student 3: *Then from here it is divided into . . . discusses children, pregnant women, people who have high blood pressure . . . how it affects health.*

(20) Text: "But authorities are learning that health problems associated with lead-based paint are far more widespread than previously thought."

Student 17: *So I think this passage might talk about a kind of paint that has lead is harmful to human beings, maybe, or talk about how to prevent its damage or improve the health of the human beings.*

Table 5 provides a quantitative analysis of supportive and nonsupportive uses of the L1 of the 20 students in this study. From Table 5, it is clear that the post-ESL students do not tend to use the L1 as a reading strategy very frequently. However, when they do use it, it is highly effective for them. In this study, the use of the L1 supported these readers' comprehension of what they were reading 100% (12/12) of the time. Half of these instances were merely to confirm what they had already comprehended in their L2.

As discussed earlier, both the intermediate and advanced groups of ESL students relied on their L1 much more frequently than the post-ESL students. Nevertheless, from Table 5, we see that, for all of the categories except one ("wrestling with word or phrase meaning" for the intermediate ESL students), the use of the L1 assisted the reading comprehension of both the intermediate and advanced ESL students much more than it hindered comprehension. Use of the L1 by the intermediate ESL students supported comprehension 76% of the time and was not supportive 24% of the time. For the advanced ESL students, use of the L1 supported comprehension 84% of the time, whereas it did not do so only 16% of the time. Consequently, use of the L1 by the two ESL groups was also a highly effective strategy for them, although not surprisingly it benefited the advanced group more than the intermediate group. It seems clear from these data that, overall, the use of the L1 did positively facilitate comprehension—for all students regardless of level—by giving them an additional avenue for processing the text they were reading.

DISCUSSION

The results of this study show that the L1 is certainly turned on and actively used by L2 readers as they seek to make sense of an L2 text. The data indicate, furthermore, that reliance on the L1 declines as proficiency in the L2 increases. This result confirms those of Upton (1997), who found that L2 readers of higher proficiency used their L1 less frequently in think-aloud protocols than L2 readers of lower proficiency, as well as those of Kern (1994), who found that L2 readers used mental translation less frequently during think-aloud protocols as they became more proficient. Nevertheless, thinking about an L2 text in the L1 is a reading strategy that L2 readers do fall back on, to a greater or lesser extent, as the need arises.

Unlike the subjects in Kern's (1994) study, who had been studying their L2 (French) for three semesters as a foreign language, both the advanced and

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Table 5. Supportive (S) and non-supportive (N) instances of L1 use by category

	Translating word or phrase meaning		Wrestling with word or phrase meaning		Confirming comprehension		Wrestling with meaning		Predicting or anticipating text structure or content		Totals	
Groups	S	N	S	N	S	N	S	N	S	N	S	N
Intermediate ESL students												
1	6	0	3	1	12	4	1	0	0	0	22	5
2	1	0	0	2	12	0	1	1	0	0	14	3
3	9	1	2	1	5	2	11	5	1	0	28	9
4	4	3	5	8	13	1	6	5	0	0	28	17
5	0	0	0	0	8	0	3	0	0	0	11	0
6	6	0	1	1	3	1	3	6	0	0	13	8
7	11	0	2	4	10	1	4	1	0	0	27	6
8	0	0	0	0	6	1	4	0	0	0	10	1
Totals	37	4	13	17	69	10	34	18	1	0	153 (76%)	49 (24%)
Advanced ESL students												
9	3	1	2	1	14	2	5	0	1	0	25	4
10	4	0	5	7	11	4	1	1	0	0	21	12
11	11	0	3	0	6	0	3	0	0	0	23	0
12	2	0	1	1	9	1	1	0	0	0	13	2
13	0	0	0	0	0	0	1	0	0	0	1	0
14	0	0	1	0	3	0	1	0	0	0	5	0
15	2	0	0	0	0	0	2	0	0	0	4	0
Total	22	1	12	9	43	7	14	1	1	0	92 (84%)	18 (16%)

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Table 5. Continued

	Translating word or phrase meaning		Wrestling with word or phrase meaning		Confirming comprehension		Wrestling with meaning		Predicting or anticipating text structure or content		Totals	
Groups	S	N	S	N	S	N	S	N	S	N	S	N
Post-ESL students												
16	2	0	1	0	3	0	0	0	0	0	6	0
17	0	0	0	0	1	0	0	0	1	0	2	0
18	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	1	0	0	0	1	0
20	0	0	1	0	2	0	0	0	0	0	3	0
Total	2	0	2	0	6	0	1	0	1	0	12 (100%)	0

intermediate ESL students in this study had in fact higher levels of L2 proficiency, having studied English as part of their secondary education for several years. All of them were also taking regular university classes in English along with their ESL courses. What is striking is the fact that, despite their L2 proficiency level, a majority (52%) of the thought expressed in the think-aloud protocols of these 15 ESL students was, either in part or in whole, in their L1. Similarly, Upton (1997), using think-aloud protocols with six intermediate-level ESL students (average TOEFL = 474; L1 = Japanese) studying in the United States, found that these weaker L2 readers used their L1 83% of the time during the think-aloud protocols. Though further research needs to be conducted to confirm these conclusions, it seems clear that many L2 readers, especially those still working on their language skills, spend much of their time thinking about L2 texts in their L1.

In seeking to outline the conditions for mental translation, Kern (1994) argued that shifting to the L1 as the language of thought "is a way of troubleshooting when visual information from the text does not correspond to the reader's already-formed hypotheses about the text's meaning" (p. 451). This argument is supported by the think-aloud data in this study, given that the ESL students in particular frequently shifted to their L1 at points in the text when they were wrestling with word-, phrase-, or sentence-level meaning. Unlike the subjects in Kern's study, however, the use of the L1 by ESL students in this study generally tended to facilitate comprehension when they came to points in the text they found difficult. This may well be because the students in this study were more proficient in the L2, thus understanding more of what they read, and so could more effectively use their L1 to help them think about and fill in comprehension gaps. Hawras (1996), in his replication of Kern's study, came to a similar conclusion.

Kern (1994) further argued that "the difficulty in thinking about difficult concepts and ideas in an L2 places an extra load on memory and comprehension processes" (p. 451), which thereby results in L2 readers switching to their L1 to think about what they are reading. This argument is also supported by the think-aloud data in this study, given that the L2 readers most frequently shifted into their L1 simply to translate a word or phrase meaning or to confirm their understanding of a sentence they had just read. It seems that, in many cases, the readers were simply restating in their minds in the L1 what they already understood in the L2 to help them keep track of the overall meaning.

It seems obvious from the data in this study, however, that L2 readers use their L1 for more than just mental translation. All of the intermediate and advanced ESL students and four of the five post-ESL students in this study also used their L1 to accomplish metalinguistic functions: making observations about the text or their reading behavior, or choosing to take some action based on the text or the reading demand. Cohen (1998) has also observed that bilinguals, to lesser and greater extents, use their L1 to think about and process information they are receiving in the L2. Cohen noted that many L2 learners of lower proficiency may perform most or all metalinguistic tasks in the L1 (p. 167).

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A. Translating word or phrase meaning;

B. Wrestling with word or phrase meaning, or syntactic structure;

C. Confirming comprehension at clause, sentence, or paragraph level;

D. Wrestling with comprehension at clause, sentence, or paragraph level;

E. Predicting or anticipating text structure or content;

F. Monitoring text characteristics or reading behavior

Figure 1. Taxonomy of L1 use by L2 readers.

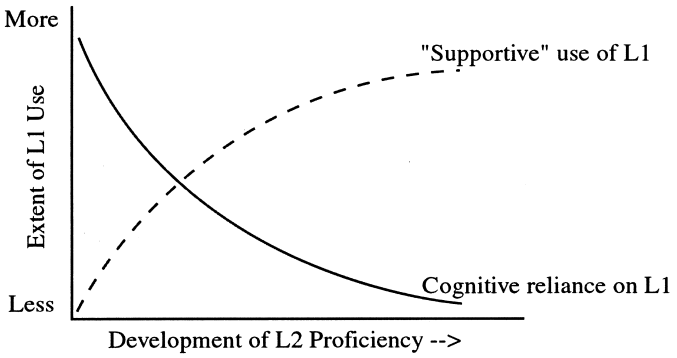


Figure 2. A graphic representation of the increase in supportive use of L1 and decrease in cognitive reliance on L1 as L2 proficiency increases.

Drawing primarily on this study but also on the three other published studies that have used think-aloud protocols to look at the language of thought while reading in the L2 (Hawras, 1996; Kern, 1994; Upton, 1997), the taxonomy of L1 use by L2 readers shown in Figure 1 has been developed to describe the situations in which the native language tends to be called on to aid in L2 reading comprehension.

These studies also show that the overall use and success of calling on the L1 to aid in L2 reading comprehension is clearly determined by the reader's overall L2 proficiency. As L2 proficiency increases, the supportive (i.e., beneficial) use of the L1 increases, while at the same time the cognitive reliance on these strategies (i.e., the need to think about the text in the L1) declines. Graphically, this relationship can be illustrated as in Figure 2. The relationship

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between L2 proficiency and the supportive cognitive use of the L1 illustrated in Figure 2 would explain why the use of the L1 by students in Kern's (1994) study, who had relatively low L2 proficiency, was not highly associated with accurate comprehension, whereas the cognitive use of the L1 by students in this study, who had a much higher L2 proficiency level, was highly associated with accurate comprehension.

At some point, the reader's L2 proficiency reaches a level where thought in the L1 becomes less efficient than just processing the text as it is read and so, for the most part, becomes unnecessary. This point when L1 thought is no longer used is most likely when the L2 reading comprehension process is automatic. Reliance on the L1 as an aid to comprehension likely only occurs when there is a shift from automatic to controlled processing (McLeod & McLaughlin, 1986).

Looking back at Tables 2, 3, and 4, however, two questions immediately present themselves. First, if the post-ESL students are so much better and more efficient readers, why do they produce so many fewer verbalizations of reading strategies than the two groups of ESL students? The eight intermediate ESL students verbalized a total of 509 strategies, averaging 64 verbalizations per student. The seven advanced ESL students verbalized a total of 411 strategies, averaging 59 verbalizations per student. The five post-ESL students verbalized a total of 172 strategies, averaging 34 verbalizations per student—nearly half as many as the intermediate ESL students. It seems evident that the reduction in verbalizations, and especially of verbalizations in the L1, as overall L2 proficiency of the students increases is due, in fact, to the increase in more automatic and proficient L2 reading skills. As Pressley and Afflerbach (1995) indicated:

> Fully automatic processes are difficult to self-report. They occur very quickly, so much so that intermediate products of processing are not heeded in short-term memory and, thus, not available for self-report. Protocol analysis is much more sensitive to processes that have not been automatized, ones that are still under conscious control. (p. 9)

By far the majority of the verbalizations, in both the L1 and the L2, occurred when students were either wrestling with or confirming meaning (i.e., their comprehension process was under more conscious control). The more proficient post-ESL students appear to have been processing the L2 text with greater ease and automaticity, thus they had less that they were consciously attending to and able to report. The fact that the post-ESL students' reading strategies were much more automatic is also supported by the data in Table 5. It shows that not only did they less frequently resort to thinking about the L2 text in their L1, as compared to the intermediate and advanced ESL students, but only once did a reader do so because she was wrestling with meaning.

The second question that arises from a reexamination of Tables 2, 3, and 4 relates to the type of strategy employed. Why, for example, is there a preponderance of type A strategies (identifying and learning text content) but no

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type C strategies (evaluating)? One hypothesis is that, owing to cultural background or possibly to reading experience in the L2, these students may not in fact be in the habit of reacting to or evaluating what they are reading (type C strategies), or thinking about what they are understanding (type B strategies). As Daneman (1991) pointed out for L1 readers, knowing how to engage in higher-level processes while reading often requires practice or training.

It must also be remembered that Pressley and Afflerbach's (1995) rubric only lists strategies that L1 readers have been shown to use. There is no indication that readers will use any particular strategy and there is no discussion about relative frequency of use; certainly none of the studies reviewed examined nonnative speakers of English. It may well be that most readers, whether reading in the L1 or the L2, may engage primarily in type A and B strategies and that type C evaluative strategies are, in reality, relatively uncommon. Although our study shows that Pressley and Afflerbach's rubric can be successfully used to evaluate the reading strategies of L2 readers, further research needs to be conducted to examine the relative frequency of the various reading strategies described in the rubric. For example, given that type C evaluative strategies were not represented in this study, future research might look more closely at these strategies and when they are expressed: Are they related to genre or task, to cultural or educational background, or to reading ability?

Conclusions based on this study must be viewed in light of the fact that it is, in essence, a set of case studies using a qualitative analysis, which involved only 20 students from two language backgrounds: Chinese and Japanese learners of English studying in an L2 setting (as opposed to a foreign language setting). Furthermore, it only looked at the comprehension of a single expository text about which the readers in general had limited background knowledge. Nevertheless, combining this study with those done by Hawras (1996), Kern (1994), and Upton (1997), which represent four different L1s and a broad range of language proficiencies, it seems apparent that L2 readers do make active use of their L1 resources as they strive to construct meaning from the text. The L1 may be used simply as a means for confirming understanding or more efficiently storing what has been understood. However, it may also be used as the language of thought, either in part (with the L2) or in whole, to wrestle with meaning or structure. The L1 may also be the language of thought to reflect on what has been understood and what one needs to do yet in the comprehension task. Though this study and others (Kern, 1994; Upton, 1997) show that use of the L1 as a tool for understanding L2 texts declines as proficiency in the L2 increases, even the highly proficient L2 readers in this study did not hesitate to use their L1 when they felt it would benefit their comprehension. Furthermore, for the students in this study, use of the L1 tended, overall, to facilitate L2 reading comprehension. In short, it should be expected that L2 readers will use their L1 as they seek to comprehend an L2 text.

CONCLUSION

To date, the dominant view of the role of the L1 in L2 reading has been simply that of translation (e.g., Kern, 1994; O'Malley & Chamot, 1990). The data from

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this study suggest, however, that the role of the L1 goes far beyond merely serving as a linguistic "decoder ring." In fact, the use of the L1 by L2 readers to help them wrestle with word- and sentence-level problems, confirm comprehension, predict text structure and content, as well as monitor text characteristics and reading behavior, supports a sociocultural view of language as a tool for thought as proposed by Vygotsky (1986). Indeed, Vygotsky's sociocultural theory of learning, which sees inner speech as the foundation of thought, suggests that the L1 would quite naturally serve as a tool to help students think about and make sense of (i.e., mediate their thinking about) the structures, content, and meaning of the L2 texts they read (see also Diaz & Berk, 1992; Donato, 2000; Lantolf & Appel, 1994; Roebuck, 2000).

When looking at how sociocultural theory manifests itself in the L2 acquisition process, the focus to date, and naturally so, has been most predominantly on the "interpsychological," or between-people, plane (Vygotsky, 1986). That is, research has focused on how teachers or more knowledgeable peers facilitate, through language, cognitive development of the L2 within the zone of proximal development, which is defined as "the interactional space within which a learner is enabled to perform a task beyond his or her own current level of competence, through assisted performance" (Ohta, 2000). The results of the study presented here suggest that L2 readers attempt to construct on an intrapsychological, or cognitive, plane a scaffold using their own expertise in their L1 as a means of pushing their L2 competence beyond its current level. This ability to "scaffold oneself" (see Lantolf, 2000, p. 23) has been noted by Verity (2000).

In short, this study opens up future possible avenues for research in the study of the L2 reading process. We suggest in conclusion that Vygotskyan sociocultural theory, which recognizes language as the facilitator of thought, is a suitable framework around which to explore L2 reading strategies. Through a sociocultural lens, the use of the L1 to mediate L2 reading comprehension is not merely a reading strategy (i.e., translation), but it provides a palette of tools that can be used to create a cognitive space in which the reader can facilitate his or her own understanding of a text. Further research is needed to explore the value of this sociocultural perspective to explain how L2 readers use their language resources to help them think about text meaning, but the fact that L2 readers actively engage their expertise in their L1 to mediate comprehension cannot be denied.

(*Received 19 February 2001*)

NOTES

1. Roebuck (1998) provides a fairly thorough overview of the Vygotskyan understanding of the role that symbolic mediation plays in human consciousness, particularly with respect to the interaction of the L1 and L2.

2. It should be noted that the students in this study would be considered "L2" (ESL) students, as they were studying a language in the country where that language is spoken. This is in contrast to the students in Kern's (1994) and Hawras's (1996) studies who would be considered "foreign language" students, as they were studying a language (i.e., French or Spanish) in a context where that language is not spoken within the local community.

3. Pressley and Afflerbach (1995), Matsumoto (1993), Cohen (1987a, 1987b), and Ericsson and Si-

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mon (1987, 1993) provide an overview of the criticisms against and persuasive arguments for the value and validity of using verbal protocols. They also establish basic procedures to investigate the conscious processes of reading in general and reading in an L2 in particular. Reading processes as described by Pressley and Afflerbach will be reviewed in the section entitled "Data Analysis."

4. Roebuck (1998), echoing Bernhardt (1991b), argued persuasively for the use of recall protocols as the assessment measure of reading comprehension for two reasons: first, because protocols reflect the understanding of content and text organization; and second, because comprehension questions both constrain and influence answers. We believe think-aloud protocols are at least as effective as written protocols in assessing reading comprehension for the same reasons and so have adopted them as the assessment measure in this study.

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https://doi.org/10.1017/S0272263101004028 Published online by Cambridge University Press

APPENDIX A

Table A1. Demographic information and proficiency scores of study participants

Groups	Age	Sex	Origin	Status	MTELP[a]	NLRP[b]	ERP[c]
Intermediate ESL students							
Student 1	28	F	China	Graduate	48	Exc.	Fair
Student 2	25	F	Taiwan	Undergrad	51	Good	Fair
Student 3	28	F	Taiwan	Undergrad	60	Exc.	Fair
Student 4	35	F	Taiwan	Undergrad	62	Exc.	Fair
Student 5	21	F	Japan	Undergrad	63	Exc.	Fair
Student 6	25	F	Japan	Undergrad	63	Good	Fair
Student 7	27	F	Japan	Undergrad	67	Good	Fair
Student 8	20	M	Japan	Undergrad	67	Good	Fair
Advanced ESL students							
Student 9	29	F	Taiwan	Graduate	70	Exc.	Fair
Student 10	33	M	China	Undergrad	70	Good	Poor
Student 11	25	M	Japan	Undergrad	70	Good	Fair
Student 12	36	F	Japan	Undergrad	72	Exc.	Fair
Student 13	25	F	Japan	Undergrad	79	Exc.	Good
Student 14	35	F	China	Graduate	82	Exc.	Fair
Student 15	21	F	Japan	Undergrad	83	Good	Fair
Post-ESL students							
Student 16	35	F	Japan	Graduate	88	Exc.	Good
Student 17	23	F	China	Graduate	89	Exc.	Exc.
Student 18	28	F	China	Graduate	89	Good	Good
Student 19	28	M	Japan	Graduate	89	Exc.	Exc.
Student 20	27	F	China	Graduate	90	Exc.	Good

[a]MTELP is the Michigan Test of English Language Proficiency, a standardized score of English evaluating vocabulary, grammar, and reading comprehension.
[b]NLRP is a self-rating of native language (Chinese or Japanese) reading proficiency on a four-point scale: poor, fair, good, excellent.
[c]ERP is a self-rating of English reading proficiency on a four-point scale: poor, fair, good, excellent.

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APPENDIX B

SIMPLIFIED RUBRIC OF READING STRATEGIES

A. Identifying and learning text content strategies
   1. Before reading
   2. During reading
      a. Identifying ideas
      b. Constructing meaning
   3. After reading
B. Monitoring strategies
   1. During reading
      a. Observation of general text characteristics and/or reading behavior
      b. Action taken in response to text characteristics and/or reading demands
   2. After reading
C. Evaluating strategies

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