

Article

A Research Synthesis on L2 Simplified Chinese Reading among Adults: Research and Pedagogical Implications

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Abstract

Even though there is still a dearth of scholarship in L2 simplified Chinese reading among adults, a growing body of research has contributed to this area to examine L2 Chinese reading process and performance. Due to this advancement in current literature, it is imperative to reflect on what has been researched in L2 Chinese reading in recent years and shed light on potential future research directions and pedagogical practices. To fill this gap, a qualitative analytic method was adopted to synthesize 25 selected studies (2009-2018) in L2 simplified Chinese reading among adult learners. Using analytic coding to identify emergent patterns regarding the research questions, methodologies, findings, and research implications, this study proposes that scholars interested in adult L2 Chinese reading conduct research looking at L2 Chinese reading processes embedded in learners' social and cultural environment, adopting diverse methodological approaches that uncover readers' voices, advancing understanding in social factors that impact L2 Chinese reading acquisition in classrooms, and attending to different processing levels and various forms of characters/ words/ sentences/ texts. Pedagogical implications were also discussed.

Keywords

L2 Chinese reading, research synthesis, methodologies, research directions

1 Introduction

The rapid globalization has witnessed a higher demand in second language (L2) reading in various fields, which in turn leads to growing research related to this issue. Great efforts can be seen in investigating L2 reading of alphabetic languages, such as L2 reading in English (Harrison & Krol, 2007) and Spanish (Miguel, 2012). On a smaller scale, scholars have shown interest in L2 reading involving Asian languages, such as L2 reading in Japanese (Toyoda & McNamara, 2011), Korean (Lee & Schallert, 1997), and Chinese. Research in this regard has advanced understanding in relevant theories and practices. Investigations in L2 Chinese reading include, but are not limited to, reading experiences among heritage speakers (Zhang, 2016) and bilingual/ multilingual learners (Kim et al., 2016) and processes of reading traditional Chinese (Guan et al., 2011). With globalization bringing people across the world

to mainland China where simplified Chinese is the major communicative tool and with more simplified Chinese language courses being introduced into western university-level classrooms, there is a flourish of interest in examining L2 simplified Chinese reading among adults. These studies, though relatively few in number, have been beneficial to understanding L2 Chinese learning and teaching. There is, however, little research reviewing this scholarship. As such, this synthesis is to sketch out the literature on reading simplified Chinese as L2 among adults, to offer research directions, and to discuss potentially beneficial pedagogical practices.

As a Sino-Tibetan language, Chinese characters are morphologically composed of strokes that form integral characters and compound structures that include radicals and other components. At the word level, a word comprises one or more than one character that represent meaning units. At the sentence level, a simple Chinese clause usually follows a basic subject+ verb+ object (SVO) structure, and there is no space between characters. Relative clauses, which have been a prominent research interest, are commonly used to modify nouns and are usually located before the corresponding nouns.

Studies in L2 Chinese reading before the 2010s mostly focused on traditional Chinese (Chang, 2006; Everson, 1998; Everson & Ke, 1997), which is still a current topic. In contrast, little research, however, was done to explore simplified Chinese reading among adults in the 1990s. There were, however, more interests in researching simplified Chinese reading in the 2000s. Though the relevant research was still minimal, the few studies in this period have offered insights into L2 simplified Chinese reading, especially in orthography and processing strategies (Wang, Perfetti, & Liu, 2003; Lee-Thompson, 2008; Shen, 2008; Packard, 2008). A brief review of some representative studies could provide references for examining more recent studies.

Wang et al. (2003) examined alphabetic readers' Chinese reading acquisition by testing their sensitivity to the orthographic features of Chinese characters under low-frequency or high-frequency conditions. The results indicated that adult learners of alphabetic backgrounds show perceptions about the structural complexity of Chinese characters and respond to simpler high-frequency characters more quickly and accurately (Wang et al., 2003). Additionally, Lee-Thompson (2008) and Shen (2008) both dealt with L2 Chinese reading strategies. To illustrate, Lee-Thompson (2008) drew the conclusion that American learners of L2 Chinese adopt both bottom-up and top-down processing strategies to cope with difficulties. The study also confirmed that Bernhardt's constructivist reading model could account for L2 Chinese learners' reading processes, particularly acknowledging reading difficulties related to the absence of word boundaries (Lee-Thompson, 2008, p. 714). In the aspect of processing L2 Chinese relative clauses, a frequently referenced study was Packard (2008), which inspected the difficulties and ease of processing subject-modifying and object-modifying relative clauses using a self-paced reading task. Similar to the research involving Chinese L1 readers, this study found that L2 simplified Chinese learners processed subject-modifying relative clauses more slowly. The experiment was replicated in more recent studies with research designs entailing greater variations.

2 Research Questions

Even though there is still a dearth of scholarship in L2 simplified Chinese reading among adults, a growing body of research has contributed to this area, illuminating how L2 learners process Chinese and their reading performance. Due to this advancement in current literature, it is imperative to reflect on what has been researched in L2 Chinese reading in recent years and identify the potential research directions and pedagogical practices. This synthesis, therefore, aims to answer the following three questions through closely examining L2 Chinese reading studies between 2009 and 2018:

1. What research questions, major issues, and findings concerning L2 simplified Chinese reading among adults have been identified in previous studies?

2. What methodologies — research design, participants, settings, and data collection and analysis — have been deployed in previous studies?
3. Drawing upon the implications revealed in previous studies, what are the potential research directions in L2 Chinese reading among adults and how can they serve pedagogical practices?

Meaningful answers to the above questions will shed valuable light on the trends and future directions of research and teaching in L2 Chinese reading.

3 Methods

To sketch out the current landscape of L2 Chinese reading research, this synthesis employs the following inclusion and exclusion criteria.

Year of publication: The current study was conducted between late 2018 and early 2019. Studies in the past ten years were included to capture the trending scholarship, whereas those published before 2009 were excluded.

L2 Chinese reading as the focus: Articles providing evidence of L2 Chinese reading processes were gathered for analysis. Particularly, L2 Chinese reading processes are the center of discussions. This includes articles that explicitly indicate L2 Chinese reading in the titles, key words, abstracts, or research questions. This study therefore excluded articles that simply discuss L2 Chinese acquisition (e.g., vocabulary retention; acquisition of a grammatical feature), even though the medium of data collection in these articles may include reading.

Simplified L2 Chinese as target language: As traditional and simplified Chinese are orthographically divergent, the research concerning these two language systems may show complex findings, which would pose difficulties for clarifications within the length of this synthesis. This synthesis, therefore, focuses on simplified Chinese as the target language. As such, articles using traditional Chinese as reading materials were not included. However, studies examining pseudo-Chinese were included if the characters are designed based on the structures of simplified Chinese.

L2 Chinese adult learners (age ≥ 18): Findings may not be consistent with different age groups in terms of L2 reading. Therefore, even though there is abundant literature involving younger participants that are intriguing for inspection, this synthesis focuses on L2 adult learners to draw reliable findings by teasing apart age groups. Articles that recruit participants younger than 18 were not included.

Participants with no vision/brain related medical conditions: This synthesis includes studies specifying that participants were healthy with normal or corrected visions. For those not explicit about the participants' physical conditions, affirmative inclusion decisions were made based on descriptions regarding the pools of the participants (e.g., college undergraduate students; students studying abroad). The current study, therefore, excluded studies that focused on patients (e.g., dyslexia).

Three sources were utilized for identifying relevant peer-reviewed articles or book chapters: WorldCat@OSU, EBSCOhost, and Scopus. The search was conducted with the key words “Chinese as a second language” and “reading.” Initially, 31 articles were found on Scopus, more than 300 items on EBSCOhost, and more than 10000 articles on WorldCat@OSU (although the articles seemed irrelevant after page ten in WorldCat). Next, the lists of the articles were carefully examined based on the criteria listed above, 19 articles were thus selected for further extensive analysis. Finally, a close look at the reference lists of these articles led to another six articles. Therefore, the identified collection consists of 25 studies in total.

The qualitative analysis utilized analytical coding adopted from Merriam and Tisdell (2016) who state that analysis is “the process of making meaning” (p. 201). Accordingly, the three-stage analysis for

this synthesis is centered around making sense of the existing research in L2 Chinese reading, uncovering details to answer the research questions. At the first stage, the 25 articles were carefully inspected by taking notes in the aspects of research questions (and predictions, if included), participants and settings, methodologies, findings, and implications (and limitations, if included). The articles were closely read again at the second stage, paying attention to coding the emergent categories across the studies. For instance, methodologies were coded as qualitative, quantitative, or mixed methods. Based on research questions and findings, some preliminarily identified themes across the studies are: Word spacing, reading strategies, cross-linguistic influence, morphological/ phonological awareness/ radical sensitivity, reading anxiety, and social reading. Participants were differentiated by age, language proficiency levels, L1 backgrounds, etc. Settings were coded as Chinese as a foreign language (CFL) or Chinese as a second language (CSL). Implications were coded with research dimensions which were further split into codes such as methodological implications and topic-related implications. At the third stage, the preliminarily identified themes from the previous stage were reviewed, compared, and refined through constantly comparing segments of data and looking for “recurring regularities” (Merriam & Tisdell, 2016, p. 203). To describe the data, research settings and thematic categories were made into tables.

4 Results

Research question 1: What research questions, major issues, and findings concerning L2 simplified Chinese reading among adults have been identified in previous studies?

Answering the above question, three major thematic categories emerged (see Table 1).

Table 1

Categories and Subcategories of the Identified Themes in the Article Collection

Categories	Subcategories	Articles	Major Reading Tasks/Experiments
1. Spacing and Parafoveal Processing	a. Spacing	Bassetti (2009)	Sentence-picture verification tasks
		Shen et al. (2012)	Eye-tracking experiment
		Yao (2011)	Off-line reading tasks with (un)spaced texts
	b. Parafoveal processing	Wang et al. (2014)	Eye-tracking experiment
2. Character/ Word-level Reading Comprehension	a. Vocabulary Knowledge	Shen & Jiang (2013)	Character-reading test; word segmentation test; reading comprehension test
		Zhang & Yang (2016)	Chinese Word Associates Test; orthographic processing task; picture selection task; grammaticality judgment task; passage comprehension tasks
	b. Character-level Linguistic Development	Ke & Koda (2017)	Online segment shifting tasks; paper-and-pencil L2 word meaning inferencing; L2 linguistic knowledge test
		(Orthographic, morphological, phonological development and radical sensitivity)	Tong & Yip (2015)
		Zhang (2018)	Recognition tasks on morphological awareness

		Zhao et al. (2012)	Functional magnetic resonance imaging (fMRI) session
	c. Character-level Reading-Writing Connection in Neuroscience	Cao & Perfetti (2016)	fMRI session
		Cao et al. (2013)	fMRI session
		Lagarrigue et al. (2017)	fMRI session
3. Sentence/ Text-level Reading Comprehension	a. Different Text Genres (humorous texts; online literary texts)	Chen (2017)	Questionnaire containing error stimuli as humorous texts
		Thoms et al. (2017)	Comprehension and vocabulary tasks; interview with focal students
	b. Sentence Structure Processing	Cui (2013)	Online self-paced reading task; off-line comprehension questionnaire
		Xu (2014)	Word-order judgment task with a whole-sentence reading technique
		Yao (2018)	Online self-paced reading experiment
		Yuan (2017)	Self-paced reading experiment; grammaticality judgment task
	c. Reading Strategies and Skills	Huang (2014)	Word-meaning inferencing tasks; interviews
		Ke & Chan (2016)	Reading tasks with recorded think-aloud reports
	Specific Strategies and Skills	Li (2018)	Written tests on coherence-building skills
		Luo & Sun (2018)	Think-aloud methods and interviews
		Yuan (2017)	Self-paced reading experiment; grammaticality judgment task
	Reading Anxiety and Related Strategies	Sun & Luo (2018)	Lived experience description; think-aloud; interviews; field observations; research journal writings
		Zhao et al. (2013)	Anxiety scales; background questionnaire; reading performance scores; interviews

Category 1: Spacing and parafoveal processing

Four studies contributed to examining L2 Chinese reading comprehension concerning the two aspects: spacing and parafoveal processing; in other words, how L2 readers process information focusing on the space and relation between characters and words. Because Chinese is characterized as an unspaced language, the role of spacing in L2 Chinese learning among spaced language speakers (e.g., English) attracts increasing academic attention. To illustrate, Yao (2011) investigated the effects of inter-word spacing on L2 Chinese reading speed and comprehension taking language proficiency levels (intermediate and advanced levels) into consideration. The results indicated that adding inter-word spacing does not affect the reading speed of L2 Chinese learners whose L1 is spaced. However, the manipulation of inter-word spacing slowed the reading speed of advanced L2 learners whose L1 is unspaced (speakers of Thai). Reading performance across the groups was not affected. In the same vein, Bassetti (2009) tested whether adding inter-word spacing would affect the process of reading Chinese among native speakers and L2 learners whose L1 is spaced, such as English. The research examined the effects both

in hanzi sentences (composed of Chinese characters) and in pinyin sentences (composed of phonetic alphabets). The study demonstrated that L1 English readers only benefit from inter-word spacing in pinyin sentences but not hanzi sentences (Bassetti, 2009). Similarly, Shen et al. (2012), used eye-tracking to test the prediction that L2 Chinese readers with a spaced L1 background may depend on spacing for “eye guidance and lexical identification” (p. 193). The study examined participants with different L1 backgrounds, namely, character-based language (Japanese) and alphabet-based language (Thai, Korean, and English). Shen et al. (2012) yielded more nuanced findings, using four conditions of spacing: unspaced texts, word-spaced texts, nonword-spaced texts, and single character-spaced texts (p. 194). The participants’ eye movements were found to be interfered the most when dealing with nonword-spaced texts and were least disrupted by word-spaced texts (Shen et al., 2012) and the effects held with different language backgrounds. In other words, adding spacing to segmented words is the most facilitative with L2 Chinese readers (Shen et al., 2012). The findings are somewhat different from Yao (2011), possibly due to different data collection methods (eye-tracking experiment in Shen et al., 2012 and off-line reading tasks in Yao, 2011), diverse L2 Chinese proficiency levels (basic, elementary-intermediate levels in Shen et al., 2012 and intermediate and advanced level in Yao, 2011), topic familiarities (participants are familiar with the reading topics in Yao, 2011 while relevant information is not given in Shen et al., 2012), and the designs of comprehension questions (yes/no questions in Shen et al., 2012 and multiple choices in Yao, 2011).

In the second subcategory, Wang et al. (2014) were interested in how Korean learners with different Chinese reading proficiency levels utilize parafoveal information in reading sentences. Specifically, through observing participants’ eye movements, the study explored the correlation between “preview benefit” (p. 29) and reading proficiency by manipulating three types of parafoveal preview conditions, namely, preview items that are orthographically, phonologically, or semantically related to the targeted words. The findings demonstrated the facilitative role of identical and orthographically similar previews when processing the target words whereas this effect was not observed when preview condition was phonologically or semantically manipulated.

Category 2: Character/word-level L2 Chinese reading comprehension

Nine studies mainly dealt with character/word-level L2 Chinese reading comprehension, with three subcategories indicating the interrelationship of these studies: “Vocabulary Knowledge,” “Character-level Linguistic Development,” and “Character-level Reading-Writing Connection in Neuroscience.” Shen and Jiang (2013) and Zhang and Yang (2016) fell into the first subcategory. For instance, Shen and Jiang (2013) sought to answer questions regarding the relationships among context-free character-reading fluency, word segmentation accuracy, and general reading comprehension and how the former two elements contribute to general reading comprehension (p. 8). The results showed that character-naming accuracy is the “strongest predictor” (p. 16) for reading comprehension, which leads to higher character-naming speed and is considered as a crucial variable to improving lower-level reading processing, including word segmentation accuracy (Sheng & Jiang, 2013, p. 16-17).

The second subcategory involved character-level linguistic development. In particular, the four studies in this cluster examined orthographic, morphological, and phonological awareness as well as radical sensitivity. For instance, Ke and Koda (2017) focused on how learners’ awareness of L1 and L2 morphological structures contributes to Chinese word meaning inferencing among adult L2 Chinese learners. The results revealed that the participants show sensitivity to morphological structures, especially with Chinese words that contain “affixoids and familiar bases” (Ke & Koda, 2017, p. 751). Interestingly, even though it was found that L1 morphological awareness (MA) positively correlates with L2 MA, only L2 MA facilitates L2 word meaning inferencing and the effect weakens as L2 linguistic knowledge improves (Ke & Koda, 2017, p. 752). For another, Tong and Yip (2015) examined

L2 Chinese learners' radical sensitivity in three aspects: positional, phonological, and semantic information (p. 164) in different contexts where explicit instruction on radicals was given or not given. The research showed radical awareness is a strong predictor in Chinese word reading ability among L2 learners, which is similar to Chinese native readers. It also suggested that semantic structures are more likely to facilitate word meaning inferencing than phonetic features unless explicit phonetic cues are provided (Tong & Yip, 2015).

Three studies offered evidence in character-level reading-writing connection in neuro-science by scanning brain activities. In particular, Lagarrigue et al. (2017) looked into the role of the writing modality of learned characters in reading tasks including novel characters. In light of their data, it was suggested that writing-specific brain regions are activated when attending to a reading task, which indicated that the former knowledge of written characters is transferred to processing novel characters in reading (Lagarrigue et al., 2017). Additionally, Cao et al. (2013) and Cao and Perfetti (2016) both tested whether learning to write Chinese characters affects character reading comprehension. For instance, Cao et al.'s (2013) findings confirmed the benefits of writing for character recognition in terms of orthography and phonology.

Category 3: Sentence/Text-level reading comprehension

Covering 13 studies, the third major category was "Sentence/Text-level Reading Comprehension" which was further divided into "Reading Different Text Genres," "Sentence Structure Processing," and "Reading Strategies and Skills." Two studies — Thoms et al. (2017) and Chen (2017) — focused on different genres of sentence/text level reading comprehension. Using digital literary texts, Thoms et al. (2017) investigated the affordance of an annotation tool (eComma) among L2 Chinese learners and how the virtual interactions affect students' digital text reading performance. The challenges from students' perspectives and the pedagogical implications of including the digital platform for creating social space in language reading are also discussed (Thoms et al., 2017, p. 41). Thoms et al. (2017) found that social reading through eComma allows L2 Chinese learners to "co-construct meaning" (p. 48) and creates opportunities for learners to have space for L2 production in addition to improving L2 text reading ability. Additionally, Chen (2017) revolved around humorous texts with error stimuli. The research compared the different perceptions of error stimuli among different demographic groups (i.e., native speakers and non-native speakers, teachers and non-teachers, and female and male participants) (Chen, 2017, p. 207). The findings uncovered two factors that affect the "degree of humorous enjoyment" — "readers' backgrounds and text sources" (Chen, 2017, p. 216).

In the subcategory "Sentence Structure Processing," three out of the four studies — Cui (2013), Xu (2014), and Yao (2018) — focused on a same sentence structure: relative clauses. Relative clauses have received substantial academic attention in L1 language acquisition, and a growing interest is observable in the L2 field. Due to the unique head-final feature of Chinese relative clauses, scholars have shown interest in investigating how L2 learners (especially those whose native relative clauses are head-initial) process this structure. These three recent studies contributed to extending previous literature by experimenting on more complicated types of relative clauses. Cui (2013), as an example, aimed to compare how L1 and L2 Chinese readers process relative clauses and whether the features of native languages impact the processing. The study revealed that both L1 and L2 readers meet more challenges in processing subject-gapped relative clauses (SRC) and object-modifying clauses (Cui, 2013, p. 37). Additionally, L2 readers present a somewhat divergent pattern (with different grammatical items causing slowdowns in reading) when processing relative clauses compared to L1 readers (Cui, 2013, p. 37). Approaching a different sentence structure, Yuan (2017) touched upon processing base-generated-topic sentences and pointed out that unlike native speakers who extract information from structures when dealing with ambiguities, L2 Chinese learners respond well to syntactic cues when processing ambiguities in the sentence structure (p. 56).

The subcategory “Reading Strategies and Skills” was furthermore divided into two aspects: “Specific Strategies and Skills” and “Reading Anxiety and Related Strategies.” Among the seven studies in this subcategory, five studies (Huang, 2014; Ke & Chan, 2016; Li, 2018; Luo & Sun, 2018; Yuan, 2017) elaborated specific strategies and skills — such as top-down strategy, the use of background knowledge, and coherence-building skills — in reading Chinese sentences or texts while the rest contributed to the discussion of reading anxiety and related strategies. To illustrate, Huang (2014) aimed to answer the questions concerning the strategies participants employ to process word-meaning of new compound words in sentences. The discussion illuminated the aspects of word inferencing strategies, reader perceptions, peer influence, and reader difficulties, thus suggesting a continuum of strategies with character meaning and context information on both ends (Huang, 2014, p. 228).

Sun and Luo (2018) and Zhao et al. (2013) offered insights into L2 Chinese reading anxiety among adult learners and the corresponding strategies utilized by readers. Taking Sun and Luo (2018) as an example, the study focused on two elementary-level CSL learners and explored the sources of the participants’ reading anxiety and their strategies to cope with their emotion. The findings revealed that there are five major sources: cross-linguistic differences, previous knowledge, vocabulary, guessing, and difficulties in comprehension (Sun & Luo, 2018, p. 319).

Research question 2: What methodologies — research design, participants, settings, and data collection and analysis — have been used in previous studies?

As indicated in Table 2, among the 25 studies, quantitative-dominant research design was the most frequently used methodology with a total of 19 studies. More delineation of the methodologies — participants, settings, and data collection and analysis — will follow.

Table 2

Research Design, Demographics of Participants, and Settings in the Selected Articles

Design	Articles	Participants (number; language level; L1)	Settings
Qualitative (4)	Huang (2014)	nine second-year CSL learners	US university
	Luo & Sun (2018)	two intermediate CSL learners (US & Mexico)	Chinese university
	Sun & Luo (2018)	two beginning CSL learners (Britain & Ecuador)	Chinese university
	Thoms et al. (2017)	11 undergraduates (4 focal students); advanced level; one teacher	US university
Quantitative (19)	Bassetti (2009)	14 L1 Chinese readers; 14 L1 English speakers (3-year CSL learners)	British university
	Cao & Perfetti (2016)	17 L1 English speakers; 17 L1 Chinese speakers	US universities
	Cao et al. (2013)	17 L1 English speakers	US universities
	Chen (2017)	51 Chinese scholars and students; six L2 Chinese students (advanced/higher levels)	US universities
	Cui (2013)	33 L2 Chinese learners (L1: English, Spanish, French, Korean, Japanese); 24 native speakers	Chinese and US universities
	Ke & Koda (2017)	50 L1 English speakers (> 2 years CSL learners)	US universities
	Lagarrigue et al. (2017)	24 French college students of L2 Chinese (beginner level)	French university

	Li (2018)	30 English-speaking CFL learners; 16 Japanese speaking CFL learners; 30 native speakers	US universities
	Shen et al. (2012)	16 US university students (beginner level); 26 Korean, 20 Japanese, and 20 Thai students (elementary-intermediate level)	Chinese university
	Sheng & Jiang (2013)	42 US college students; 36 international students from 26 countries; >1 year CSL/CFL learning	US/Chinese universities
	Tong & Yip (2015)	84 CFL learners with different L1 backgrounds (non-native/native English speakers)	In/outside of Hong Kong
	Wang et al. (2014)	36 CFL learners from Korea; 24 native speakers	Chinese university
	Xu (2014)	32 L1 English CFL adult learners	US institution
	Yao (2011)	102 international students (intermediate-advanced level) with various L1 backgrounds	Chinese universities
	Yao (2018)	52 L2 learners; 36 native speakers	Chinese university
	Yuan (2017)	44 L1 English CSL learners (diplomats, businesspeople, university teachers/students) (highly proficient); 23 L1 Chinese speakers	U.K./China/universities in these two countries
	Zhang (2018)	61 L1 English CSL college learners; 69 L1 Thai CSL college learners (intermediate level)	Chinese universities
	Zhang & Yang (2016)	21 college students with various L1 backgrounds	Chinese university
	Zhao et al. (2012)	15 L1 English/Indonesian CSL international college students; 15 L1 Chinese students	Chinese university
Mixed methods (2)	Ke & Chan (2016)	68 of all proficiency levels (within Chinese cultural sphere and non-Chinese cultural sphere)	Chinese universities
	Zhao et al. (2013)	114 US students (beginner/intermediate levels)	US university

A careful examination of the participants' demographics and of the settings (Table 2) revealed a complex picture. Firstly, with respect to the sizes of the participant pools, it ranged from two participants from case studies (e.g., two in Luo & Sun, 2018) to more than 100 participants (e.g., 114 in Zhao et al., 2013). Secondly, in terms of native languages, the studies recruited participants from various L1 backgrounds. For instance, several gathered participants with English-speaking background (e.g., Thoms et al., 2017; Zhao et al., 2013). Other studies included participants whose languages are either alphabet-based or character-based, or the spaced or unspaced characteristics of native languages were distinguished (e.g., Shen et al., 2012). A few studies compared native Chinese speakers and CSL/CFL learners (e.g., Bassetti, 2009; Chen, 2017). Thirdly, it is worth noting that most participants across the studies were identified as university students (e.g., Ke & Chan, 2016; Lagarrigue et al., 2017) and there is a small number of university language teacher participants (e.g., Chen, 2017). Note that two studies — Tong and Yip (2015) and Yuan (2017) — partially focused on participants out of university contexts. Tong and Yip (2015) did not exactly specify where the adult CFL learners in their study come from whereas Yuan (2017) recruited participants who are diplomats and businesspeople in addition to college students and teachers. Fourthly, with regards to participants' proficiency levels, a large portion of the studies directly pointed out participants' proficiency levels which fall into the categories of beginner, elementary, intermediate, and advanced levels (e.g., Sun & Luo, 2018; Zhang, 2018). Other studies, however, had more general description (such as years of Chinese learning in Bassetti, 2009) concerning their participants' L2

Chinese proficiency levels. Overall, proficiency levels were determined mostly by HSK (the official Chinese proficiency test) levels, Chinese course scores, years of learning Chinese, and students' self-reports. Lastly, 10 identified studies were situated solely in Chinese settings (e.g., Luo & Sun, 2018). Another nine studies were conducted solely in US universities and institutions (e.g., Ke & Koda, 2017) or European universities (e.g., France in Lagarrigue et al., 2017; Britain in Bassetti, 2009). Note that three studies — Cui (2013), Sheng and Jiang (2013), and Yuan (2017) — situated their research in both the Chinese context and US context. Additionally, Tong and Yip (2015) was the only study that did not specify their research setting but highlighted that the context was either in or outside of Hong Kong. To sum up, the diverse backgrounds of the participants and the complex settings in these selected studies laid foundations for nuanced findings in the research of L2 simplified Chinese reading among adults.

Among the 19 quantitative studies, data were gathered online or offline; the reading tasks were administered individually or in groups; and the locations of data collection were mostly in labs and quiet rooms, or regular classrooms. Specifically, most studies collected data in labs or computer-equipped rooms with individual participants. For instance, in Shen et al. (2012) and Wang et al. (2014), researchers used eye trackers to monitor participants' eye movement and examined its correlation with reading comprehension. In Cao et al. (2013) and Cao and Perfetti (2016), participants were scanned for brain images in fMRI labs. There are also other studies where readings tasks were completed individually or in small groups on a computer in quiet rooms (e.g., Chen, 2017; Cui, 2013). It is also noteworthy that a few studies included offline formats, such as paper-and-pen methods, to collect data (e.g., Cui, 2013; Ke & Koda, 2017). Finally, one partially collected data in regular classes where all participants performed reading tasks simultaneously (Shen & Jiang, 2013). Specifically, data concerning the task of the reading comprehension in Shen and Jiang (2013) was collected during regular class hours, associated with other data collection methods.

The reading tasks varied across different quantitative studies. Overall, some prominent ones were character judgment tasks (e.g., Tong & Yip, 2015), paper-and-pencil translation tasks (e.g., Ke & Koda, 2017), morpheme discrimination tasks (e.g., Zhang, 2018), grammar judgment tasks (e.g., Zhang & Yang, 2016), picture-sentence verification tasks (e.g., Bassetti, 2009), and self-paced sentence/text comprehension tasks (e.g., Shen & Jiang, 2013). Several studies employed multiple reading tasks. For instance, in Shen and Jiang (2013), three instruments were used to gather data: the character-reading test, the word segmentation test, and the reading comprehension test. In addition, questionnaires were a popular tool to collect evidence from participants regarding their language background and reading experiences. Some studies used questionnaires to investigate participants' L1 backgrounds and L2 language proficiency (e.g., Yuan, 2017). In Chen (2017), however, a questionnaire, consisting of 25 humorous texts, was the major data collection tool. Participants were asked to read and rate the texts as "Very Funny," "Somewhat Funny," or "Not Funny."

Data were examined and analyzed quantitatively throughout these 19 studies. For instance, in Bassetti (2009), a 2*2 mixed ANOVAS were used to analyze statistics. Computer analytic software was employed in several studies, such as MovAlyzeR software in Lagarrigue et al. (2017).

Four studies are under the category of qualitative research with similar approaches of data collection and analysis. Among these, Luo and Sun (2018) and Sun and Luo (2018) were case studies while Huang (2014) and Thoms et al. (2017) selected focal students among the participants for more in-depth analysis. All the qualitative research included retrospective interviews during data collection. For instance, Huang (2014) relied upon interviews to better understand participants' reflections on their reading strategies. Other major data collection methods included think-aloud protocols (Luo & Sun, 2018; Sun & Luo, 2018), observations (Sun & Luo, 2018), word meaning inference tasks (Huang, 2014), journal writings (Sun & Luo, 2018), and comprehension and vocabulary assessment tasks (Thoms et al., 2017). With regards to the data analysis processes, all qualitative research coded their data systematically and identified thematic categories.

Two studies — Ke and Chen (2016) and Zhao et al. (2013) — employed mixed methodologies, but with different data collection and analysis methods. Administered individually in a quiet room, Ke and Chen (2016) used think-aloud and recall protocols to further the understanding of participants' reading strategies. Differently, Zhao et al. (2013) obtained data regarding participants' reading anxiety and strategies from using two anxiety-measurement scales, participants' scores of routine exams, and email interviews.

The studies across the three categories were largely motivated by the previous extensive reading literature in L1 Chinese and L1/L2 alphabetic languages as well as a small and yet growing body of research in L2 Chinese reading. It appears that some hot topics continued to be explored and enriched to serve research and pedagogical purposes: reading fluency (e.g., Shen & Jiang, 2013), vocabulary processing (e.g., Zhang & Yang, 2016), morphological awareness (e.g., Ke & Koda, 2017), relative clauses (e.g., Cui, 2013), reading strategies (e.g., Ke & Chen, 2016), reading anxiety (e.g., Sun & Luo, 2018), etc. These recent studies have yielded rich data by introducing more variables and complexity to these issues. For instance, Zhang and Yang (2016) focused on the depth of L2 Chinese vocabulary knowledge, extending the previous relevant scholarship mostly devoted to the breadth of L2 vocabulary knowledge. In addition, the Chinese language's unique conventions (e.g., the unspacing, head-final, and orthographical features), especially compared to alphabetic languages, have gathered sustainable interest. A few studies addressed the discrepancy of the previous findings (e.g., relative clause processing; activation of brain regions when reading and writing; reading anxiety) and aimed to provide more nuanced evidence (e.g., Cao & Perfetti, 2016; Xu, 2014). Methodologically, most studies in the collection adopted quantitative research designs similar to the previous literature, employing many off-line and on-line reading tasks. The similar research designs provide a vantage point to compare findings and provide further implications.

Despite the advanced understanding in the above-mentioned issues, this line of research may go further to explore L2 Chinese reading, situating participants in their daily social and cultural contexts. With a few exceptions (Huang, 2014; Luo & Sun, 2018; Sun & Luo, 2018; Zhao et al., 2013), L2 Chinese readers' voices were largely missing in most of the examined studies. This may be related to the nature of the studies; for example, it is hard to observe participants' brain activities in a classroom setting. However, issues such as sentence processing, reading fluency, and morphological awareness could benefit from communication with participants. In other words, L2 Chinese learners' reading experiences could be shaped by a combination of factors that may not be measured in a controlled environment, such as L2 Chinese learners' reading history and cultural background, reading attitudes, relationships to the texts, understandings of the reading task, interactions with teachers and peers, their positionality as an L2 reader, etc. Considering such socio-cultural environmental factors might capture how and why they attend to Chinese characters or sentences in certain ways. These were not addressed in the identified collection.

Although most research designs in the selected studies had merits in terms of comparable findings and controlled variables, limitations may exist. For instance, eye-tracking experiments and brain imaging help capture participants' eye movement and attention in a more precise manner; however, these measurements do not reflect the real reading where more complex factors may be at play. Therefore, more diverse methodologies (e.g., qualitative approaches) to uncover L2 Chinese readers' voices are more beneficial. The following gives further details concerning methodological implications, research directions, and pedagogical considerations.

Research question 3: Drawing upon the implications revealed in previous studies, what are the potential research directions in L2 Chinese reading among adults and how can they serve pedagogical practices?

Future research directions and pedagogical implications are based on the research implications revealed throughout the 2009-2018 collection.

Implications discussed in the selected studies

The identified studies illustrated important methodological and research implications. Firstly, the most prominent implication of these studies is that methods need to be improved. This was reflected in participant selection, reading materials, data collection methods, and proficiency measurements. Regarding recruiting participants, several studies indicated that it is crucial to have larger sample sizes (e.g., Huang, 2014; Li, 2018). Some called for future inclusion of participants with different proficiency levels (e.g., Bassetti, 2009; Yuan, 2017). It was also suggested that L1 effect be inspected in future investigations by manipulating the L1 background variable (e.g., Tong & Yip, 2014; Xu, 2014). Note that some studies (Bassetti, 2009; Yao, 2011) emphasized the importance of including L1 Chinese participants for a better comparison of reading performance between L1 and L2 groups.

As for modifying reading materials in future studies, Zhang and Yang (2016) suggested that reading materials should include less frequently used words to uncover potential effects of word frequency. Also, Wang et al. (2012) stressed the importance of including compound characters instead of solely using integral characters so that radical effects can be observed. Moreover, Huang (2014) suggested using more authentic texts instead of sentences to examine readers' strategies.

A few studies emphasized the modifications of data collection processes, specifically referring to the administration of reading tasks (e.g., Ke & Koda, 2017; Zhang, 2018) and the timeline of data collection (e.g., Ke & Chan, 2016; Zhao et al., 2012). Taking Zhang (2018) for example, the study suggested that future inspections should employ online tasks to measure morphological awareness which will ensure immediacy compared to the use of offline measurements. In addition, considering some evolving factors, such as L1 backgrounds and L2 proficiency levels (Ke & Chan, 2016, p. 37), L2 processing mechanisms (Zhao et al., 2012), and potential shortcomings of short-term data collection in correlational studies (Zhao et al., 2013, p. 775), researchers contended that longitudinal studies should be carried out to provide more sustainable evidence.

Another aspect that relates to implications of methods is measurements of language/reading proficiency. In this regard, the studies highlighted the significance of refining proficiency measurements in the future to ensure the validity of findings (e.g., Ke & Chan, 2016; Tong & Yip, 2014). In particular, Ke and Chan (2016) noted that L2 proficiency levels should be measured more specifically in terms of grammar and vocabulary knowledge.

Secondly, in addition to improving methodologies in the future, the selected studies also offered propositions to expand understanding of L2 Chinese reading by providing more empirical evidence. To be specific, Cui (2013) stated that working memory capacity, as a confounding factor, should be taken in serious consideration in studying participants' relative clause reading processes. Shen and Jiang (2013) suggested that future studies should be conducted to come up with a "base character-reading fluency rate" relating to reading comprehension. Tong and Yip (2014) supported extending research to discussing "distributional features" (p. 175) of semantic and phonetic radicals as well as examining other structural components of characters (e.g., stroke patterns). Additionally, Xu (2014) contended that it is crucial for future research to delve into the "specifics of the multi-constraint proposal" (p. 455) to illuminate how different factors are at play under various contexts in reading relative clauses. It is worth noting that a few studies jointly draw future researchers' attention to the contrasts between low-level and high-level processing (Shen & Jiang, 2013; Zhang, 2018).

Further implications in research and pedagogy

Based on the research implications drawn from the 2009-2018 literature in L2 Chinese reading, the

current synthesis offers some further implications for directions in L2 Chinese reading research and pedagogy. In terms of methodologies, it appears that the quantitative approaches are in a dominant position; more qualitative approaches may complement findings yielded by quantitative methodologies and provide more insights. For instance, in addition to collecting lab data, it would be helpful to interview participants or have them write reading journals to gather evidence from their real-life reading contexts. More nuanced data may be generated, such as how to process texts with different genres, including not only textbooks but also any real-life L2 Chinese written materials (e.g., messages from classmates, emails from professors, etc.). A qualitative method could also allow researchers to probe further with certain issues, asking questions such as why certain structures are difficult to acquire from learners' viewpoints. Collecting participants' daily reading notes as artifacts accompanied by interviews may also shed light on how they process Chinese sentences or characters. Furthermore, it seems that current L2 Chinese studies are mostly situated in Chinese and US universities. It would be interesting to examine participants from more various contexts, such as East Asia, Southern Africa, South America, etc. The different contexts could complexify findings concerning learners' reading experiences. In addition, selected reading materials in L2 reading research were mostly controlled for eliminating confounding variables; it would be useful to choose more authentic materials, such as excerpts from news reports which were used in a lot of L1 Chinese studies (Shu et al., 2011; Xu & Jordan, 2009).

At this stage, important work has been done with this reviewed body of literature. The scope of major themes in L2 Chinese reading, however, is somewhat limited, which provides opportunities to expand empirical research. It appears that the social dimension of L2 Chinese reading, for instance, L2 Chinese reading acquisition in a physical classroom or an online community where interactions among students and teachers are involved, is underexplored. This is because many experiments have been conducted in labs or quiet rooms that do not reflect a natural learning environment (including overseas and out-of-school contexts). Even though some researchers collected data at regular class times, it was the individual reading experience that was the center of the discussions. As such, despite the merits of controlled environments, it is beneficial to inspect the social factors at play when L2 Chinese learners acquire reading together, especially examining L2 Chinese readers' perspectives. Investigating teachers' roles and practices will also provide perspectives on the processes of students' L2 Chinese reading acquisition. In light of these directions, some suggested research questions include: whether, how, and why students' reading histories or cultural background impact their reading processes and reading strategies at the character/sentence/discourse level? How do interactions with peers and teachers influence L2 Chinese learners' reading comprehension? How do Chinese learners understand the reading task requirements given by their teachers and how does that understanding shape the way/strategies they read? Methodologically, a qualitative dimension is advantageous to uncover social and cultural factors that impact students' L2 Chinese reading, adding to findings yielded by quantitative data.

In addition, as reflected from the thematic categories in the existing literature, reading strategies were mostly examined with sentence/text-level materials (not with character-level materials) while the discussion of the reading-writing connection in neuroscience was mostly at character level (not at sentence/text level). Therefore, there is potential space for future L2 Chinese research to expand previous explorations to different levels of processing, for instance, looking at L2 Chinese readers' processing strategies for integral and compound characters. Furthermore, various topics discussed in L1 Chinese reading could find their ways to L2 Chinese reading research as well. Unlike L1 reading experiments which have included various word structures (e.g., three-character words and four-character words), it is rare to see words with more than two characters in L2 Chinese reading research. This synthesis, therefore, calls for more empirical research concerning how L2 Chinese readers process multicharacter words such as Chinese set phrases. Since there is rich data concerning multicharacter words in L1 Chinese research, meaningful comparison can be made between research in L1 and L2 Chinese reading, e.g., comparing L1 and L2 readers' responses when types of characters are controlled (e.g., using phonetically related multicharacter words). Other topics that have been explored in L1 Chinese reading

are valuable as well, such as how reading distances, background noises, working memories, and aging affect L2 Chinese learners' reading experiences.

It is also important to note that more empirical research is needed to strengthen the previous findings. This is especially helpful to provide further evidence for studies that come up with somewhat contradictory findings. For instance, regarding spacing, Yao (2011) arrived at the conclusion that inter-word spacing has no effect on L2 Chinese learners whose L1 is spaced scripts whereas Shen et al. (2012) maintained that adding spacing to segmented words facilitates L2 Chinese readers' reading process regardless of their language backgrounds. Thus, it is of importance to conduct more empirical studies to deepen the understanding in this regard.

Pedagogically, uncovering L2 Chinese readers' hidden voices in a situated learning environment will bring benefits to teaching practices. Findings in this regard support teachers in addressing individual students' needs and provide corresponding help based on their students' reading histories, motivations, strategies, etc. Understanding students' responses to different levels of Chinese processing may suggest more targeted and nuanced teaching methods. Finally, professional development programs that entail considerations regarding how students acquire Chinese reading in a classroom will increase awareness of various social and cultural factors at play and create a more sustainable and inclusive teaching and learning agenda.

5 Conclusion

In this synthesis, efforts are made to sketch out the current scholarship in adult L2 simplified Chinese reading and point to potential research directions and pedagogical practices. Through a close analysis of the methodologies, research questions, findings, and research implications of the selected 25 studies conducted between 2009 and 2018, this study proposes that scholars interested in adult L2 Chinese reading expand research on L2 Chinese readers' reading processes embedded in their social and cultural environment and adopt approaches that aim to uncovering readers' voices. In addition, this synthesis suggests that future studies employ more diverse methodologies (e.g., different L2 reading settings, varied data-collection methods for triangulation), attend to different processing levels and various forms of characters/ words/ sentences/ texts, and contribute more empirical evidence in (dis) confirming the existing findings. Knowledge of these findings will benefit teaching practices that take place in classrooms.

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汉语作为第二语言阅读在成人学习者中的研究综述：研究和教学启示

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摘要

本文回顾分析了 2009-2018 年公开发表的 25 篇有关成人学习者阅读简体中文的论文。通过分析，本文建议未来的汉语作为二语阅读的研究可以采用更多样的研究方法，充分考察社会文化因素对成人学习者阅读过程的影响，挖掘他们在真实阅读环境中的声音和视角。此外，加强对不同形式简体中文（如更多样化的文字、词语、句式结构等）的信息处理加工研究，产出更多的实证数据，进一步丰富对于汉语作为二语阅读的认知。

关键词

汉语作为二语阅读，系统综述，研究方法，研究走向，教学启示

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