

# Does Dyslexia Occur Among Japanese English Language Learners?

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Dyslexia is the most commonly diagnosed learning disability in the English-speaking world, affecting between 10 and 20 percent of the adult population of countries such as the United States, Britain, and Canada (International Dyslexia Association, 2016). While diagnosis and treatment of dyslexia focusses on the act of reading, the underlying cause of the condition is thought to be a phonological processing disorder that inhibits an individual's ability to identify separate speech sounds (International Dyslexia Association, 2002). Awareness of dyslexia has risen steadily among speakers of other languages, but for Japanese citizens and educators it remains a relatively unknown phenomenon. Differences in the orthography of languages affect reading in ways that can greatly impact the likelihood of an individual acquiring literacy (Paulesu et al., 2001). Understanding these influences is essential to ensuring the best outcomes for Japanese English language learners.

失読症は英語圏では一般的な学習障害であり、米国、英国、カナダなどでは成人人口の約10~20%に見られる(International Dyslexia Association, 2016;)。失読症の診断や治療は読書する行為に着目しているが、その症状の原因は、個々の言語音(speech sounds)を聞き分ける能力を妨げる音韻(音素)処理障害と考えられている(International Dyslexia Association, 2002)。他の言語の国々においても失読症への認識は高まっているが、日本の一般人や教育者においては未だ比較的認知されていない状態である。言語の正字法における違いは流暢に読めるようになる能力に大きく影響する(Paulesu et al., 2001)。これらの違いを理解する事は、全ての日本人英語学習者にとって最善の学習成果をもたらすために重要なものとなる。

**B**ack in the late 1990s, a case study appeared that held great interest for those who study dyslexia as it relates to second language education (Wydell & Butterworth, 1999). In it the authors told of a young man, born of English parents yet raised in Japan, who manifested an unexpected condition that baffled those tasked with making sense of it. Although he demonstrated perfect spoken fluency in both English and Japanese, he was discovered to be severely dyslexic in just one of his native tongues. In the case of English, the young man suffered from chronic problems with accurate and efficient word reading and spelling. However, this same young man had progressed through the entire Japanese education system, consistently performing above average among readers his age.

The young man's struggles with English reading struck a chord with those who had studied dyslexia across linguistic contexts. Although it had been observed that dyslexia often passed from parent to child, suggesting a genetic basis for the condition (Francks, MacPhie, & Monaco, 2002), prevalence varied significantly from one language group to the next (e.g., Everatt, Smythe, & Ocampo, 2004; Helmuth, 2001; Kornev, Rakhlin, & Grigorenko, 2010; Lindgren, Renzi, & Richman, 1985). Early research conducted in Italy and the United States reported that developmental dyslexia occurs at a considerably lower rate among Italian speakers than it does among English-speaking Americans (Lindgren et al., 1985). Subsequent studies, however, demonstrated that this disparity is almost certainly the result of an interaction effect between neurological factors and the orthographic characteristics of languages (Paulesu et al., 2001).

## Differences in Writing Systems

Languages that exhibit a high degree of consistency in the way that sounds are represented by the writing system are said to possess transparent orthography. Meanwhile, languages that demonstrate weak correspondence between sounds and their graphic representations (graphemes) are referred to as having opaque orthography (Katz & Frost, 1992). Returning to the case of English and Italian, the roughly 40 distinct phonemes that make up the English language may be spelled in over 1000 different ways, while the 25 sounds that constitute Italian may be spelled in just 33 different ways (Helmuth, 2001).

In their 2001 study, Paulesu et al. tested the reading and phonological (sound processing) skills of English, French, and Italian-speaking dyslexics. While Italian subjects scored better on reading tests, they performed as poorly as English and French dyslexics on phonological processing tasks. Positron emission tomography (PET) scans of the subjects' brain activity while reading revealed reduced activation of the left temporal lobe among *all* subjects, regardless of language. The disparity in reading per-

formance between the groups, therefore, could not be explained by neurobiological factors alone. In other words, while the Italian, English and French dyslexics all suffered from the underlying *cause* of dyslexia (impaired phonological processing), the *symptoms* of dyslexia were least apparent among the Italian group. The Paulesu study suggests that the complexity of a language's orthography can affect both the severity of the symptoms of dyslexia and the ease with which the condition is diagnosed. As such, there are likely to be large numbers of undetected cases of dyslexia among speakers of languages with transparent orthographies, while mild cases of the condition may be exacerbated in languages where the orthography is highly irregular.

It is worth pausing at this point to consider the nature of the Japanese writing system. The modern Japanese writing system consists of a mixture of three different character types: *kanji*, which originate from Chinese and are logographic in nature; *hiragana*, a syllabic (or, perhaps more accurately, moraic) system of characters used primarily for native Japanese words and grammatical elements; and *katakana*, another set of syllabic characters used mostly for foreign words or names (Habein, 1984). Kanji are logograms (word pictures) that represent words or morphemes. They also map to general concepts that may or may not contribute to the meaning of the word being represented. Most kanji have at least two possible pronunciations, an *on'yomi* (based on the original Chinese pronunciation) and a *kun'yomi* (derived from native Japanese), though many have considerably more. Regarding the graphemes that make up hiragana and katakana, the majority map to syllables rather than phonemes. The notable exceptions to this are the vowel sounds /a/, /i/, /u<sup>h</sup>/, /e/, /o/ represented in hiragana by あ, い, う, え, お (katakana ア, イ, ウ, エ, オ) and the consonant ん (katakana ン) which, depending on the context, is pronounced as either /n/ or /m/.

An obvious question at this point would be: Where along the spectrum of transparent and opaque orthographies does the Japanese writing system sit? Is it closer to Italian, with its highly regular orthography, or does it more closely resemble English, with its complex and inconsistent system of matching symbols and sounds? In the case of hiragana and katakana, they are completely regular and transparent in the ways in which they represent sound. Consider the example of the hiragana こ (katakana コ). Regardless of context, this character will always indicate the sound /ko/. Likewise, no other hiragana (alone or in combination) can be used to represent /ko/. According to the logic of Paulesu et al. (2001), reading Japanese hiragana and katakana

requires accessing a relatively simple set of rules connecting sounds to their graphic representations.

The work of Paulesu et al. (2001) is invaluable for the insight it provides into cases such as that of the young man who was dyslexic in English but not Japanese. While the experience of reading differed vastly in each language, the underlying neurobiological impairment remained constant. It would be natural to think that Japanese with its three writing systems (hiragana, katakana, and kanji) poses greater challenges to literacy than English with its comparatively simple 26-letter alphabet. However, the phonological processing problems associated with developmental dyslexia disrupt the ability to dissect words into their component sounds. As such, writing systems that require readers to analyze phonemes, the smallest units of sound that differentiate word meanings in a language, are more likely to present difficulties for dyslexic readers. As Wydell (2012) puts it, the granularity of the smallest orthographic unit is coarser in Japanese than it is in English, which explains the disparity in the prevalence of dyslexia between the two languages.

The problem with the explanation provided above is that it does not account for the role of kanji in Japanese reading. The prevalence of dyslexia in logographic languages (e.g., Chinese and Japanese) has been explored in great detail in recent years, most notably in a study by Siok, Perfetti, Jin and Tan (2004), which examined the brains of Chinese readers. The work of Siok et al. (2004) revealed that peak neurological activation while reading Chinese occurs outside the region of the brain typically used when reading phonemic scripts such as English. Indeed, it appears that reading logographic languages places greater demands on areas of the brain associated with recognizing visual patterns. As such, the neurobiological impairment that disrupts literacy in the phonemic languages studied by Paulesu et al. (2001) fails to emerge as a significant obstacle to the reading of kanji and other logographic scripts.

### The Challenges of Diagnosing Monolingual Dyslexia

In 2006, the Japanese Ministry of Education, Culture, Sports, Science and Technology (MEXT) expanded provisions for special needs education for students with learning disabilities (MEXT, n.d.-c). Subsequent laws, including the Act on the Elimination of Discrimination against Persons with Disabilities, bolstered those protections by pledging to extend "reasonable accommodation" (Cabinet Office, Government of Japan, n.d., p. 1) in order to remove social barriers and prevent exclusion. However,

unless the acquisition of native language literacy has been severely compromised, English language learners with the phonological processing problems associated with monolingual dyslexia are unlikely ever to receive a proper diagnosis. Indeed, for native speakers of Japanese, problems with English reading are more likely to be attributed to a lack of facility with foreign languages than a recognized learning disability (Makino & Miyamoto, 2002).

Although understanding the interplay of linguistic and neurobiological factors that influence dyslexia is complex and difficult, identifying the symptoms in learners need not be. There are a number of indicators that may be observed during the course of normal classroom interactions that English language teachers can be trained to recognize. Perhaps the most important of these is prolonged and excessive reliance on kana in both encoding appropriate pronunciation and decoding English words. English language textbooks in Japan often encourage the practice of subscripting unfamiliar English words with katakana notations, ostensibly as an aid to pronunciation. Foreign names are often presented with katakana written beside or beneath, and teachers regularly use katakana to scaffold learners struggling to remember the pronunciation of difficult words. However, as learners accumulate experience in the language, they should be able to decrease and eventually eliminate their reliance on native scripts in the process of reading English. Those who cannot deserve further observation in order to determine the source of the problem.

As teachers come to know the strengths and weaknesses of their learners, they may also notice large discrepancies between an individual's reading skills and his or her listening and speaking skills. According to Olagboyega (2008), such discrepancies are predictive of reading disorders such as dyslexia and, as such, should not be overlooked. While it is true that dyslexics often perform better when tested orally (Davis, 1992), the same can be said of some who are developmentally normal in terms of reading performance. To an extent, variance between a language learner's accomplishments in different skill areas is normal. What teachers should be looking for are significant differences in performance that persist despite sufficient practice and adequate instruction.

Strophosymbolia, the practice of reversing letters (e.g., using *b* in place of *d* and *vice versa*), is often posited as a hallmark of dyslexia (Lilienfeld, Lynn, Ruscio, & Beyerstein, 2010) even though it is observed in dyslexics and non-dyslexics alike (Cornell, 1985). Recent research by Blackburne et al. (2014) into the neural correlates of letter reversal

suggests that the ability to “distinguish between typical and reversed letters may develop slowly” (p. 1) which helps to explain the lingering uncertainty as to whether or not dyslexics manifest a selective propensity for the trait. In all contexts, including English language teaching, one ought to be wary of using letter reversals as a rough and ready diagnostic of dyslexia. It is possible, likely even, that the practice is the result of simple confusion or a lack of experience with the written forms of the language. Learners of Japanese may find it helpful to recall their early struggles differentiating the katakana  $\text{マ}/\text{ma}/$  and  $\text{ム}/\text{mu}/$ .

Teachers whose learners manifest symptoms similar to those outlined here will no doubt wonder about an appropriate course of action. Even for those with expertise in recognizing monolingual dyslexia, it is often difficult to differentiate genuine impairment from a lack of knowledge and experience with English (especially at low levels of proficiency). Nonetheless, there are a number of simple field tests that reduce the influence of language knowledge (or lack thereof) on a learner's performance.

Because the etiology of monolingual dyslexia resides in the phonological processing area of the brain, the most effective diagnostic tools are those that require the subject to identify, differentiate, or manipulate units of sound (Torgesen & Mathes, 2002). Examples of such tasks include: phoneme identification, phoneme isolation, phoneme blending, and phoneme segmentation, among others. These tasks isolate sound processing capabilities from word knowledge, which is essential for the reasons outlined above. In order to assess phoneme identification skills, the tester reads a set of three words (e.g., *fix*, *fall*, *fun*) and asks the subject to identify the sound (phoneme) that is common to all three (/f/). Concerning phoneme isolation, there are two types: initial and final. Initial phoneme isolation requires the subject to pronounce the phoneme that comes at the beginning of a word spoken by the tester. Final phoneme isolation involves pronouncing the phoneme at the end of a spoken word. For example, if the tester speaks the word *bin*, the subject would be expected to respond with /b/ in the case of initial phoneme isolation and /n/ in the case of final phoneme isolation. The last two phonological processing tasks, phoneme blending and phoneme segmentation, are those which dyslexics are likely to find most challenging. Phoneme blending requires the subject to form a word by combining the individual phonemes spoken by the tester. For example, if the tester pronounces /b/ /e/ /d/, the subject would be expected to respond with the

word 'bed'. In the case of phoneme segmentation, the tester would speak a complete word (e.g., *name*) and the subject would respond with /n/ /æ/ /m/.

It is important to keep in mind that the tests described above cannot, on their own, confirm or exclude a diagnosis of monolingual dyslexia. Indeed, as Coulson et al. (2013) report, phonological deficits are also observed among non-reading-disabled Japanese English language learners of low proficiency. At best, such tasks are capable of identifying learners with poor phonological awareness who require remediation or accommodation of one form or another.

### Reasonable Accommodation

Developmental dyslexia is a chronic condition with a neurobiological basis. Although its symptoms may be alleviated through medical, educational, or technological interventions, the causal roots of the condition remain stubbornly intact. In the absence of a cure, our attention should turn to reducing the disadvantage incurred by those living with dyslexia. The United Nations Convention on the Rights of Persons with Disabilities (CRPD), of which Japan is a signatory, stipulates that "reasonable accommodation" (2006, p. 4) be extended to those with disabilities in order to meet the objectives of inclusive education. The CRPD defines reasonable accommodation as "necessary and appropriate modification and adjustments... to ensure to persons with disabilities the enjoyment or exercise on an equal basis with others of all human rights and fundamental freedoms" (p. 4). However, the decision of which accommodations will be made and how they will be implemented is something to be determined by the individual signatories. What seems certain is that no action will be taken on the issue of monolingual dyslexia in Japan without pressure from those closest to the problem, namely teachers, parents, and the learners themselves. As successive governments introduce measures aimed at enhancing English language education, such as the Global 30 program (MEXT n.d.-a) and the Super Global High School Program (MEXT n.d.-b), there is a real risk that those with monolingual dyslexia will be even further disadvantaged. More than ever, Japan requires highly informed, knowledgeable teachers and policy-makers willing to act in the interests of those struggling with this particular disability.

### Conclusion

Meara, Coltheart, and Masterson (1985) were among the first in the field of English language teaching to draw attention to the possibility that a learner

with apparently normal first language reading skills could experience significant difficulties acquiring literacy in English. Although they correctly attributed the phenomenon to the orthographic complexity of English, the exact etiology of monolingual dyslexia remained unclear until advances in neuroimaging enabled greater scrutiny of the neurobiological factors involved. Research efforts made in the past decade have gone a long way to filling the gaps in our understanding of developmental dyslexia and other reading disorders. However, there is a great deal that remains unknown, especially concerning the challenges faced by readers of non-alphabetic scripts. If it is true that the symptoms of dyslexia are aggravated by the opaque orthography of the English language (and, by contrast, eased by the orthographic regularity of hiragana and katakana) then it is certain that a percentage of Japanese learners of English will fail to acquire second language literacy due to factors that cannot be addressed either by existing classroom practices or the current suite of policies related to English education in Japan. Greater awareness of the issue of monolingual dyslexia among language teachers is a vital first step in bringing this issue the attention it deserves.

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