

Chinese as a Second Language and Dyslexia: A State-of-the-Art Review

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Abstract Globalisation has increased the number of Chinese as a Second Language (CSL) learners worldwide. In this context, many learners face reading difficulties driven by differences between their native language background and the orthographic, morphological, and phonological nature of Chinese – features whose challenges can overlap with developmental dyslexia. This paper reviews the latest international research into the intersection of CSL acquisition and dyslexia, aiming to highlight critical research gaps and evaluate teaching implications. Ultimately, it proposes a forward-looking agenda for the development of inclusive CSL literacy instruction.

Keywords Developmental dyslexia. Chinese Second Language Acquisition. Cross-linguistic Studies. Inclusive Linguistic Education. L2 Literacy Acquisition.

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1 Introduction

Over the past two decades, CSL teaching and acquisition has experienced extraordinary global growth, driven by economic, cultural, and educational factors, with official data indicating hundreds of millions studying the language outside China (Chen, Zhao 2022; Zhang, Han, Zhang 2023a). While CSL teaching has historical roots in Europe, its didactic and methodological approaches are still considered a relatively young discipline under development (Rossi 2021).

This expansion is mirrored in Italy, where the teaching of Chinese is steadily increasing across secondary schools and universities (Gabbianelli, Formica 2017; Rossi 2021; Buchetti et al. 2025). Due to the unique features of the language, this growth has led to extensive research in Chinese Second Language Acquisition (CSLA), particularly focused on CSL literacy acquisition, i.e. learning to read and write characters (Gong, Lai, Gao 2020; Ke 2012; 2018). However, despite this progress, pedagogical approaches remain under construction, underscoring the necessity for further research into personalised and individualised teaching approaches targeting diverse learning needs (Rossi 2021; Verzi 2023; 2026a).

The core topic of this paper is exactly this: what happens when a person with a literacy impairment (namely, a difficulty in reading and/or writing in their first language), or with diagnosed developmental dyslexia, embarks the journey of learning CSL? First of all, it's necessary to briefly define and introduce dyslexia and literacy impairments, which will be also further discussed in the next sections.

Drawing from the latest definition, released in October 2025 by the International Dyslexia Association (IDA), dyslexia is a specific learning disability characterised by persistent difficulties in achieving accurate, rapid word reading and spelling. These difficulties, which occur across a continuum of severity, are commonly associated with weaknesses in phonological and/or morphological processing. Crucially, the manifestation and severity of these core challenges vary depending on the orthography of the language, often leading to secondary consequences such as reduced reading comprehension and limited written output, among others.¹ While acknowledging these formal clinical definitions, the present state-of-the-art review prioritises a focus on the diverse challenges encountered within real-world educational settings, where the

1 All supporting material related to the 2025 updated definition is available at the International Dyslexia Association's project page: <https://dyslexiaida.org/definition-of-dyslexia/>.

absence of a formal diagnosis of dyslexia often obscures a student's underlying difficulties. In the Italian context, for instance, the official identification of dyslexia remains a significant issue: a national study by Barbiero et al. (2019) found that the actual prevalence of dyslexia (3.5%) is more than double the administrative data (1.5%), indicating that approximately two out of three cases remain undiagnosed in primary school children. Despite the legal mandate of the Italian Law 170/2010 (the regulatory framework of which will be discussed in detail in Section 2.6), this critical evidence of underdiagnosis necessitates a wider investigation. Therefore, the term 'literacy impairments' (or reading and writing impairments) is employed in this paper to encompass difficulties shown by both officially diagnosed dyslexic students and those with uncertified but persistent reading and writing difficulties in their first language (L1).

The complexity of addressing literacy-based learning difficulties extends critically into the domain of L2 acquisition and teaching. When a learner with an L1 literacy impairment approaches an L2, the resulting difficulty is modulated by several interacting factors, including: the individual's underlying cognitive abilities, the level or type of literacy impairment, the specific orthography of the L2, and the typological distance between the L1 and L2 orthographies (Łodej 2016). Orthographic distance is precisely one of the main aspects that guide the present investigation into a very extreme typological contrast: the acquisition of morphosyllabic L2 Chinese by L1 Italian learners.

Italian, on the one hand, is a language based on an alphabetic writing system and characterised by a transparent (or 'shallow') orthography, in which there is a regular correspondence between graphemes and phonemes. Chinese, on the other hand, is based on a morphosyllabic writing system (Shu, Anderson 1997), where characters are the smallest meaningful orthographic units and correspond to entire spoken syllables, not to individual phonemes, as happens in alphabet-based languages (Mattingly 1987; Leong 1997). Chinese is also defined as an opaque (or 'deep') orthography, as opposed to Italian, because the orthography-to-phonology mapping is not consistent (Wydell, Butterworth 1999; Wydell, Fern-Pollak 2012; Ijuin, Wydell 2018; Wydell 2023).²

2 Although the literature from Wydell and colleagues often prioritises the Japanese *kanji* script, their work also extensively discusses the Chinese language. These studies are cited here because *kanji* are based on Chinese characters, and thus share the same core morphosyllabic principle and the same underlying challenge of inconsistent orthography-to-phonology mapping that defines Chinese as an opaque script for reading acquisition.

1.1 Scope and Methodology of the Review

In line with its objective, this paper is structured as a state-of-the-art review, conceived specifically as a narrative overview of a still emerging and fragmented field. Maintaining an analytical focus on the cross-linguistic relationship between Italian as an L1 and Chinese as an L2, its primary objective is to critically review existing contributions on the acquisition of L2 Chinese by learners with L1 literacy impairments or diagnosed developmental dyslexia, systematically mapping, integrating and synthesising them. To this end, the review draws on literature from several related fields, including second language acquisition and teaching, applied linguistics, and cross-linguistic neurocognitive studies of both first and second language acquisition. A purposive and iterative sampling strategy was adopted, informed by a comprehensive body of literature compiled during a multi-year doctoral research project focusing on inclusive educational linguistics and specific learning difficulties in second language acquisition. To ensure methodological transparency, the selection of sources was limited to peer-reviewed international and national publications, critical theoretical frameworks and empirical studies. Sources were systematically evaluated based on their methodological rigour, relevance to research on dyslexia and SLA, and direct contribution to CSL acquisition settings. Specifically, the selection and evaluation of sources were executed across a sequential, three-stage thematic architecture:

1. Comparative profiles of typical and impaired literacy acquisition across languages and orthographies (specifically contrasting the transparent alphabetic orthography of L1 Italian with the morphosyllabic orthography of L1 Chinese);
2. The intersection of SLA and developmental dyslexia, with a specific focus on CSL research both globally and within the Italian higher education landscape;
3. Potential evidence-based pedagogical adjustments, future directions, and instructional accommodations for literacy-impaired learners in the CSL classroom.

By critically synthesising empirical research, clinical profiles, and recent pilot classroom studies across these three domains, this state-of-the-art review bridges foundational cognitive-linguistic research with actionable, context-specific classroom practices for CSL teaching and learning.

1.2 Originality and Innovative Contribution

While previous literature reviews have mostly separately explored L1 Chinese dyslexia, typical CSL reading and writing acquisition, and dyslexia in alphabet-based second languages, the present review offers two main distinct innovative contributions to the existing scholarship:

- **Theoretical Decentring of Alphabetic-Biased Dyslexia Models**
The vast majority of second language dyslexia research is based on alphabetic-to-alphabetic transfer. This paper challenges universalist, alphabetic-biased assumptions of reading difficulties by critically synthesising the transition from a highly transparent, phonology-dependent L1 (Italian) to a morphosyllabic, visually, spatially and orthographically demanding L2 (Chinese). This synthesis shows how cognitive-linguistic deficits can be affected by extreme typological distance: rather than treating the acquisition of L2 Chinese reading and writing strictly as an additional hurdle for dyslexic learners, this paper proposes a novel theoretical perspective, investigating whether the non-alphabetic nature of Chinese enables learners with severe phonological decoding deficits (typical of L1 Italian dyslexia) to use their intact visual-spatial and morphological pathways as a form of cognitive compensation. This defines a critical yet currently under-researched paradigm that future empirical studies of dyslexia and SLA should systematically address.
- **A Pioneering Global Map of CSL and Dyslexia Research and Its Future Directions**

To the author's knowledge, this review provides the most comprehensive and up-to-date synthesis of CSL and dyslexia research to date, bringing together early seminal studies and the latest cutting-edge literature within a unified framework. By providing this state-of-the-art baseline, the paper is intended to serve as an essential foundational gateway and primary reference for future researchers entering this emerging field. Furthermore, by highlighting critical gaps in the current literature, it acts as a strategic guide for future empirical work. Ultimately, this review provides an essential starting point for researchers and education authorities as they design inclusive guidelines and learning support for the growing number of secondary school students navigating Chinese literacy challenges.

2 Theoretical Framework: Acquiring L1 Literacy in Different Languages

This section sets out a comprehensive theoretical framework to address two key questions: 1) How does the process of literacy acquisition occur in a learner's L1? and 2) How do literacy impairments and dyslexia manifest themselves across different languages?

2.1 L1 Reading Acquisition Across Different Languages

For people all over the world, learning to read is the key to participating in society. As they acquire this ability, learners also implicitly become aware of how writing systems work and how written words reveal meaning through their graphic forms. In order to analyse this process systematically across diverse languages, Perfetti et al. (2007) established a triadic taxonomy that distinguishes between the writing system (the structural level of language encoded; for example, alphabetic versus logographic),³ the script (the specific graphic format; for example, Latin versus Cyrillic) and the orthography (the standardised spelling rules and mapping conventions within a given script), as illustrated in Figure 1.

Understanding how these three dimensions interact is essential, as the specific properties of a writing system directly dictate how reading acquisition unfolds. Specifically, reading development depends on how graphemes map onto phonology and which linguistic constituents (morphemes, syllables, or phonemes) form the core unit of visual representation (Verhoeven, Perfetti 2017).

Over the past two decades, extensive cross-linguistic research has explored how these mapping variations influence reading development. By investigating seventeen different writing systems, Verhoeven and Perfetti (2017, 12) have shown that, although “learning to read means learning how a writing system encodes language”, this process is guided by universal operating principles that cover linguistic awareness, word identification and comprehension (for a detailed overview of all the operating principles, cf. Verhoeven, Perfetti 2017; 2022). Neurocognitive research corroborates these universal foundations: across all languages, reading acquisition recruits an emergent neural network that strongly overlaps with spoken language processing areas (Paulesu et al. 2000; Rueckl et al. 2015). This neural convergence confirms two fundamental laws of literacy:

3 This classification defines the Chinese writing system as ‘logographic’. However, for the purposes of this paper, and as will be elaborated on further in Section 2.3, the Chinese writing system will be referred to primarily as ‘morphosyllabic’.

first, that writing ultimately represents spoken language; and second, that reading inevitably involves phonology.

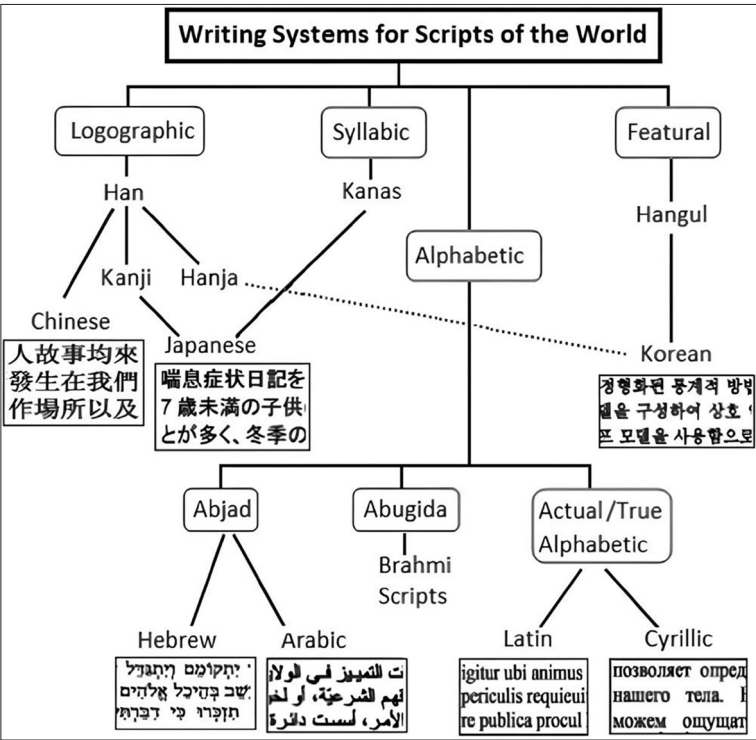


Figure 1 Classification for writing systems of the world and their scripts (Singh, Sharma, Chauhan 2023, 3006)

Within this universal framework, word recognition is fundamentally governed by the Orthographic Depth Hypothesis (ODH), which asserts that the transparency or opacity of a writing system dictates the specific cognitive-linguistic processes required for written decoding (Katz, Frost 1992; Ziegler, Goswami 2005). In transparent (shallow) orthographies like Italian or Spanish, highly consistent grapheme-to-phoneme correspondences allow learners to decode novel words with rapid accuracy using simple, rule-based conversion. Conversely, in opaque (deep) orthographies like English, inconsistent mappings force greater reliance on lexical memory and whole-word recognition strategies (e.g., ‘food’ vs. ‘blood’; ‘dear’ vs. ‘bear’; ‘low’ vs. ‘now’). However, extending this model beyond alphabetic scripts reveals a fundamental structural shift: in non-alphabetic morphosyllabic systems, such as Chinese, phonemes are not the

primary mapping unit. Instead, characters directly represent morphemes, which requires extensive visual-spatial processing and intricate knowledge of stroke combinations and radical structures (Wydell, Fern-Pollak 2012). Taken together, these universal principles and their orthographic variations provide a baseline framework for identifying cross-linguistic reading impairments such as developmental dyslexia (Verhoeven, Perfetti, Pugh 2019).

2.2 Reading Acquisition in L1 Italian

The discussion in this chapter and throughout the section on cross-linguistic reading acquisition (§§ 2.2-2.4) is primarily based on the aforementioned seminal volume, *Learning to Read Across Languages and Writing Systems*, edited by Verhoeven and Perfetti (2017). This book has served as an authoritative core resource throughout this paper. Specifically, the following information on Italian is drawn almost entirely from the chapter “Learning to Read Italian” by Burani, Thornton and Zoccolotti (2017).⁴

The Italian writing system, classified as a transparent alphabetic writing system with mostly consistent letter-to-phoneme correspondences, can be considered “an (almost) pure phonemic system, where the phonological structure of base words rarely changes with derivational morphology” (Burani, Thornton, Zoccolotti 2017, 218). A “fairly regular pattern of phoneme-grapheme correspondences” is exhibited (Vincent 1988, 285), though a few non-univocal correspondences are present. Most cases where more than one letter or letter sequence can map to the same phoneme or phoneme sequence primarily cause difficulty in spelling (encoding) rather than in reading (decoding). Formal instruction in reading and writing begins in primary school when children are six years old, with reading and spelling mainly taught through phonics by training sound-letter and letter-sound correspondences. Evidence confirms the relatively fast acquisition of accuracy in reading Italian, similar to other transparent orthographies. Because of the high degree of regularity, accuracy asymptotes early, and by the end of Grade 1, children make relatively few reading errors, typically reading correctly over 90% of content and function words.

By contrast, optimal reading speed (fluency) is obtained slowly through the whole school curriculum. This parameter proves more

⁴ Reading acquisition in L1 Italian is presented concisely here to allocate greater analytical space to L1 Chinese in subsequent sections. This structural choice reflects the distinct cognitive demands of non-alphabetic reading, as the morphosyllabic architecture of Chinese involves intricate processing at the character, radical, and stroke levels that warrants a far more extensive investigation.

sensitive than accuracy for tracking the developmental trajectory of reading; since decoding accuracy reaches a ceiling level very early in transparent orthographies, speed becomes the primary metric to observe how learners transition from letter-by-letter decoding (sublexical processing) to the retrieval of larger lexical or morphological units.

2.3 Reading Acquisition in L1 Chinese

Standard Chinese, alternatively known as Mandarin or *Pǔtōnghuà* 普通话 (common language) and hereafter referred to as ‘Chinese’, is the official language of the People’s Republic of China (PRC) and Taiwan. It is important to note that despite the existence of various Chinese dialects and varieties, Standard Chinese is the most consistently used variety in L2 Chinese teaching and learning contexts worldwide. This language is characterised by unique features across its writing system, phonology, orthography, and morphology. As previously mentioned, taking into account the correspondence between characters, morphemes, and syllables, as well as the non-biunivocal relationship between characters and syllables, the Chinese writing system is recognised as being morphosyllabic (Shu, Anderson 1997). However, it can also be described as logographic, since it employs graphemes that are made up of meaningful syllables (Abbiati 2012). Among the more than 40,000 existing characters, approximately 3,500 are required for functional literacy (Taylor, Taylor 1995). Chinese is characterised by a number of unique and distinctive features that have a big role for the process of literacy acquisition. These factors are outlined below.

- Chinese is a tonal language with a relatively simple syllable structure. It consists of approximately 400 basic syllables which, when accounting for the four tones, result in roughly 1,300 tonal syllables (Duanmu 2007). Tone awareness is a critical component of phonological processing (Li, Ho 2011), and this is because tones distinguish meanings, e.g., *cháng* 尝 (to taste) vs. *chàng* 唱 (to sing).
- Together with tone awareness, syllable awareness is a more prominent predictor of reading success in Chinese than phoneme-level awareness (McBride-Chang, Ho 2005). These skills are intrinsically linked to the challenge of high homophone density; because a single tonal syllable, such as *shì*, can correspond to dozens of different characters (e.g., 是, 事, 市, 世, 式), the reader cannot rely on phonological decoding alone to access meaning. Consequently, syllable awareness acts as the gateway to morphological awareness, allowing the reader to

map a specific sound to the correct character based on lexical and contextual cues.

- The Chinese script is composed of visually complex characters written within a uniform, imaginary square area. Unlike alphabetic systems, Chinese text lacks interword spacing. For instance, a standard sentence appears as *dàjiā dōu xǐhuān xuéxí Zhōngwén* 大家都喜欢学习中文 (everyone likes studying Chinese). If this sentence used word-level spacing as found in alphabetic scripts, it would appear as: 大 家 都 喜 欢 学 习 中 文. In the absence of these visual markers, characters are spaced equally, making word segmentation a significant cognitive task for the reader, as they must mentally group characters into lexical units based on context and grammatical knowledge (Yang 2021).
- A Chinese morpheme usually corresponds to one syllable and one character, e.g. *shū* 书 (book). According to Packard's (2000) classification, morphemes can be either free, appearing as independent words such as *yú* 鱼 (fish), or bound, appearing only in combination, such as *mín* 民 in *rénmín* 人民 (people). At the word level, another key feature of Chinese morphology is compounding, the process through which approximately 80% of modern Chinese words are formed (Packard 2000; Arcodia, Basciano 2018; 2021). Compounds are generally defined as words formed by combining two or more roots – whether free or bound – and are categorised based on the specific syntactic and semantic relationships between their components (Arcodia, Basciano 2021). Given this structural prevalence, awareness of compounds and their internal logic represents the strongest predictor of Chinese reading proficiency (Tong et al. 2009).
- At the character level, between 80% and 95% of modern Chinese characters are phonetic-semantic compounds, *xíngshēng* 形声 (Arcodia, Basciano 2016; 2021). These consist of two functional components: a semantic radical providing meaning information and a phonetic radical providing pronunciation clues. For example, in the character *cái* 材 (material), the semantic radical *mù* 木 (wood) indicates the conceptual category, while the phonetic radical *cái* 才 provides the sound (Shu 2003) [fig. 2].

The reliability of these radicals varies significantly. According to research by Shu et al. (2003), approximately 58% of characters taught in elementary school are semantically transparent, where the radical directly represents the character's category (e.g., *chī* 吃 [eat], where the left radical *kǒu* 口 [mouth] relates to the action of eating). Another 30% are semi-transparent (e.g., *liè* 猎 [hunting], where the left radical refers to animals), while 9% are opaque, providing no semantic clues (e.g., *lǚè* 略 [brief], where the left radical *tián* 田 [field] is unrelated to the meaning). Regarding phonetic components, roughly 39% of characters are

regular, meaning the phonetic radical is a trustworthy guide to pronunciation (e.g., *liáng* 粮 [grain], which contains the right radical *liáng* 良). About 26% are semi-regular, providing only partial information (e.g., *jī* 积 [accumulate] with the right radical *zhī* 只), and 15% are irregular, offering no clues to the sound (e.g., *lù* 路 [street] with the radical *gè* 各). The chart shown in Figure 3 below illustrates these varying levels of radical reliability for reading.



Figure 2 Anatomy of a semantic-phonetic compound.
Based on Shu 2003

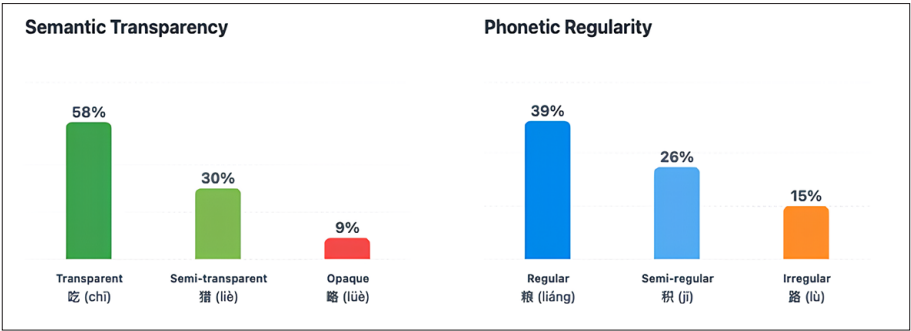


Figure 3 Distribution of semantic transparency and phonetic regularity in compound characters.
Based on Shu et al. 2003

Given these unique features, reading acquisition in Chinese relies on a specific set of metalinguistic and cognitive skills. These include phonological awareness, morphological awareness, visual-orthographic awareness, and RAN (Li et al. 2012). A comprehensive understanding of these skills is fundamental to the development of frameworks for diagnosing and treating literacy impairments (McBride, Wang, Cheang 2018). This will be discussed in detail in relation to the specific profile of Chinese dyslexia in Section 2.7.

2.4 Literacy Education in Chinese Societies and Main Challenges for L1 Learners

Reading instruction across Chinese-speaking regions, frequently defined as ‘Chinese societies’ (Zhang, McBride-Chang 2011), is characterised by a high degree of diversity in educational methodology, timing, and the primary spoken language used in the classroom. In Mainland China, Mandarin Chinese (*Pǔtōnghuà* 普通话) is the primary medium of instruction. Also other terms are used across the Chinese societies to refer to Mandarin: for instance, it is known as *Guóyǔ* 国语 (the ‘national language’) in Taiwan, and *Huàyǔ* 华语 in Singapore (Gong, Lai, Gao 2020). While Mandarin is the dominant spoken language in schools in both Mainland China and Taiwan, Hong Kong maintains a distinct linguistic landscape. There, Cantonese remains the primary spoken language and principal medium of instruction; however, the region aims for a ‘tri-lingual’ (Mandarin Chinese, Cantonese, and English) and ‘bi-literate’ (Chinese and English) society (Li, Rao 2005). Consequently, most students in Hong Kong also receive L2 Mandarin and L2 English instruction as part of their schooling (Pan et al. 2024). Singapore presents an even more special linguistic environment: it recognises four official languages (English, Chinese, Malay, and Tamil), where English serves as the primary language of instruction, whereas the child’s respective mother tongue is taught as a compulsory second language (Li, Rao 2005). Given that children of Chinese descent constitute the majority of the student population, Chinese is the most widely studied second language within the Singaporean education system (Lee, Poon 2014).

In Mainland China, children are taught through Mandarin immersion in school, regardless of their home dialect. Formal reading instruction begins in Grade 1, with an intensive ten-week introduction to *Pīnyīn* 拼音⁵ (Pan 2000; Chen, Pasquarella 2017). Children in Taiwan follow a similar path, but using *Zhùyīn fúhào* 注音符号. In contrast, those in Hong Kong often begin learning characters as early as age three in kindergarten, through a ‘look-and-say’ approach without using any phonetic bridge. Traditional pedagogy in these regions relies heavily on rote learning: a typical class involves dictation tasks, and homework requires children to copy new characters repeatedly in order to master their complex visual

5 *Pinyin* is a romanisation system that uses the Latin alphabet to represent the sounds of Chinese characters, helping students to associate characters with their correct pronunciation, acting as a phonetic bridge during the first stage of literacy acquisition (cf. Norman 1988). *Zhuyin fuhao*, also known as *Bopomofo*, is a unique phonetic script for Mandarin Chinese that uses a series of symbols to represent the sounds of the language (cf. DeFrancis 1984).

structures and stroke sequences (Chen, Pasquarella 2017). Despite these regional differences, the ultimate objective remains consistent: children are expected to master 2,500-3,000 characters by the end of Year 6 (Shu et al. 2003).

In Singapore, instead, the educational approach to Chinese literacy is distinct from Mainland China, Taiwan, and Hong Kong. Simplified characters and *Pinyin* are still used, but literacy instruction is specifically designed to address the challenges of a non-immersion environment. Unlike children in China or Taiwan who are surrounded by Chinese daily, many Singaporean students come from households where English is the primary language, leaving them with only six hours of Chinese exposure per week (Lee 2012). Moreover, to prevent these students from becoming overwhelmed or discouraged by the demands of traditional instruction of characters, the Ministry of Education introduced some reforms in 2007. These changes shifted the focus away from the exhaustive, high-pressure mastery of character writing and towards 'functional literacy'. This means the curriculum now prioritises the ability to speak, listen, and read in real-world contexts, ensuring that the language remains a practical and accessible tool for communication rather than a purely academic hurdle (Shen et al. 2014).

Regardless of the Chinese-speaking region involved, the path to literacy in Chinese presents unique cognitive challenges that differ significantly from alphabetic systems. Because the writing system lacks direct grapheme-phoneme correspondences, children cannot simply 'decode' new words; they must memorise thousands of visually complex characters, which is a really gradual and laborious process. Literacy development is further complicated by the high homophone density of the spoken language, which often leads to 'homophone substitutions' in spelling (i.e., writing a phonetically correct but semantically incorrect character) and a general difficulty in distinguishing meanings between identical syllables. Given the morphosyllabic nature of the script, the contribution of phonological awareness is relatively limited compared to the critical roles played by morphological awareness and orthographic processing (Chen, Pasquarella 2017). By comparison, since this study is primarily focused on Italian and Chinese learners, while an Italian child might achieve decoding accuracy in months (Seymour, Aro, Erskine 2003; Burani, Thornton, Zoccolotti 2017), Chinese children add only 200 to 700 characters to their sight vocabulary annually, making literacy a decade-long undertaking (Shu et al. 2003).

To address these challenges, research increasingly advocates for instructional activities that move beyond rote memorisation to focus on metalinguistic awareness. While traditional classrooms rarely include phonological activities, games involving syllable and onset-rime manipulation can be highly beneficial in early grades,

and the use of systems like *Pinyin* inherently strengthens this phonetic foundation. Furthermore, explicit morphological instruction is necessary to help children navigate homophones by identifying morpheme meanings and manipulating word structures more systematically. Finally, a more deliberate focus on orthographic processing, specifically the internal structure of compound characters, is essential. While semantic radicals are already taught for dictionary use, systematic instruction of phonetic radicals is often overlooked due to their perceived unreliability. However, since skilled readers are better able to utilise phonetic radicals to predict pronunciation, teaching these components more systematically could significantly improve the efficiency of character memorisation and reading acquisition (Anderson et al. 2003).

2.5 How Do Dyslexia and Literacy Impairments Manifest Across Different Languages?

Reading and writing are two of the most significant achievements of humankind. However, while most children reach a skilled level of literacy within five to six years of education, others struggle significantly despite receiving adequate teaching. This can ultimately lead to a diagnosis of developmental dyslexia (Verhoeven, Perfetti, Pugh 2019; Wydell, Fern-Pollak 2012).⁶

To understand the nature of this struggle, it is necessary to look at the most recent clinical consensus. According to the International Dyslexia Association's latest (2025) definition:

Dyslexia is a specific learning disability characterized by difficulties in word reading and/or spelling that involve accuracy, speed, or both and **vary depending on the orthography**. These difficulties occur along a continuum of severity and persist even with instruction that is effective for the individual's peers. The causes of dyslexia are complex and involve combinations of genetic, neurobiological, and environmental influences that interact throughout development. **Underlying difficulties with phonological and morphological processing are common but not universal**, and early oral language weaknesses often foreshadow literacy challenges. Secondary consequences include reading comprehension problems and reduced reading and writing experience that can impede growth in language,

⁶ A distinction must be made between developmental dyslexia and acquired dyslexia, which refers to reading impairments caused by brain damage in individuals who had already achieved typical literacy skills prior to the incident (Wydell, Fern-Pollak 2012).

knowledge, written expression, and overall academic achievement. Psychological well-being and employment opportunities also may be affected. Although identification and targeted instruction are important at any age, language and literacy support before and during the early years of education is particularly effective. (emphasis added)⁷

Historically, the primary theoretical models explaining the mechanisms behind these difficulties include the Magnocellular Theory (Livingstone et al. 1991; Stein 2001; 2019), the Phonological Deficit Hypothesis (Snowling 2000; Ramus et al. 2003), the Psycholinguistic Grain-Size Theory (Ziegler, Goswami 2005), and the Double-Deficit Hypothesis (Wolf, Bowers 1999).

The Magnocellular Theory, proposed by neurocognitive studies, suggests a dysfunction within the visual and auditory pathways that impairs visuo-motor perception and temporal sensitivity (Stein 2019), which ultimately exerts a negative influence on reading fluency (Livingstone et al. 1991).

According to the Phonological Model, phonology is encoded in all writing systems. There is a universal consensus among researchers that phonological impairments encompassing awareness, memory and decoding are central to reading difficulties and dyslexia. These deficits hinder a student's ability to accurately map graphemes to phonemes, creating significant obstacles to reading (Snowling 2000; Vellutino et al. 2004).

However, Psycholinguistic Grain-Size Theory suggests that the manifestation of phonological deficits varies across scripts depending on a language's 'grain size', which refers to how graphic units map onto phonological units (Ziegler, Goswami 2005). In alphabetic systems (e.g., Italian, English), graphic units map onto phonemes. Consequently, phonological awareness is more important at the phoneme level, therefore becoming a critical predictor of success and a primary risk factor for dyslexia. Another crucial aspect that influences the manifestation of phonological problems among alphabetic orthographies is the level of transparency of the orthography involved. In transparent orthographies like Italian, where spelling-to-sound mappings are highly predictable, readers can rely on small 'grains' (single grapheme-phoneme relations). Consequently, dyslexia in Italian primarily presents as a deficit in reading speed and fluency, while decoding accuracy remains remarkably stable (Barbiero et al. 2012). In contrast, opaque orthographies such as English involve inconsistent mappings that force children to

7 The definition is available at the International Dyslexia Association's project page: <https://dyslexiaida.org/definition-of-dyslexia/>.

simultaneously process multiple grain sizes, from individual letters to larger lexical patterns. This structural complexity often results in a more severe clinical picture, where dyslexic readers struggle significantly with both accuracy and speed (Ziegler, Goswami 2005).

It is important to note that these theoretical models were predominantly developed through the study of alphabetic orthographies. Moving beyond alphabetic systems to syllabic and morphosyllabic systems (e.g. Japanese and Chinese), mapping occurs at the syllable level. Therefore, for these scripts, phoneme awareness is less essential (though still relevant) for acquiring reading skills. In scripts such as Chinese, however, phonological awareness is more important at the syllable and onset-rime level. However, phonemic awareness remains relevant in non-alphabetic scripts too, as phonological deficits are universal. When diagnosing dyslexia, phoneme-level tests are often more effective than simpler syllable-level evaluations, which may not be sensitive enough to reveal impairment (see the research of McBride-Chang et al. 2004; Siok, Fletcher 2001; Xu, Tan, Perfetti 2019).

While early theoretical frameworks of dyslexia primarily relied on the Phonological Deficit Hypothesis as the most relevant and universal predictor of dyslexia, the field is increasingly shifting towards a multifactorial perspective. A recent Delphi study of dyslexia experts (Carroll et al. 2025) highlighted the consensus that developmental dyslexia is a neurodevelopmental disorder whose key feature, in all languages, is the difficulty in acquiring reading and writing fluency. This is not caused by a single, isolated deficit but rather by the cumulative effect of multiple, interacting cognitive weaknesses. Consequently, as highlighted by the Delphi study, a comprehensive evaluation of potential reading difficulties should be based on “converging evidence from multiple risk factors” rather than a single criterion (Carroll et al. 2025, 8).

Right after phonological awareness, RAN (or ‘naming speed’) is the second universal indicator of dyslexia. Regardless of the writing system, the inability to quickly retrieve a name for a visual symbol (digits, colours, or characters) is a marker of a fluency problem (Landerl 2019). This observation is theoretically grounded in the Double Deficit Hypothesis, which posits that phonological awareness deficits and RAN deficits represent two distinct and independent causes of reading difficulties. While phonological deficits primarily impact decoding accuracy, naming speed deficits affect the fluency and automaticity of word recognition (Wolf, Bowers 1999).

This broader understanding of the interacting factors that influence the manifestation of dyslexia raises a fundamental question in cross-linguistic studies: which aspects of developmental dyslexia are language-specific, and which are universal across all writing systems?

The latest definition from the International Dyslexia Association (2025) addresses this issue, highlighting two elements that are central to the present research. The first is the explicit recognition that manifestations “vary depending on the orthography”; the second is the acknowledgement that phonological and morphological difficulties are “common but not universal”.⁸

Verhoeven, Perfetti and Pugh’s (2019) work further contributes to the effort to answer this question. In an attempt to identify evidence of universals, the authors compared the main characteristics of both reading acquisition and developmental dyslexia across nine languages and four major writing systems. Their findings suggest a “deceptively simple” connection (Verhoeven, Perfetti, Pugh 2019, 443): the cognitive factors essential for learning to read are the same factors that, when impaired, define reading difficulties across all languages and writing systems.⁹ Moreover, the authors explain how universal cognitive-linguistic factors are ‘filtered’ through the specific requirements of different writing systems. Recognising that the ‘face’ of dyslexia is a product of the interaction between universal cognitive constraints and the specific demands of a given orthography provides a fundamental framework for comparing specific linguistic profiles. Consequently, it is essential to first examine how the unique structure of a writing system influences the manifestation of dyslexia during the development of a native language. Evaluating the distinct behavioural profiles of native Italian and Chinese readers establishes a clear baseline: this is necessary in order to understand what happens when these two completely different writing systems interact with a learner in a CSL classroom.

8 To facilitate the reader’s comprehension, emphasis has been added in bold to these two clauses cited in the IDA’s 2025 definition of dyslexia, which is available at the International Dyslexia Association’s project page: <https://dyslexiaida.org/definition-of-dyslexia/>.

9 For a more detailed breakdown of the specific generalisations concerning language awareness and word identification, see the original summary in Table 20.1 (Verhoeven, Perfetti, Pugh 2019).

2.6 Dyslexia in the Italian Context: Clinical Profile, Legislation, and L2 Implications

Due to the highly transparent nature of the Italian orthography, the developmental trajectory of an Italian reader differs sharply from that of readers of more opaque scripts. As previously mentioned, the primary clinical marker for L1 Italian dyslexia is not a lack of accuracy, but a significant deficit in reading speed and fluency (Tressoldi, Stella, Faggella 2001). To compensate for their difficulties with phonological processing, these learners often adopt a laborious serial decoding approach that prioritises precision. While this strategy enables them to achieve high levels of accuracy, it lacks the automation necessary for fluency. Consequently, they experience a persistent deficit in reading speed compared to their peers.

This slower word recognition can impede the shift from ‘learning to read’ to ‘reading to learn’, as cognitive resources are exhausted by the decoding process rather than being available for comprehension (Barbiero et al. 2019).

Research has also shown that dyslexia can have a significant impact on learning foreign languages, particularly when the target language requires the use of complex phonological and orthographic skills. In the case of L1 Italian learners, empirical evidence confirms that while a highly transparent native orthography allows for successful cognitive compensation, transitioning to an opaque foreign language, such as English, reveals underlying word recognition and decoding struggles similar to those experienced in their native language (Palladino et al. 2013; Daloiso, Costenaro, Favaro 2014).

In line with the theoretical perspective proposed in Section 1.2, it can be hypothesised that encountering a morphosyllabic script fundamentally alters the reading strategy of the learner. Since Chinese characters map directly onto morphemes rather than phonemes, learners are compelled to bypass their impaired L1 mechanism of slow, serial phonological assembly of linear graphemes. This typological shift may enable learners to utilise their intact visual-spatial and morphological pathways as a compensatory mechanism. However, this reliance on visual-spatial decoding introduces a distinct cognitive disadvantage: the complex architecture of Chinese characters necessitates the rapid identification of radicals and holistic spatial processing, placing greater demands on visual-spatial working memory and processing speed. Consequently, it is posited that, while the transparent phonological scaffolding of L1 Italian is no longer usable (or necessary), learners’ ultimate success in L2 Chinese depends on whether their morphological and orthographic awareness can compensate for their deficits in RAN and visual processing speed. Although direct empirical testing across L1 Italian CSL cohorts remains an area for future research, this conceptual model highlights

both the compensatory potential and the unique cognitive demands of non-alphabetic reading.

Highlighting how these cognitive vulnerabilities intersect with a non-alphabetic layout reveals a significant shortcoming in institutional support systems, which are almost exclusively designed for alphabetic remediation.

The institutional management of these cognitive vulnerabilities is governed by a distinct national legal framework. Within the Italian education system, learners with dyslexia are formally recognised as part of a broader category of students with specific learning disorders (SLDs; It. *Disturbi Specifici dell'Apprendimento*, DSA), which also encompasses dysgraphia, dysorthography and dyscalculia. This categorisation is defined in Article 1 of Law 170/2010, landmark legislation that addresses the rights and support of students with SLDs specifically, and formally recognises dyslexia as a neurodevelopmental condition that can significantly impact academic achievement despite adequate cognitive abilities and instruction. According to the latest report by the Italian Ministry of Education, students with certified SLDs represented around 6% of the school population during the 2022-23 academic year. Dyslexia was the most frequently diagnosed condition, accounting for 36% of all SLDs diagnoses. Prevalence rates also show regional variability, peaking in northern Italy and remaining markedly lower in the south.¹⁰ Article 3 of Law 170/2010 establishes the right of students with SLDs to personalised educational strategies and equal opportunities. Diagnostic procedures for dyslexia are usually carried out after the second year of primary school, which is typically around the ages of 7-8. These must be conducted by public health services or accredited private specialists, and once diagnosed, students are entitled to a Personalised Didactic Plan (It. *Piano Didattico Personalizzato*, PDP) that outlines compensatory tools and dispensational measures in accordance with national and regional guidelines. The law also mandates teacher training, early identification protocols, and close collaboration with families.¹¹ This legal right to targeted accommodations extends to the study of foreign languages within the secondary school curriculum. However, a major pedagogical obstacle arises in practice: the foreign language sections of standard PDPs are highly generic and uniform. They are traditionally designed

10 For official data on specific learning disabilities in Italy, refer to the report published by the Italian Ministry of Education and Merit (MIM) in September 2024. Available online at: https://www.mim.gov.it/documents/20182/8938897/Focus_Alunni+con+DSA+aa.ss.202122_202223.pdf/ed651f1c-4a5c-a42e-d9a0-2ac407ebc269?version=1.0&t=1737467257075.

11 For the full text of the law, see <https://www.gazzettaufficiale.it/eli/id/2010/10/18/010G0192/sg>.

around the needs of Western European, alphabetic languages – such as English, French, or Spanish – and fail to account for variations in writing systems. Consequently, these standardised documents do not take into consideration the extreme typological distance and unique morphosyllabic orthography of Chinese. By prescribing identical accommodations for radically different linguistic environments, current PDP frameworks overlook the specific visual-spatial and orthographic hurdles faced by dyslexic learners in the CSL classroom. This systemic mismatch highlights a profound gap between the legal mandate for inclusivity and the cognitive-linguistic realities of non-alphabetic second language acquisition. Ultimately, this institutional deficit creates a critical barrier to CSL instruction – a policy and pedagogical challenge that is systematically addressed through proposed structural realignments in Section 4.2.

2.7 Chinese Developmental Dyslexia: Main Features and Variations

Theoretical models of dyslexia have traditionally been developed primarily through the lens of alphabetic languages. However, research over the last few decades has shifted this paradigm, confirming that dyslexia can manifest across all languages and writing systems. In native Chinese populations, the prevalence of Chinese Dyslexia (or Chinese Developmental Dyslexia, CDD) is estimated to be between 2% and 12%, figures that are notably comparable to those observed in Western, alphabetic-speaking populations (Li et al. 2012; Xu, Tan, Perfetti 2019; Zhang et al. 2023).

Chinese presents a unique set of cognitive demands that contrast sharply with the ‘shallow’ transparency of Italian or the ‘opaque’ nature of English (Perfetti, Harris 2013), including the high graphic complexity of characters requires sophisticated visual-spatial memory for recognition and the polysemic and homophonic nature (Ho et al. 2002). In fact, in Chinese the correspondence between phonology and semantics is often indirect or polysemic (one sound mapping to many meanings/characters), placing a higher burden on lexical retrieval (Perfetti, Harris 2013).

To explain the origin of these difficulties, researchers generally operate within two primary theoretical frameworks: the Linguistic Deficit Theory, which focuses on impairments in language-specific processing, such as phonological, orthographic, morphological, and semantic awareness; and the Non-Linguistic (Cognitive) Deficit Theory, which highlights ‘lower-level’ sensory or general cognitive deficiencies, such as RAN awareness, visual processing, visual attention, visual-motor integration, and working memory (Xin 2026).

The categorisation and analysis of linguistic deficits in CDD presented in this subsection are primarily based on the comprehensive theoretical synthesis of developmental dyslexia in Chinese populations established by Xin (2026). Within this overarching framework, linguistic deficits are conceptualised as systemic impairments in the metalinguistic skills required to process the sounds, structures, and meanings of the morphosyllabic writing system.

In terms of phonological awareness, the ability to manipulate the sounds of the language is especially critical during the early stages of literacy instruction, when children use the *Pinyin* phonetic transcription system (McBride 2016). Children with CDD exhibit significant deficits in the awareness of syllables, onsets, rimes, and tones (Li, Ho 2011; McBride, Wang, Cheang 2018). In particular, these learners struggle with the perception and discrimination of tones compared to typically developing peers. This manifests as difficulty in reading single characters or pseudo-characters, often stemming from an inability to recognise phonological components, such as the phonetic radical in semantic-phonetic compounds. Such impairments compromise the accurate representation of the lexicon and the mastery of phonological rules, thereby hindering overall reading development (Tong et al. 2017).

Furthermore, the acquisition of orthographic awareness presents a distinct challenge because, unlike alphabetic languages, the structural units of Chinese are strokes and radicals, and this requires sophisticated visual-orthographic skills (Ho et al. 2002). Deficits in this area cause significant delays in character recognition and writing. Specifically, as detailed in Xin's (2026) study, children with CDD face distinct challenges in visual discrimination, which manifests as difficulty distinguishing between visually similar 'orthographic neighbours' (e.g., *mù* 目 vs. *rì* 日). Additionally, they experience impaired visual memory, showing difficulty memorising the specific stroke order required for complex characters, alongside deficits in visuo-spatial attention, characterised by an inability to quickly focus on relevant components or exclude irrelevant graphic information (Zeng, Zhou, Meng 2003).

Beyond these visual-orthographic challenges, the profile of Chinese dyslexia is also deeply rooted in morphological and semantic awareness. In light of the close orthography-meaning relationship in Chinese, morphological awareness, the ability to manipulate meaning units (morphemes), is a primary predictor of reading success (Shu et al. 2006; Zhang et al. 2023), and it often explains more variance in reading ability than phonological or orthographic skills (McBride, Wang, Cheang 2018). Moreover, research indicates that morphological awareness is the strongest factor in discriminating dyslexic readers from age-matched controls (Shu et al. 2006). Notably, 76% of children with CDD exhibit morphological deficits, a

significantly higher prevalence than those with phonological (43%) or naming speed (41%) deficits (Xin 2026). These weaknesses often lead to poor semantic comprehension, where students struggle to deduce word meanings from context or master the comprehension of full sentences and paragraphs (Lei et al. 2011). Deficits in this area are all a hallmark of CDD and can be detected as early as during the preschool years (Kalindi, Chung 2018).

In addition to language-specific skills, CDD is characterised by ‘non-linguistic’ deficits affecting general processing speed and sensory integration.

A primary component of this profile involves RAN awareness, a consistently strong predictor of reading fluency and accuracy in both alphabetic (Lervåg, Hulme 2009) and Chinese contexts (Tan et al. 2005; Ho et al. 2004).

Children with CDD perform significantly more slowly in RAN tasks (Ho, Lai 1999; Ho et al. 2002), for instance, identified RAN deficits as a dominant characteristic among Chinese dyslexics, reflecting an impairment at the intersection of general processing speed and rapid visual-orthographic mapping. Eye-tracking data provides a clear physiological explanation for this slowness, revealing that dyslexic children have a significantly reduced perceptual span when reading or performing rapid naming tasks (Yan et al. 2020). In reading research, fluency relies on the seamless coordination between two visual processes: foveal processing, which involves sharp central focus to recognise and decode the character being looked at, and parafoveal processing, which uses peripheral vision to preview and gather basic information about the next character to the right (Rayner et al. 1981). Children with CDD struggle with efficient orthographic decoding and must therefore allocate a disproportionate amount of their limited cognitive and attentional resources to foveal processing to resolve the character under their immediate central focus. This excessive foveal load effectively ‘blinds’ their parafoveal preview window, severely limiting their ability to pre-process subsequent characters (Sun et al. 2026). This restricted perceptual span consequently narrows their ‘preview window’, disrupting the natural flow of reading and the planning of progressive saccades (the rapid, voluntary eye movements that advance across the text). It also forces the eyes to make frequent backward movements (regressions) to re-analyse characters, severely hindering overall reading fluency (Yan et al. 2020).

The impact of these deficits extends to visual and visual-motor integration, where basic visual processing is often impaired. Dyslexic learners typically possess a higher visual discrimination threshold, resulting in lower resolution and slower processing of visual stimuli (Stein 2023), which manifests as longer fixation times (Sui et al. 2018).

These behaviours result in frequent word omissions or skipping, which severely compromises reading fluency (McBride-Chang, Ho 2005).

Finally, working memory and visual attention act as the 'engine' for reading. Working memory is essential for retaining the complex graphic information of a character while simultaneously retrieving its meaning and sound (Yang 2021). Visual attention allows the reader to efficiently navigate the 'visual search' required to locate target components within the high-density environment of a Chinese text (Liu, Chen, Chung 2015).

The diagnostic criteria for CDD are fragmented and vary considerably across Sinophone regions, depending on local educational policies and instructional scripts (McBride, Wang, Cheang 2018; Pan et al. 2024). In Hong Kong, for example, a diagnosis requires an IQ within the normal range alongside a performance deficit of at least one standard deviation (SD) across three literacy tasks (Chung, Ho 2010). In Taiwan, dyslexia is identified if a student scores below the 3rd to 5th percentile nationally in character identification, despite remedial intervention (Cheah et al. 2025). In contrast, Mainland China lacks a uniform clinical framework, partly due to cultural tendencies to view reading difficulties as a matter of personal effort or general academic achievement, rather than a neurodevelopmental condition (McBride, Wang, Cheang 2018). Research criteria in Beijing require an IQ within the normal range alongside character recognition at least 1.5 SD below the norm (Lin, Wang, Meng 2013). These inconsistencies across regions emphasise the urgent need for standardised, uniform diagnostic criteria to facilitate cohesive research and equitable intervention paradigms across Chinese societies (Cheah et al. 2025). Establishing a precise profile of how dyslexia manifests itself in native speakers of Chinese provides a crucial comparative baseline for CSL research. To examine whether CSL learners draw upon the same cognitive-linguistic pathways and potentially experience the same core deficits when acquiring L2 Chinese literacy, or whether they recruit alternative compensatory routes, a detailed understanding of the script-specific demands is required.

Synthesising the preceding analysis of L1 Italian and L1 Chinese profiles, Table 1 clarifies the linguistic, cognitive, and diagnostic frameworks that characterise the manifestation of the disorder in each language.

Table 1 Comparative analysis of literacy acquisition and dyslexia manifestation in L1 Italian and L1 Chinese

Feature	L1 Italian	L1 Chinese (Mandarin)
Writing System Type	Alphabetic (Latin-based); highly transparent orthography; nearly pure phonemic system.	Morphosyllabic (logographic/morphemic); derives from the Sino-Tibetan family; complex orthography-phonology mapping.
Orthography Type and Orthographic Load	Graphemes (21 letters) used to build all words. Spaces provide clear word boundaries.	Morphemes/Characters composed of strokes and radicals. Standard Functional Inventory of > 6,000 characters; 80-90% are phono-semantic compounds (few characters retain clear pictographic properties). Fixed spacing between characters, no explicit cues for word boundaries.
Phonology and Morphology	23 consonants, 7 vowels; no long-short contrast. Inflectional morphology (gender/number).	Tonal language (4 tones); 21 initials, 3 glides, 6 vowels. Derivational morphology through compounding.
Predictors of learning to read	Phonological and morphological awareness; lexical knowledge	Syllable-level awareness; visual-orthographic skills; morphological awareness (specifically compounding).
Reading Development and Primary Manifestation of Dyslexia	Rapid acquisition; 90% accuracy by Grade 1. Mastery of sublexical and lexical paths.	Gradual acquisition; heavy reliance on visual-spatial memory and morphological knowledge.
Primary Manifestation of Dyslexia	Deficit in reading speed and fluency; accuracy is usually mastered early. Dysorthography (persistent spelling hurdles) is a frequently associated impairment.	Deficits in character recognition, tone discrimination, and reading fluency.
Core Cognitive-Linguistic Predictors	Phonological awareness, Lexical and morphological knowledge.	Orthographic processing, RAN, phonological awareness, and morphological awareness

Feature	L1 Italian	L1 Chinese (Mandarin)
Legislative and Diagnostic Context	Standardised via Law 170/2010; focus on speed/accuracy SD thresholds.	Variation of diagnostic criteria across different Chinese-speaking regions.

Source: Verhoeven, Perfetti 2017, 468

2.8 **Dyslexia and L2 Reading Acquisition**

From a developmental perspective, reading and listening share similar processing requirements. Phonological skills, for instance, are fundamental for decoding and reading acquisition in both the L1 and the L2, and they represent a critical challenge for learners with reading difficulties (Harrison, Krol 2007; Lipka, Siegel 2007). While typically developing children transfer oral comprehension skills to reading without difficulty, in children with literacy impairments this process is frequently obstructed by insufficient decoding efficiency. In this sense, decoding serves as a ‘threshold’ for reading comprehension (Łodej 2016). When shifting from L1 to L2 reading, a central question arises: “Is L2 reading a language problem or a reading problem?” (Alderson 1984, 24). Two major variables traditionally help explain the variance in L2 reading ability: the Linguistic Threshold Hypothesis and the Developmental Interdependence Hypothesis. The former suggests that a certain level of L2 proficiency is a prerequisite to effectively use L1 reading strategies, noting that if a reader struggles with L2 decoding, their cognitive resources are entirely consumed, preventing fluent comprehension (Bernhardt, Kamil 1995). The latter, conversely, posits that L2 competence is largely determined by the L1 capabilities developed prior to L2 exposure.

Furthermore, the manifestation of reading difficulties is heavily influenced by the ‘orthographic depth’ of a language, i.e. the consistency of its letter-to-sound relationships (Seymour, Aro, Erskine 2003; Ziegler, Goswami 2005). A crucial contribution that has enriched this theoretical framework is the Hypothesis of Granularity and Transparency (HGT), introduced by Wydell and Butterworth (1999). The HGT posits that developmental phonological dyslexia depends on the transparency of the orthographic system and the granularity of the phonological units represented, such as the phoneme, syllable, or character.¹²

12 According to Wydell (2023), granularity refers to the level of detail of the smallest sound one can produce in a language, ranging from ‘fine’ (phonemes) to ‘highly granular’ (syllables, characters, or whole words).

According to this hypothesis, phonological dyslexia is significantly less prevalent in transparent orthographies where grapheme-phoneme correspondence is regular, such as Italian, as well as in opaque orthographies if the minimum orthographic unit representing sound is highly granular, such as whole characters in Chinese or Japanese *kanji*.

An emblematic case is the English-Japanese bilingual studied by Wydell and Butterworth (1999), who demonstrated excellent reading skills in Japanese (both the syllabic *kana* and morphosyllabic *kanji*) but significant difficulties in English, an opaque orthography (Wydell 2023).¹³

As hypothesised in Section 2.2, and based on these theoretical premises, a compelling mechanism emerges regarding the acquisition of Chinese as a second language by native speakers of transparent alphabetic orthographies. While the highly granular, morphosyllabic nature of Chinese orthography could potentially compensate for deficits in L1 phonological assembly, it also places unprecedented demands on visual-spatial processing, orthographic memory, and rapid naming (RAN).

However, it is not possible to determine whether a non-alphabetic target script would mitigate or exacerbate a learner's pre-existing reading impairment through theoretical deduction alone. Empirical evidence is necessary to understand how L2 learners navigate this radical shift in cognitive architecture. A critical review of the literature is therefore required to firstly map how typical CSL learners master the complex mechanisms of reading and secondly evaluate how these processes break down when confronted with developmental dyslexia. The following sections systematically analyse these empirical findings, tracing the evolution of global CSL research and highlighting critical gaps regarding neurodivergent populations.

13 Japanese orthography comprises *kanji* (characters of Chinese origin) and *kana* (moraiic syllabic systems). For a detailed analysis, see Wydell, Butterworth 1999.

3 CSL Acquisition, Teaching, and Dyslexia: The State-of-the-Art

Over the past two decades, there has been a massive global increase in the number of CSL learners, driven by a diverse array of cultural, economic, technological, and educational factors. Consequently, the teaching of Chinese as a second language or foreign language has experienced extraordinary growth and rising importance during this period (Zhang, Han, Zhang 2023a). According to official data from the Chinese Ministry of Education, the Chinese language had been incorporated into the national education systems of 76 countries by the end of 2021, bringing the total number of individuals who have received formal training to nearly 200 million.¹⁴

To understand the current scale of this field, it is necessary to examine the foundational milestones of its development.

The learning and teaching of CSL has a long history. In the 1950s, CSL instruction primarily served China's foreign diplomacy, playing a vital role in helping the country establish international relations with socialist nations and the third world. The first academic article regarding CSL teaching was "Jiao fei hanzu xuexi hanyu de yixie wenti" 教非汉族学生学习汉语的一些问题 (Some Issues in Teaching Chinese to Non-Chinese Students) (Zhou 1953), published in China and using Chinese (Zhao, Huang 2010).

Later on, with China's reform and opening up policies in the late 1970s, the number of studies on CSL education increased steadily (Gong, Lai, Gao 2020).

Research on second language acquisition in China subsequently saw a shift in the 1980s, as scholars in the field of language sciences began to focus on the configuration of the linguistic-communicative systems of L2 learners (Buchetti et al. 2025). Within the European educational context, Rossi (2021, 14) captures this evolution by noting:

Chinese as a Foreign Language (CFL) has the double valence of being, at the same time, ancient and young. Ancient because it had already become the object of academic research and teaching back in the 19th century in Europe, and has gained over the years a more and more institutional recognition and a solid position in higher and secondary education. On the other hand, it can be also considered a relatively young discipline if viewed from

14 For official data regarding international Chinese language education, see The State Council of the People's Republic of China, "Education Ministry: Over 25m Foreigners Learning Chinese by End of 2021" (29 June 2022), available at https://english.www.gov.cn/statecouncil/ministries/202206/29/content_WS62bba005c6d02e533532ce5e.html.

the perspective of teaching and learning, since its processes, approaches and methods are in an ongoing phase of construction in the West.

With the beginning of the 21st century, in fact, there has been an explosion of interest in Asian languages worldwide, with a particular interest in modern Chinese. This language has gained a relevant position in several learning environments, predominantly in secondary schools, colleges, and universities. Despite its relatively recent introduction into many educational systems, modern Chinese has globally become the first non-European language included in high school and university curricula (for further details, refer to Rossi 2021). Outside of Europe, according to the 2021 Modern Language Association (MLA) report, Chinese is now the sixth most studied language in the United States.¹⁵

A critical factor in this global expansion was undoubtedly the establishment of the Confucius Institute network, beginning with the first launch in South Korea in 2004 (Gong, Lai, Gao 2020). According to recent news reports from late 2025, the network has expanded to include 510 Confucius Institutes operating across 164 countries and regions worldwide.¹⁶

As the number of learners grew, so did the intensity and diversity of CSL education research. Over the last 15 years, there has been a significant rise in publications in this field, alongside the development of new, emerging perspectives. While the majority of research on CSL education has been conducted by Chinese scholars and published in Chinese journals, international scholars and publications in English have also made notable efforts to meet the increasing global demand, especially in Western countries (Gong, Lyu, Gao 2018).

Scholars within and outside China exhibit different research foci regarding CSL instruction. Drawing on the comparative analysis by Gong, Lai and Gao (2020), studies published in Chinese journals are often concerned with instructional practices and teacher education and development. Conversely, studies published in international English-language journals usually concentrate on student learning outcomes and pedagogical approaches to facilitate language skill development, as well as students' intercultural competence and language learning in cross-cultural encounters. Furthermore,

15 See the full report *Enrollments in Languages Other Than English in US Institutions of Higher Education, Fall 2021*, by N. Lusin, T. Peterson, C. Sulewski and R. Zafer (2023) at <https://www.mla.org/content/download/191324/file/Enrollments-in-Languages-Other-ThanEnglish-in-US-Institutions-of-Higher-Education-Fall-2021.pdf>.

16 See the full article "Confucius Institute Continues Expansion with New Projects" by S. Zou, published in *China Daily* (17 November 2025), at <https://www.chinadaily.com.cn/a/202511/17/WS691b147fa310d6866eb29f01.html>.

a significant body of work among these various research foci has centred on the challenges and factors influencing the acquisition of reading skills in Chinese as a second language. This focus stems from the premise that Mandarin Chinese presents idiosyncratic hurdles for learners, e.g., tone acquisition and the high complexity of its morphosyllabic writing system (Ke 2020), features that have been discussed throughout the preceding sections of this work. These investigations examine a wide spectrum of cognitive and linguistic variables in various educational settings.¹⁷ Findings from such studies range from the discovery of neural and cognitive mechanisms to the practical improvement of language teaching practices; accordingly, scholars and experts in the field highlight the need for further research into the complexities of language learning, cross-linguistic transfer, and neurocognitive processes in different linguistic contexts (Zhang, Han, Zhang 2023a).

In Italy, the interest in the Chinese language and the consequent spread of its teaching and learning have grown steadily, a trend evident in both schools and universities (Buchetti et al. 2025). While Chinese studies enjoy a long academic tradition in Italy, dating back to the first chair of Far Eastern Languages inaugurated in 1864 in Florence, the discipline has recently undergone a process of interrogation and consolidation, reaching the status of a “scientific discipline” (Favaloro 2017, 98).

At the school level, particularly within secondary education, the number of students choosing Chinese as part of their regular curriculum is increasing significantly (Gabbianelli, Formica 2017). Following a period of autonomous curricular experimentation starting in 2004, a major milestone was reached in 2016 with the adoption of the Syllabus of Chinese Language (It. *Sillabo della lingua cinese*).¹⁸ This ministerial document, developed through collaboration between institutional and academic representatives, officially integrated Chinese into the national secondary school system and provided a standardised ‘framework of reference’ for the discipline nationwide (Antonucci, Zuccheri 2010; Favaloro 2017; Gabbianelli 2020). Recent analyses derived from ministerial reports highlight a significant

17 This body of literature specifically addresses early reading challenges, cross-linguistic transfer, and metacognitive monitoring, alongside the impacts of idiomatic expression processing, thematic relations, and semantic memory. Research also extends to linguistic distance, code-switching costs, sentence structure processing, context predictability, and the influence of heritage language exposure on L2 reading proficiency (Zhang, Han, Zhang 2023a).

18 For the full framework, see Italian Ministry of Education, University and Research (MIUR), *Il Sillabo della lingua cinese. Quadro di riferimento unitario per l'insegnamento della lingua cinese nella scuola secondaria di secondo grado* (Rome, 2016), available at <https://scuole.vda.it/images/news/sillabocinese.pdf>.

upward trend: between the 2014/15 and 2020/21 school years, the number of institutes offering curricular Chinese (including boarding schools and non-state schools) grew from 108 to 179, representing a remarkable increase of approximately 66%. This confirms its status as the most widely studied non-European language in the Italian school system, with a consolidation of its presence particularly in the *Licei Linguistici*, i.e., specialised high schools with a core curriculum focused on modern foreign languages and cultures (Buchetti et al. 2025).

At the university level, this expansion is evidenced by the growing number of institutions offering Chinese language and culture courses. According to census data by Antonucci and Zuccheri (2010), 40 Italian universities were offering Chinese courses in 2010. By 2016, reports from the Conference of Italian University Rectors (CRUI) indicated that out of 82 active universities, 47 (approx. 55%) offered curricular or extracurricular Chinese language programs (Buchetti et al. 2025). Again, this growth is often supported by the consolidated presence of Confucius Institutes and Confucius Classrooms integrated within Italian universities, complemented and reinforced by academic agreements that include approximately 80 active joint double-degree programs between Italian and Chinese universities (Buchetti et al. 2025).

This institutional progress has transformed the perception of Chinese from an ‘exotic’ subject into a core component of the Italian educational landscape (Favaloro 2017; Gabbianelli 2020). However, despite these advancements, pedagogical approaches in Italy remain in a ‘phase of construction’ (Rossi 2021). Challenges persist regarding the solidification of teaching methodologies and the development of adequate didactic resources. Moreover, there is a pressing need for dedicated research into personalised teaching approaches that address the diverse learning needs of CSL students, including those with literacy impairments, to ensure truly equitable and effective instruction (Verzì 2023; 2026a).

3.1 Studies on CSL Reading

Before narrowing the focus to dyslexia, it is essential to review the existing international literature on the acquisition of reading in CSL. Understanding how typical developing learners master this morphosyllabic system provides the necessary benchmark for identifying where the reading process ‘breaks down’ for learners with literacy impairments.

The structural distance between alphabetic L1s and the Chinese script creates a unique set of challenges for CSL learners, a theme that has dominated the research landscape over the last two decades

(Zhang, Han, Zhang 2023a). Although there is a substantial body of research focused on native Chinese speakers, the number of studies investigating the reading acquisition of CSL is comparatively limited. However, this area of research has received increasing attention in recent years and is gradually expanding.

This rising international attention is most prominently consolidated in the landmark collection edited by Zhang, Han and Zhang (2023a; 2023b): *Reading Acquisition of Chinese as a Second/Foreign Language* (volumes 1 and 2). Comprising thirty combined empirical investigations and systematic updates, these volumes represent the most extensive contemporary mapping of the cognitive, linguistic, and neurocognitive mechanisms underlying CSL literacy development. As articulated in their respective opening editorials (Zhang, Han, Zhang 2023c; 2023d), this extensive body of research attempts to isolate the ways in which L2 learners confront the distinct, complexities of a logographic script, ranging from its intense visual and spatial demands to its complete lack of inter-word boundaries. This marks a significant turning point in the field.

In order to fully understand the structural evolution that led to this current milestone, it is necessary to examine the systematic reviews and meta-analyses that formed the foundation immediately prior to it. Before this modern synthesis, Ke (2020) conducted a critical review that systematically outlined the structural landscape of L2 Chinese reading research, identifying 92 empirical studies published in international English-language journals between 1976 and 2018. Ke observed that the field had historically prioritised technology-assisted learning and mechanical character instruction over comprehensive reading assessment or the systematic evaluation of individual learner differences, a critical gap highly pertinent to the objectives of the present work. Li and Li (2020) corroborated this institutional imbalance by reviewing 142 Chinese-language and 72 English-language articles published between 2005 and 2019. Specifically, Li categorised the global research output into four dominant paradigms: pedagogy and teaching strategies (the primary focus of researchers in mainland China); recognition and writing studies, exploring the mechanics of character retention; the investigation of internal character knowledge and radical awareness; and computer-assisted character learning (the most heavily researched theme among scholars working outside China).

Finally, Chen and Zhao (2022)'s meta-analysis statistically quantified the precise metalinguistic factors driving CFL literacy acquisition through a comprehensive meta-analysis of 42 effect sizes from a sample of 1,103 subjects. They found that phonological, orthographic and morphological awareness, as well as rapid automatised naming (RAN), all maintain significant, moderate relationships with CSL word reading. Crucially, they identified a

distinct sensitive period for phonological learning, proving that the reliance on phonological processing is significantly stronger for beginning learners before fading as students advance.

Collectively, the body of global literature published over the last two decades has converged on several critical avenues for future research, with the aim of bridging the persistent gap between theoretical models and classroom realities. Ke (2020) proposes shifting towards word-level reading and conducting coordinated, cross-border research involving diverse CSL learner populations. Similarly, Zhang, Han and Zhang (2023a) point out that it is still unclear how learners from different linguistic backgrounds manage to master the complex Chinese orthography, syllable-character correspondence and word segmentation without inter-word spacing.

The research gap concerning individual learner differences mentioned by Ke (2020) is particularly evident when considering neurodivergent populations; specifically, the study of how dyslexia manifests in the L2 Chinese classroom remains one of the least explored dimensions of this global research landscape. In fact, there is a notable absence of empirical data regarding learners whose cognitive profile is already characterised by a reading impairment in their L1.

A synthesis of this extensive global pool of literature yields a clear analytical conclusion: despite the impressive scope of these studies, which span hundreds of empirical investigations and major systematic reviews involving thousands of diverse second language learners, learners with developmental dyslexia or underlying literacy impairments are completely absent from the empirical record: in other words, current CSL reading acquisition research implicitly assumes neurotypicality. By bypassing the structural and cognitive realities of neurodivergent students, the field lacks the empirical tools necessary to understand how deficits in L1 reading skills are affected by a non-alphabetic writing system.

3.2 Studies on CSL and Dyslexia: The Global Landscape

Research on dyslexia within the CSL context remains exceptionally scarce from a global perspective, with only a few geographic hubs contributing significant empirical data. To date, the Dyslexia Association of Singapore (DAS) has been the primary global contributor to this specialised field. Given the multicultural and multilingual context of Singapore, DAS has conducted extensive research through its own peer-reviewed publication, the *Asia Pacific Journal of Developmental Differences* (APJDD). Launched to address a wide range of special educational needs – including dyslexia, autism, dyspraxia, dyscalculia, and ADHD – within the Asia-Pacific context,

the journal began publishing dedicated research on the intersection of CSL learning and dyslexia in 2014. This comprised a landmark study that, to the author's knowledge, stands as the first formal publication investigating English-Chinese bilingual children learning Chinese as a second language (Lee, Poon 2014). This institutional focus is inherently tied to the specific linguistic environment of Singaporean society – previously discussed in Section 2.4 – where the requirement for students to navigate the bilingual demands of English and Chinese has necessitated the development of specialised intervention models and substantial empirical work.

In the European context, a significant contribution to understanding these cross-linguistic challenges is provided by Kuester-Gruber et al. (2023), who investigated German-speaking children with and without dyslexia as absolute beginners learning Chinese. Their research used eye-tracking technology to observe how these learners processed characters. The findings showed that dyslexic children did not differ significantly from the control group in terms of their eye movements when naming Chinese characters. However, their overall accuracy in naming these characters was significantly lower. These results imply that a morphosyllabic script like Chinese may not offer a simple compensatory advantage against underlying phonological deficits. According to Kuester-Gruber et al.'s study, despite the employment of alternative visual processing strategies, core phonological and naming difficulties can still significantly hinder accurate L2 performance.

Complementing these findings within Europe, the Italian context has emerged as a major centre of research activity, offering a unique linguistic perspective due to the stark contrast between the Italian transparent alphabetic system and the morphosyllabic nature of Chinese. As Italy has established itself as a key contributor to the investigation of SLDs within Chinese second language acquisition, the following section details the specific findings of Italian scholars and the broader national response to dyslexia in the CSL classroom.

3.3 Mapping the National Response: The Italian Context

Within the European landscape, Italy has distinguished itself as one of the most dynamic hubs for research into the teaching and learning of Chinese as a Second Language for students with SLDs. This interest has been driven by the rapid expansion of Chinese as a curricular subject in Italian secondary schools and the parallel necessity of ensuring inclusive educational pathways for all learners, in accordance with national legislation (Scibetta, Wang, Francolino 2026).

Italian research in this field has evolved from an exploratory phase based on daily teaching experiences towards a more systematic experimental stage. Early contributions were provided by Formica (2018), who shared operational models aimed at facilitating Chinese instruction in the high school classroom. Similarly, Cai and Piccioni (2017) analysed the intrinsic difficulties related to the morphosyllabic nature of Chinese writing for high school learners of L2 Chinese, highlighting the importance of targeted pedagogical adaptations to compensate for decoding deficits. A fundamental step towards academic inclusion was marked by the work of Giaconi et al. (2019) and Gesù (2019) at the University of Macerata, Italy. Their project represented a pioneering initiative aimed at making university-level Chinese instruction more accessible, promoting the creation of specific teaching materials and the identification of support strategies for dyslexic students.

Recently, the debate has been enriched by studies employing advanced investigative methodologies. Verzi (2023; 2026a) and Verzi and Roccaforte (2024) used eye-tracking techniques to examine the reading patterns of Italian CSL university students with dyslexia, providing new evidence on the visual processing of characters and suggesting that iconic representations can serve as strategic supports. Complementing this experimental approach, the work of Cirola (2026a; 2026b) fits into this framework, addressing the critical need for standardised assessment tools. Through the development of an experimental battery designed for high school learners of L2 Chinese with and without L1 literacy impairments, her research aims to identify the cognitive-linguistic predictors of success in L2 Chinese reading and writing. This research is closely linked to the intervention study by Bianchi and Novelli (2024; Novelli 2026), which puts into practice evidence-based techniques, such as multisensory learning and visual association, to reduce learning obstacles for all students, both with and without dyslexia.

The edited volume by Scibetta, Wang and Francolino (2026)¹⁹ represents the most recent and complete synthesis of the national literature on this topic. The primary added value of this work lies in its promotion of a significant paradigm shift: moving away from 'compensatory' adaptations for individual students and advancing towards the proactive design of accessible, inclusive, and sustainable learning pathways for the entire class. By bridging the gap between theoretical research and daily classroom practice, the volume fosters

19 Several of the works cited in this Section (e.g., Verzi 2026b; Cirola 2026b; Novelli 2026) are included as chapters within this volume (Scibetta, Wang, Francolino 2026), alongside various other significant contributions to the field of CSL inclusive education. For a comprehensive overview of these studies, readers are encouraged to refer directly to the full volume.

a synergy between the university and secondary school contexts. It addresses accessibility not merely as a set of dispensatory measures, but as a universal pedagogical requirement that benefits all learners by adapting to a plurality of cognitive styles.

In conclusion, Italy has established itself as an excellent scientific laboratory for studying dyslexia within the context of the CSL educational system. This has laid the foundations for a national body of literature based on robust theoretical frameworks. However, there are still some critical gaps, particularly with regard to the generalisability of empirical data across larger cohorts. These gaps will be discussed further in Section 4.

4 Conclusions

The present literature review has mapped the evolution of Chinese as a Second Language from a niche academic pursuit to a global educational phenomenon, while concurrently examining the robust body of cross-linguistic research regarding L1 literacy acquisition and the diverse manifestation of literacy impairments, such as developmental dyslexia, in acquiring both an L1 and an L2. Within this landscape, the specific intersection of dyslexia and CSL acquisition has emerged as a critical, albeit underexplored, field of inquiry. This final section provides a synthesis of the central themes and evidence identified in the literature, discusses the inherent limitations of the current research state, and outlines future directions for the discipline.

4.1 Discussion and Limitations of Current Research

This consolidation of evidence reveals that orthographic depth, phonological awareness, and the typological distance between languages play a significant role in the manifestation of dyslexia. Contrasting the Italian and Chinese contexts shows that dyslexia is not a monolithic difficulty, but rather a dynamic interaction between cognitive deficits and the specific demands of a writing system. In the Italian context, where the alphabetic script is highly transparent, dyslexia primarily manifests as deficits in phonological awareness, reading fluency and speed; however, decoding accuracy remains relatively intact. In contrast, in the Chinese context, the nature of the impairment is quite different: the morphosyllabic nature of the script places greater emphasis on orthographic and morphological awareness, as well as visual-spatial processing and RAN awareness. Consequently, while Italian learners struggle with the automaticity of phoneme-to-grapheme mapping, Chinese learners, as well as those

in Singapore's bilingual environment, have particular difficulty with character recognition, awareness of radical position, and distinguishing between visually similar orthographic neighbours.

This cross-linguistic comparison underscores a fundamental shift in the scientific understanding of dyslexia – moving from a single-deficit phonological model towards the multifactorial perspective supported by recent consensus (Carroll et al. 2025). As discussed in Section 2, the 'face' of dyslexia is effectively filtered through the orthography. For the Italian L2 learner of Chinese, this creates a 'double burden'. These learners must not only manage their existing L1 deficits – likely centred on processing speed and phonological retrieval – but must also develop entirely new cognitive strategies for a script that provides no inherent alphabetic cues to phonology except for the initial temporary support of *Pinyin*. While *Pinyin* remains a necessary lifelong reference for acquiring new vocabulary, the ultimate goal of CSL literacy – the direct recognition of characters – represents the primary cognitive hurdle for all learners; however, further empirical research is specifically needed to confirm if recognising and reading characters is truly the exact stage where the CSL reading process fails for students with dyslexia.

The most significant limitation identified in this study is the extreme scarcity of empirical data, with research currently concentrated in a few geographic hubs, primarily Italy and Singapore. While these regions provide invaluable both longitudinal and cross-sectional insights, the global applicability of their findings is limited by several factors that remain unresolved in the broader literature. Most notably, the influence of the native language on the acquisition of the second language, often referred to as cross-linguistic transfer, remains a critical gap, as the majority of studies focus exclusively on English-Chinese or Italian-Chinese learners. Consequently, there is a lack of data regarding how learners from other diverse linguistic backgrounds experience dyslexia in the CSL classroom, particularly those coming from other opaque alphabetic systems like Danish or Swedish, different script families such as Arabic or Cyrillic, or systems involving different levels of granularity like Japanese, where the highly granular morphosyllabic *kanji* contrasts with the transparent syllabic *kana*. Understanding whether an opaque L1 background provides a different 'transfer effect' compared to a transparent L1 background is essential for building a truly universal theoretical framework for dyslexia in CSL acquisition.

Furthermore, the generalizability of existing research is hindered by small sample sizes, as many studies are either qualitative case studies or involve cohorts that are too limited to represent the broader CSL population. This issue is further complicated by a lack of standardised assessment tools for identifying dyslexia specifically in CSL learners, which leads to persistent methodological

discrepancies. The result is that researchers and practitioners often have to rely on L1 diagnoses and pedagogical suggestions that usually work for other L2s (e.g., English), but do not necessarily work for Chinese. Such borrowed frameworks may fail to capture the full scope of L2-specific difficulties, as they tend to ignore the unique orthographic and morphological demands of a non-alphabetic script. Finally, regarding the exhaustiveness of this survey, it must be acknowledged that while the Dyslexia Association of Singapore (DAS) and the Italian scholarly community have been identified as the primary global hubs for pedagogical research thanks to their organised and institutionalised approaches, the rapid globalisation of CSL suggests that smaller research clusters or localised clinical studies may exist beyond these regions. Although a rigorous search by the author did not reveal further formal empirical publications of comparable scale, future researchers may discover other niche studies as the field continues to transition from an experimental phase to a broader pedagogical discipline.

4.2 Future Directions and Pedagogical Implications

In order to advance the field, research must shift its focus from merely identifying deficits to developing validated pedagogical interventions and robust empirical methodologies. To guide this transition, future scholarly efforts should be directed along two primary axes.

1. **Technology-Enhanced Teaching and Learner Corpus Research**

The expansion of multisensory instructional models represents one of the most promising avenues for non-alphabetic reading instruction. In their review of multisensory interventions for dyslexic learners, Lim, Yeo and Handayani (2023) highlight how Visual, Auditory, Kinesthetic, and Tactile (VAKT) techniques, such as the Orton-Gillingham (OG) approach, Fernald methods, and tactile symbol tracing, consistently improve oral reading, word recognition, and letter-reversal errors across various writing systems. This multisensory approach has recently received direct empirical support also within the Italian CSL dyslexia literature (e.g., Novelli 2026), proving that tactile stroke-tracing and visual association significantly reduce learning obstacles for L2 Chinese learners with reading impairments.

Within the fields of Computer-Assisted Language Learning (CALL), Mobile-Assisted Language Learning (MALL) and Assistive Technology (AT), researchers must design and validate digital strategies targeted at non-alphabetic scripts. As Pothuri and Kumar's (2025) systematic review demonstrated,

interactive, multisensory and teacher-supported CALL and MALL tools significantly improve reading, spelling and engagement for dyslexic learners. In the field of L1 Chinese literacy, recent technological innovations provide promising solutions: interactive character-learning applications (Fan et al. 2025) offer dynamic radical decomposition to support young readers with dyslexia, and adaptive, AI-driven digital tutoring environments (Wang, Kuo 2026) provide personalised support that significantly increases intrinsic motivation and problem-solving skills among native Chinese primary school students with dyslexia. However, Fan et al. (2025) and Wang, Kuo (2026) both focus strictly on the native L1 Chinese population. Therefore, the direct efficacy of these models as formal compensatory mechanisms for CSL dyslexic readers requires further empirical testing.

Furthermore, a highly promising but currently untapped resource is the compilation of specialised learner corpora for CSL and dyslexia. For instance, Radar and Gilquin (2024) demonstrated the power of process-oriented corpus research by using keystroke logging to analyse real-time pause and revision behaviours in dyslexic university students learning a second language. While research at the intersection of learner corpora and dyslexia has begun to take shape within alphabetic SLA, this methodology has yet to be systematically applied to non-alphabetic second language acquisition. Compiling such specialised CSL corpora would make it possible to empirically track interlanguage development, pinpoint cognitive challenges during character production, and design evidence-based pedagogical interventions.

2. Institutional Policy Realignment and Language-Specific Accommodations

To bridge the gap between academic theory and classroom reality, future research should actively drive institutional policy reform, particularly within highly structured educational environments like the Italian secondary school system. As exposed in Section 2.6, the standardised foreign language sections of Personalised Didactic Plans (PDPs) suffer from a severe alphabetic-centred bias. They prescribe uniform accommodations designed for Western European alphabetic languages, completely failing to address the visual-spatial and morphosyllabic hurdles unique to the Chinese writing system. Consequently, future empirical findings must be translated into systemic policy updates. Researchers, educational planners, and technology developers must collaborate to redesign PDP templates, moving away from cross-language uniformity and towards language-specific guidelines. To make

this policy transition possible, future research must prioritise experimental, classroom-based studies that rigorously test and prove new compensatory tools specifically designed for dyslexic CSL learners. Only once these non-alphabetic interventions have been empirically validated on CSL student populations can they be formally legitimised and integrated into customised PDP frameworks.

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