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L2 Chinese Reading Comprehension among Beginning-Level, K-12 Learners: A Literature Review

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Abstract

This review focuses on beginning-level, K-12, L1 English learners, and considers their reading comprehension of texts written in Chinese characters and literacy development. Instructional approaches, materials design, and teaching and learning strategies related to reading texts in Chinese characters in these settings are reviewed. This review includes both empirical studies and think pieces that appeal to prior empirical work in L2 Chinese reading to understand what Chinese as a Second Language scholars research, discuss, and advocate about reading comprehension for L2 learners mainly at beginning levels of K-12 education. This literature review therefore includes a variety of source materials: empirical research, research-informed advocacy and think pieces, and action research studies by Chinese language instructors. The article concludes with observations about the state of research and current recommendations in Chinese as a second language reading comprehension.

Keywords: Chinese as a second language, Chinese literacy, reading comprehension

Introduction

Chinese remains a less commonly taught language in K-12 schools in the United States (National Council of Less Commonly Taught Languages/NCOLCTL, 2017). As a relatively small and young field within foreign language education, Chinese as a second language (CSL) instruction does not have as extensive a history as the instruction of languages such as Spanish and French, which are more similar to English. CSL researchers and teachers continue to seek effective practices to develop students' L2 Chinese, including their Chinese character reading comprehension. The orthography of Chinese, which lacks obvious phonetic correspondence to oral language, particularly for beginning-level learners, presents quite a different experience than English as a first language/L1. Learners from an L1 English background, who are also new to the vocabulary, syntax, and structure of Chinese language face additional challenges when reading texts written in Chinese characters. Questions about how to introduce students efficiently and effectively to Chinese character texts continue to interest Chinese language teachers and researchers. The field has not yet come to definitive conclusions, but research related to Chinese language and literacy instruction shows some trends and themes which will be seen in this literature review.

The goal of this literature review is to understand how and what scholars in the field of CSL research, discuss, and advocate about CSL text-level reading comprehension for young, beginning-level learners. This literature review therefore necessarily includes a variety of source materials: empirical research, research-informed advocacy and think pieces, and action research studies by Chinese language instructors. The great majority of sources reviewed are published in English and the type of source material is noted throughout this review so that empirical studies

are distinguished from other pieces. CSL literature has many studies of individual Chinese character and word learning (Li, 2020; Zhang & Ke, 2018). Those are not in view in this article. This review also differs from a recent, thorough, historical review of CSL reading by Ke (2020), since that study focused on empirical studies and included studies of CSL reading at all proficiency levels and ages of learners. One qualification for inclusion in the present review is a focus on early stages of L2 Chinese reading comprehension, which I will define as learners developing abilities to make meaning from Chinese character texts beyond word-level recognition (Grabe, 2009). While word and character knowledge has been found relevant to strong reading comprehension, character knowledge alone does not somehow become strong reading comprehension (Grabe, 2009; Ke, 2020; cf. studies mentioned later in this review). Grabe (2009) noted in the preface of his book, *Reading in a Second Language: Moving from Theory to Practice* that during the process of writing of the book, evidence “remained constant -- we only learn to read by reading” (p. v). He reiterated and upgraded that comment later in the volume: “one learns to read by reading (and by reading a lot)” (Grabe, 2009, p. 328). Understanding how young L2 learners begin to read Chinese is an important question in developing classroom practices for students’ reading proficiency.

This review focuses on publications relevant to beginning-level, K-12, L1 English learners, and their text-level, Chinese character reading comprehension. Beginning level for the purposes of this review includes the first year of immersion programs and the first 200-300 hours of foreign language programs. Empirical studies at the university level have found that beginning CSL learners are different from intermediate and advanced learners in reading strategies they use and prefer (Ke & Chan, 2017; Kuo, 2015) and in the specific reading challenges they encounter (Kuo, 2015). University-aged beginners’ morphological awareness of separable words also differed from more advanced Chinese language learners (Shen, 2019) as did their perceptions and preferences about reading aloud as a means of learning (Shen, Zhou, & Gao, 2020). Inferring from those findings, it seems quite possible that K-12 beginning learners could also differ from more advanced K-12 learners, justifying specific attention on beginning K-12 learners in this review. Scholars support a distinction between adults and children in learning to read a new language, sometimes citing “age-related cognitive and affective factors” as well as the fact that children are still developing reading skills in their first language, which may affect their progress in developing L2 reading skills (Lü, 2017, p. 311). Instructional approaches, materials design, and student strategies related to reading in Chinese characters were all of interest. A few studies and think pieces that dealt with early development of Chinese L2 reading were included when they did not necessitate a university classroom as the context and when strong support exists in other literature for many ages of learners, as in the case of Extensive Reading (Grabe, 2009; Zhou & Day, 2020).

This literature review began with a broader topic: L2 Chinese reading development in comparison to L1 Chinese reading development. Searches were conducted through Google Scholar, the database Linguistics and Language Behavior Abstracts (LLBA), and through following up cited works in articles. A very large number of studies with university learners was found. To narrow the scope of this literature review, therefore, those studies that specifically targeted university classrooms and other adult learners of Chinese were generally eliminated. Fewer publications were found directly about reading Chinese as a second language at K-12 levels, and I have sought to be comprehensive in this review, including all publications which I found that fit that category. The age of the sources included varies from the late 1980’s through 2020. From this survey of the literature on L2 Chinese reading development, it appears that some

studies have been replicated, or at least that very similar topics have been investigated following a study. Some older work, however, seems to include strategies or aspects of Chinese reading that were unrepresented by newer studies. Therefore, age of the article was not a primary consideration for inclusion, although recent studies were deliberately sought.

The review is divided into three main sections: themes in the literature, research methods, and conclusion, with subheadings within each section. The next section includes an overview of research methods used to investigate K-12 L2 Chinese reading. I then review findings in research literature and relevant advocacy and think pieces, as well as some action research studies, grouping them around themes which became salient as I reviewed the literature. In the final section, I make observations about what points of consensus have developed and what areas may be addressed by future research studies. Appendix A contains definitions of terms used.

Themes in the Literature

This section of the review synthesizes empirical studies, think pieces, and action research in CSL relevant to beginning-level reading comprehension, primarily centered on young, K-12 learners.

Expectations for literacy development

Several studies referred to the need to match expectations for Chinese literacy to the time available with learners as well as to their developmental level. In reporting on immersion programs in Utah and their results with reading, Kimura and Mikesell (2017) observed weaker results for Chinese literacy than results in a similar French immersion program. Students struggled with comprehension aurally as well as with understanding texts. However, descriptions of the class environment suggested that beginning-level students sometimes understood only a word or two out of an entire story told by the teacher. Since vocabulary, syntactic, and grammatical knowledge was apparently significantly below the students' linguistic ability, it seems reasonable that reading materials were likewise beyond their comprehension.

Shen (2013) summarized main controversies related to L2 Chinese literacy, pointing to related research on those topics. Shen advocated that given the time available, it is unreasonable to expect students to reach 3000-character (8000-word) knowledge in 4 years of a university-level Chinese program. Shen further suggested that the 3000-character level is generally agreed by educators as the level needed "to read and write freely in daily life" (p. 380). As a result, some Chinese teachers may work towards that goal with their students regardless of the actual time required to accumulate that level of reading skill. Based on Shen's assessment, it would seem reasonable to expect that foreign language programs in middle and high school with fewer hours of instruction should expect yet smaller vocabulary sizes. Shen (2018) also more recently restated that Chinese reading comprehension developed more slowly for learners than other L2s.

In a think piece published in 2008, Allen prioritized reading comprehension over the writing of characters by hand. He advocated that students should spend their limited time for Chinese learning on recognizing characters that match up to or surpass their spoken Chinese proficiency. According to Allen, such proficiency in reading characters would permit students to compose texts electronically, greatly reducing the gap that Chinese language learners typically have between their spoken and written Chinese.

In a white paper written to address controversies about what teaching methods were appropriate for young learners in STARTALK programs, Curtain et al. (2016) noted that

STARTALK program literacy goals must be decided based on time available, and adapted to student age, language background, and students' interests. They based their advice on research evidence about the development of Chinese literacy by native and non-native young learners. STARTALK is a US government-sponsored program for less commonly taught languages, including teacher training and student summer programs (STARTALK, 2019). As such, STARTALK programs have an influence on teaching practices in K-12 Chinese education across the US.

In their advocacy piece that drew upon research literature, Everson, Chang, and Ross (2016) noted that goals for a CSL program with young learners need to align with "continuity of learning and time on task" so that reasonable outcomes for students can be determined and achieved (p. 4). They considered it necessary to recognize the differences between learning Chinese as a first and as a second language to avoid judging L2 children's outcomes with children in L1 Chinese schooling, as that would be "both unfair and unrealistic" (Everson et al., 2016, p. 4).

These studies and think pieces revealed that Chinese language programs may not yet have developed consistency in their expectations for new learners' reading comprehension. Additionally, CSL programs may need to give more consideration to the instructional approaches and materials used with young L2 Chinese learners for reading. Chinese language teachers may need more developmentally appropriate expectations about their students' reading comprehension and the goals chosen for their courses, given the time in class.

Character and word knowledge as related to text-level reading comprehension

Scholars acknowledge that word-level recognition is a critical element in text-level reading comprehension (Grabe, 2009), and some CSL studies have investigated both character- and word-level recognition as well as text comprehension. Francis (2010) noted that while character- and word-level studies have an important contribution, studies of text comprehension must also be pursued to understand Chinese reading. However, in CSL research, many studies are specific to radical and component knowledge without a text-level reading comprehension context. Everson (2011) noted the prevalence of an emphasis towards character and word recognition, even in studies that have included text-level reading, since "many of the findings center on the character or word" (p. 253). Studies may be better able to help us understand Chinese literacy holistically when both factors are investigated. Character and word recognition must not be treated as if they are the equivalent of, or more important than, whole text comprehension.

Curtain et al. (2016) related character/word recognition in its advocacy piece about young CSL learners and developing their reading comprehension. They reported that "successful higher-level reading depends on quick and accurate lower-level processing" because of cognitive limits on how much the brain can retain at a time (2016, p. 9). Studies surveyed by Grabe (2009) found likewise. This finding suggests that if a reader needs to work hard to recognize characters, they will have less mental processing ability remaining for higher-level aspects of reading, such as interpreting the whole meaning. Zhou and McBride-Chang (2015) likewise observed that "vocabulary knowledge was a key correlate of Chinese word reading" (p. 10).

In advocating for instructional approaches in Chinese programs for young learners, Everson et al. (2016) suggested that handwriting characters, including learning strokes and stroke order, "makes it easier to learn characters" and time spent on these tasks are "investments" in literacy development, including text-level reading comprehension (p. 3). Likewise, they viewed

learners' reading comprehension to benefit when learners studied radicals and components of characters, stating that such learning makes them easier to recall, recognize, and estimate meaning and sometimes pronunciation when an unfamiliar character is encountered during reading (Everson et al., 2016). They were less concerned about which script (simplified or traditional) was introduced at early levels, because they expected for "an experienced learner" who first studied one form of characters, learning the other script "will not be difficult" (Everson et al., 2016, p. 3).

Shum, Ki, and Leong (2014) studied 13- and 14-year-old learners of Chinese, mainly from Hindi and Urdu language backgrounds, in Hong Kong. Through their multipart study, they concluded that students need to know both "the structure and function of Chinese characters and words," but that knowledge is "not sufficient for Chinese text comprehension" (p. 168). They suggested that their results support previous research showing word-level identification is important in reading comprehension, but also that reading in context is critical to developing text comprehension. Citing Wang and Leland (2011), they likewise found that studying "characters and words in isolation facilitates their identification, while learning them in context enhances the comprehension of meaning" (Shum et al., 2014, p. 170). They also found that different proficiency levels of learners seemed to have different most significant factors for text comprehension. Learners at a more beginning level had comprehension correlated more to their scores of verbal span working memory while more advanced L2 Chinese learners' scores of word identification were more closely linked (p. 166).

Wong (2017) studied the reading comprehension, listening comprehension, and word-level decoding skills of learners of Chinese in Hong Kong. Wong found "statistically significant and unique contributions of character reading and listening comprehension to reading comprehension" (p. 969). Character recognition had a greater explanatory effect than did listening comprehension. They suggested caution about that finding, though: they lacked an oral vocabulary component of the listening test, which they considered more closely related to "lower level decoding skills" (p. 980), since their listening comprehension test included context beyond word level. They found a reciprocal relationship between character and word recognition and reading comprehension, each linked to the other skill, leading to their recommendation that "in addition to initial character knowledge, a substantial amount of reading" was necessary to develop both skills in character recognition and reading comprehension (p. 981). They also noted that these learners were required to develop listening and reading skills simultaneously, perhaps leading to a more "interwoven development" as a result (p. 981).

Knell and West (2017) advocated a combined approach to literacy instruction. While they noted that characters always must be taught and shown as linked to sound and meaning, Knell and West (2017) found that the more important factor in having students learn to hand-write Chinese characters may not be when to begin, but how. The experience that students had in writing characters by hand mattered more, they found, than exactly when students began hand-writing characters. They recommended that teachers need to know how to adapt character handwriting instruction to different school settings and student populations. They found that "introducing two to four characters per lesson, from the beginning of instruction, and allowing regular, sufficient, and varied reading and writing practice offer an effective and age-appropriate approach to integrating oral and written language for middle school learners" (2017, p. 528). They therefore encouraged some focus on single characters, but also multiple opportunities to encounter those characters in reading materials.

Nearly all publications attributed strong links between character and word recognition to reading comprehension, with one noteworthy exception: DeCourcy (2002) noted that immersion students of L2 Chinese frequently reported that they could read text aloud but not understand its meaning. The students also reported understanding words in isolation but being unable to piece together whole text meaning. DeCourcy (2002) went on to report that even one or two significant words could determine their lack of comprehension of the whole sentence, preventing them from completing cloze exercises. Nonetheless, the students mainly sought to understand texts by “looking for key vocabulary” (p. 116). The “strategies of ‘imagery’ and ‘visualisation’ were used very frequently by the learners of Chinese” (p. 117). Since this study was conducted in the same immersion program in which students reported very low aural comprehension at times, further understanding of that classroom situation may help clarify its difference from other studies that showed strong links between word and text comprehension. Findings about the relevance of listening comprehension to reading comprehension, as in Wong (2017), may also be useful in understanding the relationship between aural language development and written text comprehension.

Studies that investigated both character and word recognition and reading comprehension have found that without relatively effortless word-level recognition, whole text comprehension will also be compromised. Many publications therefore recommend attending to both aspects of literacy in Chinese as a second language.

Aural/oral language and Chinese reading ability

Chinese characters generally lack clear phonetic markers that aid beginning-level, L2 Chinese readers, yet studies have revealed there are possible relationships between aural and oral knowledge and successful text-level reading comprehension. Some controversy in the field relates to how L2 Chinese learners may rely on phonology as a path to semantic understanding of Chinese characters and/or character texts, or if they bypass phonology with a direct path to meaning (Francis, 2010). This latter position would suggest something unique about Chinese reading, since studies of reading with more phonetically written languages have so far shown learners’ path to comprehension is dependent on phonology.

Another issue in empirical research and think pieces is how oral language and written character text comprehension may relate to each other. Zhao and Poole (2017) noted that oral knowledge of Chinese does not map easily to its written forms; that is, oral language may therefore have little aid for learners when they encounter written texts. However, Shum, Ki, and Leong (2014) found empirical evidence that the contextualized listening comprehension of young teenage learners of Chinese in Hong Kong (as well as character and word recognition) had a predictive effect on reading comprehension. Curtain et al. (2016), in their research-informed list of recommendations for Chinese language STARTALK programs, included “Literacy development for Chinese L2 learners is dependent on and integrated with rich and meaningful oral language experiences. Oral language development is enhanced by meaningful connections with written language” (2016, p. 2). Perhaps the apparent contrast in these comments are because the authors were writing about two different things: for Zhao and Poole (2017), they were considering the reading processes of learners, but for Curtain et al. (2016), they were writing about effective instructional practices for teachers. These differences of belief and practice about the relationship of aural/oral language and reading seem to be a factor addressed in the CELIN brief written for early language programs by Everson, Chang, and Ross (2016). They encouraged a strong foundation of oral language as the basis for reading and writing, and integration of

reading and handwriting with communicative purposes and tasks. A consensus of scholarship is that reading Chinese character texts should be done in a larger context of communicative language instruction, relating spoken and written language to each other (Everson et al., 2016; Shen, 2014).

The degree to which Chinese language classrooms at K-12 levels use practices that connect aural/oral language and reading suggests that such recommendations may not always be followed. In more traditional Chinese instructional approaches such as that described by Bell (1995), a whole language experience was not an especially strong consideration in teaching Chinese literacy, and extensive hand-writing practice was viewed as the starting point which may lead to later reading ability. Lo-Philip (2014) likewise found in classroom observations that classroom literacy work involved recitation and drills more than communicative contexts. Yue (2019) also found in her case study of a grade five Chinese classroom in the US that the teacher less often used reading in context or connected extended discourse to activities to learn reading and writing in Chinese.

So far, CSL studies have shown that learners may be using both phonology and appearance to draw out meaning from characters in reading, though the exact relationship and processes are still under investigation. In terms of teaching practices, CSL researchers and advocates have encouraged reading and literacy work in connection with aural and oral language, but whether those practices are prevalent in CSL K-12 classrooms remains unclear. Some empirical evidence has shown that reading may be taught without much of a communicative context.

Implicit and explicit learning

Many studies mentioned approaches to reading comprehension and word recognition that could be categorized as implicit or explicit. Research on implicit and explicit language learning includes the idea that the level of attention to forms or meaning are an aspect of distinguishing these types of learning (Jin, 2018). Therefore, an approach that emphasizes more whole text reading and typing may be considered somewhat more implicit, while an approach that emphasizes handwriting characters and analyzing character forms may be considered more explicit learning. Allen (2008) advocated for less handwriting and more computer-based compositional writing, but he also wondered if characters would be retained more through reading and typing than by handwriting. Allen recommended longitudinal studies to test this premise. He believed that prior to extensive handwriting of characters, students first need strong capabilities in listening and speaking, including accuracy in distinguishing and producing “syllables and tones,” and strong abilities in “reading and writing electronically” through extensive experience (p. 247).

In their empirical study in a preschool-aged Chinese language classroom, Chang and Watson (1988) asserted that an “overemphasis on the use of graphic cues in reading instruction causes children to use far more visual information than would be necessary if the same information were embedded in an instructional unit based on whole, natural language” (p. 37). They appeared to be calling for more implicit, meaning-focused reading, based on their findings with young learners of Chinese, countering prevalent instructional practices which emphasize individual character and word recognition.

By contrast, however, Zhao and Poole (2017) advocated for more explicit instruction within at least a certain context. They argued that words should be pre-taught directly before reading text that included them. Apparently in their study, many words in reading texts were not

familiar at all aurally or visually, and they believed explicit vocabulary work prior to encountering them in context was preferable. Explicit vocabulary instruction was therefore followed by contextualized exposure to the words, which is yet a difference from traditional, word-only activities. Shen (2014) noted that isolated word recognition exercises mean vocabulary is “isolated from a meaningful communicative setting, which not only increases learning difficulty, but also dampens learners’ enthusiasm toward learning” (p. 282). Zhao and Poole (2017) described their approach as aimed at increasing students’ reading comprehension. They followed explicit vocabulary instruction with more contextualized reading, suggesting that they valued comprehension of whole texts as an end goal of any explicit instructional strategies.

Yu and Pine (2006) studied preschool L1 Chinese reading approaches based on Western early reading strategies, which have not yet been widely used in China. These approaches included some implicit work with meaning in focus, and some explicit work noticing characters, but without extensive study. Their study found that the teachers’ varied vocabulary use, discourse and questions about picture books, modeling reading, and encouraging imagination and thinking about ideas resulted in greater interest in books and reading by the children. Perhaps such methods have applications in L2 Chinese classrooms, especially to those with students not yet literate in L1 English. Willis’ (2018) study of teacher beliefs about literacy instruction noted that teachers in the US could and do sometimes adopt new approaches when they see students in need of something different from traditional practices.

This review of the literature found that both implicit and explicit teaching approaches were advocated for CSL reading. While researchers did not find fault with explicit teaching approaches as such, they also advocated for more implicit approaches. They also encouraged educators to find developmentally appropriate ways to work with learners to develop Chinese literacy.

L1 English transfer to Chinese character reading

Research findings related to L1 English reading transfer to L2 Chinese reading have suggested some beneficial transfer, though perhaps not much beyond general reading skills. Kimura and Mikesell (2017) noted that research on emerging bilingual children in Chinese immersion programs indicated beneficial transfer to and from each language, showing that the languages offered mutual support to the learner. They believed that some general reading abilities probably applied to reading in both languages and noted that children were able to discern the differences in how written English and Chinese worked without much explicit instruction about them. They suggested that this transfer of reading abilities might be better harnessed for literacy development, but that if so, the topic required further exploration. In addition, they believed that students benefit when family members and teachers model acceptance of both languages and literacies, even if those adults do not know or read both languages themselves.

Zhou and McBride-Chang (2015) compared native and non-native children in a dual-immersion school (Mandarin and English). They found that children who were learning Chinese as a new language had “a significant lag” in developing Chinese reading ability (p. 10). They found several factors were related to reading skills in Chinese as a foreign language, including “Chinese vocabulary knowledge as a foundation, phonological awareness skills, especially at the lexical tone level, and both pure visual and orthographic skills of Chinese” (p. 10).

These studies have suggested that L1 English learners face challenges in developing L2 Chinese reading ability, some of which heritage Chinese learners and those from other East

Asian language backgrounds have less difficulty overcoming. In developing reading skills, students who are already strong readers in English and those who have positive support from adults may benefit as they develop their Chinese reading.

Pinyin and character reading

The use of pinyin, either exclusively for a period of time prior to introducing characters, or as a concurrent aid with character texts, has been a controversial point in the literature. Lü (2017) spoke of potential benefits for pinyin use in bilingual children's literacy development:

1. Pinyin is a useful tool for children to retrieve and connect the phonetic, semantic, and visual information that is necessary for character recognition and reading comprehension;
2. children can utilize Pinyin to build up or strengthen such relationships incidentally;
3. Pinyin skills and Chinese phonological awareness may be mutually facilitative; and
4. the experience of learning Pinyin promotes Chinese literacy learning longitudinally; but
5. the facilitative effect of Pinyin on learning is sensitive to the conceptual difficulty of annotated words, annotation format, and children's overall literacy skills (p. 310).

However, Lü also noted that this study of pinyin ability with bilingual children did not establish causality between pinyin reading and later character reading abilities, since Lü did not employ an experimental research design (2017). Other scholars found no correlation between pinyin knowledge and character reading ability. Castro (2014) reported that pinyin reading ability and character recognition held no apparent correlation. Likewise, Lü concluded that pinyin skills “neither help nor hinder the acquisition of the orthographic form of new vocabulary in L2 Chinese” (2014, p. ii).

When to teach pinyin in elementary school Chinese programs has been “controversial” (Everson, et al., 2016, p. 3). Yue (2017) interviewed nine K-12 CSL teachers, asking about how they taught pinyin, characters, and reading. Teachers in her study had a variety of approaches, some teaching pinyin first and others characters first; one teacher did not directly teach pinyin explicitly at all. “Increasingly” programs in the US delay pinyin instruction until later in an elementary immersion program, first teaching oral language and high frequency characters (Everson et al, 2016, p. 3). Nonetheless, some scholars have recommended using pinyin or one or more ways while students are still acquiring recognition of characters encountered in texts. Curtain et al. (2016) recommended using texts with a mix of pinyin and characters, thereby increasing a student's comprehension of reading material and reducing frustration. They suggested that English reading skills will transfer to pinyin reading, but not so much to character reading. Likewise, Lee and Kalyuga (2011) found that pinyin above character texts (with English meaning below) was an aid to comprehension, but side-by-side presentation of pinyin and characters with English meaning split readers' attention too much to attend well to meaning. They noted that reading materials were often designed without theoretical or research study investigations of what worked best for L2 learners. They drew on cognitive load theory to suggest materials design that would minimally impact cognitive resources available for comprehension. However, their study sought overall text comprehension without differentiating how students derived that meaning (from pinyin annotations or from characters). If character reading comprehension is the goal, therefore, their findings have less relevance.

In conclusion, in CSL, scholars have recommended the use of pinyin as a way to increase the accessibility of written Chinese materials, particularly for L1 English learners. Pinyin can help learners connect aural language to a written form and can aid in preparation for character

literacy. Reading in Chinese characters alone, however, is a different skill and must be developed in addition to any pinyin reading skills.

Materials design

Several studies gave specific recommendations about design of reading materials. Chang and Watson (1988) encouraged the use of predictable texts created by the teacher, based on background knowledge students have rather than introducing unfamiliar topics in reading texts. After reading, students were invited to add to and change the reading in creative ways. Other scholars agreed with the idea of adapted texts, as stated by Curtain et al. (2016). They advocated that teachers can adapt and modify reading materials to their students' needs for comprehension, their ages, and language proficiency levels as needed.

How, or if, to combine pinyin and characters in texts for learners was a topic discussed in the research. Lü (2017) made an indirect call for more nonnative, school-age appropriate reading materials with pinyin above characters, noting that L1 Chinese children were able to draw upon pinyin for unknown characters without being distracted from character reading. However, Lü noted that studies with L2 readers needed to be done on this point. Given the note from Everson et al. (2016) about the need to recognize differences between L1 and L2 Chinese readers, Lü's call for studies with L2 readers identifies an area for further research. L2 readers of Chinese cannot be assumed to experience texts that show characters and pinyin together in the same way as Chinese children who have a very different language background and environment.

Chinese character texts do not include spaces between words, but some studies have explored possible effects of adding interword spacing for beginning readers. Shen et al. (2012) conducted a study to determine whether adding spaces would benefit beginning students. For those learners, students' word recognition and text comprehension both improved when Chinese character texts included spaces between words (Shen et al., 2012). The researchers used eye-tracking equipment to check for reading speeds per sentence, how long, and where their eyes were focused. Their results led them to report that "word spacing manipulation is a helpful tool in learning to read Chinese as a second language" (p. 196).

In all of the studies considered, the researchers found that modifying texts for use with beginning learners was beneficial to their reading, whether those modifications were in the content or the physical layout of text on the page. Typical textbook formats for the presentation of reading materials were not found to be models for reading materials.

Student beliefs and attitudes

Several researchers stated that student interest and enjoyment should be part of literacy activities and planning by teachers (Chang & Watson, 1988; Curtain et al., 2016; Everson, 1994). Two scholars made additional recommendations towards that end. Lo-Philip (2011), in speaking of native Chinese teachers, said that they should understand and talk with students about the literacy practices they experienced in their first language. This dialogue was important in helping teachers to find literacy practices that learners will find "comfortable and acceptable" in their L2 Chinese literacy as well (p. 249). She warned that neglected to consider students' experiences and perspectives "may result in demotivation and loss of interest" in gaining Chinese reading skills (p. 249). Shen (2014) noted that critical pedagogy principles, such as learners' self-reflection on learning strategies and metalinguistic awareness, would be beneficial to incorporate into Chinese programs. Perhaps following this line of thinking, Shen and Xu (2015) tested and surveyed first-year Chinese language students' responses to more active and collaborative ways

of being introduced to and working with new vocabulary in context. Students reported positive learning gains from several of the tested strategies, including character networks (forming associations between words), team-based tasks, and problem-solving.

These findings suggest that student motivation may be linked to teaching practices, and that teachers may increase their effectiveness by asking about their students' experiences with Chinese reading.

Teaching approaches

The literature reviewed on teaching approaches for Chinese reading comprehension included a wide range of subtopics. Some studies suggested that Chinese reading instructional approaches shared many features in common with English reading instruction; other studies found that Chinese reading is distinct and ought not to be attempted in ways similar to English literacy practices. The literature reviewed included a number of classroom reading activities, and some studies of Extensive Reading were found. Lastly, teaching approaches that involved a delay to character reading, character handwriting, or both were located. These studies are reviewed in detail in the next section.

Chinese literacy instructional practices that shared similarities with English literacy instruction. Chang and Watson conducted a longitudinal study of L2 Chinese young learners. They observed that “whether or not different writing systems call for the use of different reading instruction is an important issue” (1988, p. 39). The teacher used predictable, teacher-created texts modeled off of English emerging reader texts. These texts were used in many ways. Teacher-guided, prediction-developing strategies such as pre-teaching the content of reading, repeated reading aloud to the students, and dialogic reading with the students were part of the students' encounters with reading materials. They concluded that only a few adjustments to strategies borrowed from emerging English literacy approaches were required. They argued that this was because in both Chinese and English, “prediction of meaning from on-the-page and off-the-page context of classroom instruction and text on the pages” is generally achievable in classroom settings where teachers are attending to learners' first steps to read Chinese character texts (p. 43). They additionally argued that teachers could therefore use “prediction strategies and predictable materials” based on aural/oral language used in the classroom (p. 43). They claimed that reading involved many aspects all working together at the same time, including phonetic and visual elements and contextual elements such as “meaning and syntax” (p. 43). Therefore, they concluded that in the reading of any language, irrespective of the orthography, “rhyme, repetition, rhythm, and recognition of unique relationships within a complete text” aid the reader and can be harnessed in reading instruction (1988, p. 43).

Everson (1994) likewise suggested that building on learners' L1 English reading skills could inform teaching practices for Chinese reading. He gave counterexamples about what practices teachers ought to avoid: difficult texts made students resort to intensive glossary work and “slow and laborious decoding” that means they “never begin to read in a rapid manner” (p. 6). Everson went on to state that an over-emphasis on character memorization may mean neglect of teaching students to read extended texts efficiently, or to enjoy the process. He therefore recommended pinyin reading and “firm grounding in the spoken language via romanization” before reading character texts (1994, p. 7). Additional recommendations included giving more time spent on reading, including strategies such as re-reading, recycling prior vocabulary in new texts, and to encourage timed reading to encourage speed rather than labored character decoding.

Lastly, Everson considered the inclusion of familiar topics an important aspect of reading material so that students' background knowledge aids comprehension.

Chinese literacy instructional practices as distinct from English literacy instruction. Some studies of Chinese reading found that traditional approaches such as an early and strong emphasis on character handwriting was important for L2 Chinese literacy as well. Bell's (1995) study of L2 Chinese literacy suggested that Chinese literacy should be deeply rooted in L1 Chinese traditions in order to be authentic for L2 learners. These practices include a heavy emphasis on the aesthetics of character handwriting and little to no contextualized encounters with those characters in words or longer texts. Lo-Philip (2014) noted that literacy practices are "multimodal" in her study of a Chinese immersion school using predominately traditional approaches (p. 238). She stated that interaction with the teacher and other learners, rather than solely cognitive or linguistic factors, should be considered in studies of Chinese literacy. She observed that teachers used repeated handwriting and oral repetition of new vocabulary as well as explicit instruction about radicals within characters. Teachers also used choral reading aloud of texts with immediate error correction for pronunciation. She attributes these practices in part to Confucian educational practices that have a history of more than 2000 years. Furthermore, she found that teachers did not question such traditional methods. These sociocultural aspects of teaching Chinese literacy were important to understand along with materials used, she found, because they help to contextualize practices and balance instructional designs. However, the position that exclusively traditional Chinese approaches to literacy should be used with beginning L2 learners was in the minority in the literature found. Scholars more typically sought either to adapt L1 reading approaches and sometimes suggested that L2 Chinese reading may take a quite different path from L1 Chinese reading development. For example, Shen (2014) suggests that students should be permitted to read and write in a combination of characters and pinyin as their Chinese develops, and that their handwritten knowledge of characters does not need to be linked closely to their reading comprehension.

Classroom reading activities. Reading activities during class included many different options. Zhao and Poole (2017) recommended a variety of pre-reading, whole-class reading, and post-reading activities to make text reading more engaging and accessible, such as sentence prompts, giving background knowledge, prediction questions, and having peers read aloud together. They suggested unscrambling sentences as a way to encourage sentence-level comprehension, and recommended showing words in context, not in a list. They also recommended more time for Chinese literacy development than for L2 languages that share an alphabet with English. Reading aloud chorally and repeated reading were seen as beneficial for early readers by Shen and Jiang (2013). Zhao and Poole (2017), however, recommended graded readers instead of the repeated reading of short texts. Graded readers, they said, provide multiple exposures to vocabulary and sentence structure while being less tedious for learners than repeated reading.

Yu and Pine (2006) studied the effects of training preschool teachers in emerging literacy strategies to use with Chinese preschoolers. They found that encouraging children towards active engagement "with interesting, meaningful, and functional written language" was critical to their progress (p. 13). By posting characters in the classroom environment and making printed characters visually and regularly available, they found that young children seemed "to activate the children to explore the function and meaning of print and the relationship between written language and their here-and-now activities" (2006, p. 13). They found, therefore, that changing

teachers' instructional practices led to more student engagement and interest in Chinese text. Everson et al. (2016) similarly suggested that a print-rich classroom environment was beneficial. They recommended that teachers display written Chinese and that schools devote classroom space for Chinese learning so that walls can be used for such decorations (Everson et al., 2016).

Neubauer (2018) described a reading approach called Cold Character Reading (Waltz, 2015). In that call for attention in research on newer reading practices, the author described the general sequence of instruction and anecdotal evidence so far of results from the practices. Cold Character Reading first seeks to develop strong aural comprehension for all words that appear in an upcoming reading text. That aural instruction is followed by choral reading of carefully-designed texts that include somewhat unpredictable, yet repeated exposure to newly-seen Chinese characters. Based on anecdotal accounts, students draw upon their sense of the aural language to aid in whole text reading, with individual Chinese character recognition developing over time through that process and additional, independent reading. However, at present no empirical studies specifically about Cold Character Reading in Chinese classrooms have yet been published.

Considered together, these surveys of reading activities seen in Chinese language classes all included benefits from fostering connections between aural language and social, teacher-supported processes for reading Chinese character texts aloud with learners.

Extensive Reading. Two studies related directly to Extensive Reading (ER) among beginning Chinese learners. Extensive Reading is when learners read many books at a very high comprehension level, developing fluency and building vocabulary in the process (Grabe, 2009). Research on ER has been shown beneficial for many ages of learners in both L1 and L2 (Grabe, 2009). First, Zhang, and Koda (2011) noted that for heritage learners of Chinese, home literacy activities such as ER required a threshold in order to produce word knowledge gains. That is, free reading materials that were read only once or twice per month had no impact on children's vocabulary.

Online ER materials by Shen and Tsai (2010) included access to pinyin and bilingual dictionary support for character texts. Learners from around the world were able to access the library, since it was online and free. Their program included reading comprehension questions after each reading. They suggested that teachers need to guide students about use of an ER library and to model reading strategies, partly to ensure that students read texts with "only about 1% unfamiliar characters" (p. 44) so that the program would encourage vocabulary gains and reading fluency.

Two studies relate to ER with quite different types of learners yet finding similar positive outcomes for vocabulary acquisition through reading extensively. A study by Shu, Anderson, and Zhang (1995) looked at word learning through reading among US, L1 English children and China, L1 Chinese children. Among their findings relevant to some degree here, they found that Chinese children who read more at home were able to pick up more new vocabulary from even one exposure in a Chinese character text, as were the American children. Their findings held for students of all ability levels. However, they pointed out that ER is not a considerable part of the Chinese education the children were likely to receive, and instructional time is more often given to explicit vocabulary instruction. Although they (like Zhang & Koda, 2011) found that ER takes time to show benefits, the cumulative effects are potentially very great. Additional studies of ER outcomes and classroom practices could benefit K-12 CSL programs and teacher education. The

ways in which these findings might relate to younger, L2 learners at beginning levels is yet to be studied, as far as this review has found.

These studies have shown that ER in Chinese language programs can be conducted in accord with ER practices for other languages. Ample opportunities to see known words and minimizing the percentage of unfamiliar characters that learners will encounter are part of the process of using ER in Chinese language instruction. How CSL teachers and learners in K-12 enact ER in classroom settings has not yet been explored in empirical studies found in this review.

Delaying character reading and/or handwriting. Two studies included in this review directly considered whether or not to delay the introduction of characters to learners, or if pinyin reading should precede character reading for a time. Knell and West (2017) found no benefit to delaying characters in oral language development, in reading comprehension in characters, nor in student-reported affective responses at the end of the year. Ye (2013) considered student goals and circumstances as a deciding factor. However, Ye expected a delay of character introduction was probably preferable at least with younger learners, who the researcher expected might acquire new orthographies differently from college-level students of Chinese.

Allen (2008) also called for a delay in character handwriting in CSL generally, though did not necessarily call for a delay in reading characters. He recommended using typing as an instructional activity very early, in which students type familiar sentences. Allen's rationale was that hand-writing Chinese characters is very time-consuming and would necessarily take up even more time if conducted before students have the "linguistic frame onto which to attach the rote memory" (2008, p. 237). Early stages of Chinese learning therefore should not heavily involve character handwriting practice, he asserted. In a similar way, the advocacy pieces by Everson et al. (2016) and by Curtain et al. recommended that handwriting be incorporated as only one part of literacy training for motivational reasons as well as linguistic ones. According to Curtain et al., "CFL learners who have developed some degree of syntactic awareness are better at reading and understanding texts" (Curtain et al., 2016, p. 5). They also recommended including handwriting as one approach to learning characters, but not the only means used.

The questions of whether to delay character reading and character handwriting has mainly taken place with university-level students (Packard, 1990), and so far, one study with middle school students has suggested no significant gains from delaying either character reading or handwriting. Further research with K-12 learners of Chinese and when and how to introduce character reading and handwriting will help to address on-going questions on this topic.

Research Methods

In this section, a review of empirical studies and the methods used to understand and investigate CSL reading comprehension are discussed. Quantitative and qualitative approaches both were common, and a few studies took a mixed methods approach.

Quantitative observational and quasi-experimental designs

Several studies featured quasi-experimental design to correlate teaching strategies with student outcomes. Knell and West (2017) conducted a quasi-experimental study which compared two groups of middle-school Chinese as a Foreign Language learners, one with delayed introduction of characters and one without delay. Other variables were controlled by conducting the study with same teacher and materials for all students. Lee and Kalyuga (2011) conducted

experimental comparisons of various pinyin placements compared to characters and assessed novice L2 Chinese learners' comprehension and short-term retention. Shen et al. (2012) compared various types of word and non-word spacing to help determine how adding spaces between words might be an aid to beginning learners. They used eye-tracking equipment to measure the time required for reading texts, and used equipment that recorded their eye focus while reading to determine the length learners spent on different aspects of the text.

Some studies used quantitative methods to investigate and observe different aspects of reading comprehension in young learners. Using modified versions of tests used in other studies, Shum, Ki, and Leong (2014) investigated two groups of Hong Kong-dwelling, non-native teenagers' Chinese reading comprehension from many angles, comparing them to native Chinese peers. They used multi-part quantitative analysis of tests of various aspects of cognitive processing (working memory, nonverbal general ability) and factors believed relevant to reading comprehension (word recognition without and within sentence contexts, sentence grammaticality choice) and self-evaluation by learners of their time in Hong Kong and motivations and beliefs related to learning Chinese (Shum, Ki, and Leong, 2014). Multiple regression led them to conclude which factors more significantly affected learners' reading comprehension. Another Hong Kong-based study of young CSL learners was conducted by Wong (2017). Participants were students in grades 4 and 5 who learned Cantonese but had a variety of Indo-European home languages. Tests of listening comprehension, character recognition, and reading comprehension were given to the same students in grades 4 and 5. These components were chosen based on the Simple View of Reading, a theoretical explanation which considers reading comprehension to be explained by two components: aural/oral language knowledge and word-level decoding skills (Gough & Tunmer, 1986; cf. Wong, 2017, p. 970). Wong's (2017) quantitative data was analyzed using regression and path analysis around those factors.

Quantitative studies of K-12 CSL reading comprehension were not numerous, with some quasi-experimental designs to understand how instructional practices and text features might affect learners. Other studies used quantitative analysis to investigate components of reading comprehension.

Longitudinal studies

A few longitudinal studies relevant to CSL reading comprehension have been done. Chang and Watson (1988) spent more than a year of observation of young L2 Chinese learners and literacy practices, including in-depth notes on instructional approaches used. A year-long qualitative study with a sociocultural framework was conducted by Lo-Philip (2014) in a one-way immersion school on the West coast of the US. She used an embedded ethnography approach. She was a school volunteer for a year prior to the study, and during the study year, Lo-Philip continued as a volunteer, observing many classes. She also audio or video recorded each class when she observed. Zhou and McBride-Chang (2015) compared groups of native and non-native children in a dual-immersion school that taught in Mandarin and English, noting formative and summative reading outcomes among learners. Knell and West (2017) based their year-long study with 7th and 8th grade CSL learners on the research design Packard (1990) used with beginning-level, university learners in a study of delayed and non-delayed introduction of Chinese characters. Wong (2017) also had some longitudinal aspects in its design by testing reading comprehension across two consecutive school years.

These longitudinal studies are able to take into account longer-term outcomes in Chinese reading, but it can be seen from the list of studies that longitudinal designs vary considerably,

with qualitative designs used to understand patterns of classroom behaviors and learners' experiences over time. Quantitative studies that incorporated longitudinal data did so to compare progress and outcomes for learners.

Interviews and think-aloud protocols

Several studies included interviews and think-aloud protocols with Chinese language learners. DeCourcy (2002) used think-aloud protocols to investigate the Chinese reading comprehension strategies young learners used to cope with highly incomprehensible texts they encountered in immersion classes. Knell and West (2017) study of delayed or immediate character introduction involved oral interviews in Chinese as proficiency check at the end of the first semester and then the end of the year-long study. These studies reveal some of the ways in which learners navigate their own Chinese reading through strategies to comprehend texts, and some students' attitudes about their experiences with Chinese reading.

One study in this review included interviews about CSL literacy from teachers. Five K-12 CSL who were raised in China and now teach in the US were interviewed and observed in their classrooms in a dissertation study by Willis (2018). She found that the teachers' educational and cultural background influenced their approach to literacy instruction, generally preferring bottom-up skills work such as character memory work and handwriting. The teachers also modified that instruction based on the apparent needs of the learners, and also used student-centered and top-down reading strategies. Willis (2018) noted that teacher training and CSL research would benefit from giving attention to the backgrounds of CSL teachers in research and teacher development.

Questionnaire surveys

In this review, only two studies included a questionnaire, each designed to survey students of Chinese. In addition to the previously mentioned elements of their research design, Knell and West (2017) also used an 11-item questionnaire with a Likert scale, asking for student attitudes about character reading, writing, and the timing of their introduction of characters. Lee and Kalyuga (2011) used a questionnaire about learners' perceived cognitive load during their study of words with pinyin and characters shown in different configurations. These questionnaires were aimed at being able to compare different approaches to instruction based on the students' own perceptions.

Criticism of research methods

Research in CSL generally, including research into L2 Chinese reading, has not been without criticism. Jiang and Cohen (2012) called for more rigorous design in studies of Chinese language learning and Chinese reading. They critiqued the research methods used in studies, particularly the use of self-reporting questionnaires of learners, and the ways in which case studies were designed and reported. These researchers believed that findings from some of the studies listed in this review, as well as other studies with university-level learners, could be called into question because of weaknesses at this level. Ke (2018) expressed similar concerns about research design and validity of findings, calling for more rigorous attention to data collection and statistical analysis. Ke also called for more studies from a socio-cultural framework, which would enrich our understanding of how students' identities and learning environments relate to their Chinese learning.

Several studies of reading comprehension incorporated character or word recognition as part of the overall design (Lo-Philip, 2014; Lü, 2017; Zhang & Koda, 2011; Zhang & Yang, 2016), but they did not necessarily indicate how they found character or word recognition relates to the comprehension of whole texts, if at all. On that point, Francis (2010) suggested that single character or word recognition is a distinct skill from comprehending whole texts. While he was not overly critical of single character/word recognition studies, he noted that “studies of reading that require subjects to decode connected text should complement single-character/word-in-isolation studies in all respects” (p. 698). He suggested more work needs to be done to see if the role of phonological and orthographic elements at the word/character-level role remain the same at the level of text reading.

Discussion and Directions for Further Research

This review of CSL reading comprehension and K-12 learners has revealed that current research and advocacy and think pieces on K-12 Chinese language reading comprehension is a relatively small subfield within CSL. This review has shown that areas of interest among scholars have nonetheless been fairly wide-ranging, including studies with qualitative and quantitative designs investigating many aspects of CSL reading comprehension among young learners. Studies have looked at reading comprehension and its relationship to listening comprehension, and character and word recognition, some classroom practices, and students’ and teachers’ beliefs and practices related to reading comprehension. Areas for future research are many. In addition to building on the topics and research designs represented by the empirical studies reviewed here, some new areas for future investigation seem worth attention.

An area for future research is Chinese language teacher education and the issues of reading comprehension and literacy instruction. We know little empirically about what K-12 CSL teachers’ believe, practice, and how they are trained in reading comprehension theory and instruction. Some studies have investigated beliefs about Chinese character instruction and reading through case studies, suggesting that CSL teachers may find reading comprehension instruction challenging (Yue, 2017, 2019). Broader-scale surveys of K-12 CSL teachers may allow us to understand how typical or prevalent those experiences may be. Qualitative and quantitative research studies can complement our understanding of the depth and breadth of CSL teachers’ beliefs and practices related to reading comprehension. Studies of how Chinese language teachers take up new beliefs and practices related to developing beginners’ reading Chinese character texts would be useful. Though research and advocacy found in this review recommends communicative practices and reading embedded in meaningful communication and contexts, some evidence from classrooms suggests there are challenges to carrying out those practices (De Courcy, 2002; Yue, 2019). To what degree are research-informed practices enacted in Chinese classrooms when it comes to beginning CSL reading? How do Chinese teachers decide to make and carry out changes if traditional instruction differs from empirically grounded recommendations (Wong, 2017)? More connections between university researchers, teacher educators, and K-12 teachers would be helpful in finding answers to such questions.

Future studies can continue to deepen our understanding of effective practices for reading in CSL. Jiang and Cohen (2012) called for more rigorous experimental studies of strategies for Chinese reading. Francis (2010) called for more studies to determine the role of phonological working memory in text comprehension. His questions for future research included the role of phonological processing in reading Chinese, and the relationship of word and character

recognition and text comprehension. Working memory was found significantly involved in L2 Chinese reading comprehension by Shum et al. (2014). Working out teaching implications of such factors, including training that has shown to develop greater working memory ability (Shum et al, 2014) remains an area for further attention.

In all areas of Chinese reading, additional longitudinal studies would be beneficial. Longitudinal studies were called for by Knell and West (2017): “Longitudinal research that follows K–12 and postsecondary students as they progress in their Chinese studies will be required in order to address questions about instructional timing across a range of learning situations” (p. 529). Allen (2008), on the other side of the issue of delaying character instruction, too, called for longitudinal studies of character retention. Longitudinal studies can better reflect the many factors that affect teaching over a school year and the consecutive years of a Chinese language program.

This review of the literature uncovered only one piece related to reading assessment: Zhang (2017). Zhang recommended studies to assess the validity of common testing formats, components of reading comprehension, and effects of different presentation formats (such as multiple choice versus handwritten or typed answers, and possible effects when images to accompany text). Only a few such studies now exist for university learners; none were found that focused on K-12 reading assessment.

Studies have not yet comprehensively addressed materials design and some kinds of instructional strategies and student outcomes. In particular, Extensive Reading and the possibility of implicit vocabulary growth in Chinese has few extant studies, although ample research has been done relate to ER in other language contexts (Grabe, 2009; Shen & Tsai, 2010; Zhou & Day, 2020). I believe that studies of the resources and the results of ER programs in K-12 Chinese classes would aid classroom teachers and publishers of curricular materials in understanding young learners’ needs. Such a study could include student outcomes and also the design and comprehensibility of the materials used, since ER requires a variety of texts at 98% or better reader comprehension. Providing highly comprehensible texts is a challenge in early levels of Chinese, but it may be possible earlier than is commonly expected (Neubauer, 2018).

Studies of reading that incorporate auditory support would also benefit the field. These studies could include use of audio books used while students follow in texts, teacher support during choral reading, teacher-led dialogic reading with the whole class or smaller groups of students, and shadow reading and other forms of partner reading. Such means of encountering character texts – rather than students’ silent reading, or perhaps students reading aloud with the teacher responding with judgment about their accuracy – have not been found in this review. However, several studies with beginning through advanced learners in universities have been conducted on that topic. In those studies, a strong predictor of L2 Chinese reading comprehension has been the learner’s vocabulary recognition within the text (Shen, 2018; Zhang & Ke, 2018). Usually, these findings have been used to as evidence to recommend word-level instruction and independent learning for beginning Chinese learners as a key pedagogical approach, which is the typical approach in K-12 instruction as well.

Action research studies from K-12 contexts were not found in this review of the literature. Chinese language teachers conducting action research as they earn masters and doctoral degrees can be encouraged to publish their findings for the benefit of other teachers. Although action research does not allow for generalizable results, such classroom-based studies may suggest valuable practices and inform the field about some learners within their classroom contexts. Their findings may be transferable to other, similar classrooms. University instructors

have shared about their use of class-created story libraries to provide ER opportunities for beginning learners (Riggs, 2017) and reading novels as the basis for drama in project-based learning (Xu, 2019). Similar studies that investigate student outcomes and motivation are worth conducting at K-12 levels as well.

Finally, few studies that consider K-12 settings and the types of reading activity, text comprehensibility, and time spent on different reading tasks have not been found in this review. Studies in this review included two studies with preschool settings (Chang & Watson, 1988; Yu & Pine, 2006) and one classroom study at a K-8 school levels (Lo-Philip, 2014). In her suggestions for further research, Shen (2018) noted that to that date, “no studies have been conducted on reading instructional models” (p. 145). Studies of Chinese literacy practices through classroom-based research at elementary through high school levels would address this gap in K-12 CSL research. Regarding reading strategies used by students, Ke and Chan (2012) said that studies directly to compare the same learners’ L1 and L2 reading strategies would be informative about linguistic transfer from L1 to L2 Chinese. This may provide implications for what teachers may recommend to their students about strategies for L2 Chinese reading, whether parallel to or different from the strategies they might use when reading L1, or in a more nuanced combination of strategies. What kinds of instructional strategies are efficient and motivational in leading young students to text-level literacy in L2 Chinese? These questions have not been fully answered yet. Understanding classroom practices in a wider range of Chinese language classrooms will help CSL theory, research, and practice more closely interrelate. The field of L2 Chinese literacy has many avenues to explore.

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Appendix A: Definition of Terms

Chinese characters: Chinese characters are symbols which point to meaning and sometimes phonetic cues. Chinese orthography is morphosyllabic: the characters can represent whole words or parts of words, and each character has one syllable of sound associated with it. (Some characters have multiple possible pronunciations depending on the context and use but are still associated with only one syllable at a time.) The same set of Chinese characters are used with all Chinese dialects, with a few unique characters added for some words specific to dialects such as Cantonese. Chinese characters are not random; there is embedded meaning, and components of characters are re-used in many other characters. Single characters are also often re-used in many multi-character words. Authentic character texts (and most designed for language learners) do not have spaces between words, so learners need to discern word boundaries without spaces as cues.

Character components: More generally, components include all the subcomponents of a character. Some components may refer to meaning or may represent roughly phonetic indicators about that character. Recognition of the meaning of these components can aid character- and word-level production (Zhang & Ke, 2018) and comprehension (Curtain et al., 2016).

Pinyin: Pinyin is a phonetic writing system developed in the 1950's to show standard Mandarin pronunciation of Chinese characters. Its goal was to help standardize pronunciation and encourage comprehension of speech across the country. Pinyin follows orthographic rules: once a person knows what sounds the possible combinations of letters represent, one knows all possible syllables available in Chinese (about 250 total). Chinese has many homophones, so for many native speakers and more advanced L2 Chinese learners, reading pinyin actually can feel confusing if attempting to read longer texts in pinyin with a view to meaning instead of just how to pronounce the words. The lines above letters are tone marks, indicating one of the four tones used in Mandarin. Pinyin looks like this: nǐhǎo! pīnyīn shì zhèyàng de yì huì shì. (*Hello! Pinyin is this kind of thing.*) Many people use pinyin to type in Chinese characters: pinyin letters are used to represent the sound of words, and computers and phones use algorithms to predict most likely characters based on frequency in the language and on that device. The user can also override the automated estimate.

Radicals (bushou, classifiers of characters; Taylor & Taylor, 2014): Chinese characters can be categorized (by dictionaries, for example) based on one component of a multi-part character, as in the example 她 (*she*) which contains the radical 女, meaning “female.” About 200 radicals are used in Chinese characters, and recognition and comprehension of radicals has been shown to aid character-level comprehension (Everson, 2011; Shen, 2013, 2014; Zhao & Poole, 2017).