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Language and Dyslexia: The Influence of Morphological Awareness on the Literacy Development of Children with Dyslexia

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Introduction

Dyslexia affects approximately 7-10% of the English-speaking population (Kalashnikova et al., 2019) and is a "persistent and unexplained difficulty in achieving accurate and/or fluent word recognition skills, despite adequate intelligence and opportunity" (Waldie et al., 2017, p. 29). Dyslexia is a heritable learning disability with a prevalence of 35-40% among boys and 20% among girls (Snowling & Stackhouse, 2006). Children are expected to be competent using their native language by the time they start school around five years old. Those who are at risk for dyslexia might start showing problems as early as between two and five years old in their receptive and expressive vocabulary, use of grammar, and narrative skills. Those with dyslexia are also likely to exhibit deficits in tasks involving phonological awareness, short-term verbal memory, non-word repetition accuracy, naming speed, and speech rate. These skills might also develop at a slower pace among children with dyslexia, but there is variation in the severity of deficits among the dyslexic population (Snowling & Stackhouse, 2006).

Difficulties in the phonological domain are the most typical and widely researched among children with dyslexia. This includes limitations of verbal short-term memory and problems with phonological awareness (Snowling & Stackhouse, 2006). Phonology is the system that maps speech sounds to meanings. Learning to read in an alphabetic system, such as English, requires the development of the mapping between speech sounds and letters; however, phonological awareness is not the only domain affected by dyslexia. Wider skills are also required to understand the meanings of words and sentences and to integrate these meanings into texts. (Snowling & Stackhouse, 2006).

Morphemes are the smallest linguistic units that convey meaning. These units also play an important role in literacy, as they contribute to word recognition as well as spelling and

reading comprehension. Morphological awareness is the "explicit awareness and ability to manipulate and reflect upon the morphemic structure of words" (Law & Ghesquière, 2017, p.47). An awareness of the morphemic structure of one's language may also contribute to reading and spelling skills independent of orthographic processing and phonological awareness (Law & Ghesquière, 2017). Children with dyslexia face deficits in morphological awareness, which then plays an essential role in reading and spelling development.

Morphological Awareness and Reading Accuracy

Derivational Morphology

Morphological awareness influences many aspects of reading ability. It is therefore a factor in reading success or failure (Casalis et al., 2004). The majority of the vocabulary that individuals are exposed to daily is morphologically complex (Nagy & Anderson, 1984 qtd. Casalis et al., 2004) and sensitivity to derivational morphemes is a developmental skill that increases with age into adolescence (Siegel, 2008). The process of encoding this morphological information occurs in three stages: mapping, licensing, and combination (Casalis et al., 2004). Mapping occurs when a speech input is mapped onto a form-based representation of a free or bound morpheme. Licensing then involves forming the subcategorization properties of these representations. This is done by forming the semantic and syntactic structure of the input to determine what the distribution or class of the form is going to be. Lastly, the combination stage incorporates these formed syntactic and semantic representations and integrates them into the mental lexicon (Schreuder and Baauen, 1995 qtd. Casalis et al., 2004).

When comparing children with dyslexia to reading-age and chronological-aged matched peers on morphological tasks, Casalis et al. found that children with dyslexia performed below children in the chronological-age control group on all of the morphological tasks. Measures such as sentence completion and production after definition assessed the productive knowledge of derived words by requiring children to complete sentences with either a derived word given the base, or a base word given the derived word. While children with dyslexia were impaired in all measures of morphological awareness, these productive knowledge measures were found to be more difficult for children with dyslexia than formal analyses, such as blending and segmentation. Children in the dyslexia group performed the same as children in the reading-age control group for these productive knowledge tasks, but worse than their reading-matched peers in formal tasks. This supports the view that the productive knowledge of derivations may develop in parallel with learning to read (Casalis et al., 2004). The difference in formal tasks could be due to a deficit in the first stage of morphological processing, which relies on segmentation. This underperformance of children with dyslexia compared to non-dyslexic readers indicates that morphological skills may not develop normally in children with developmental dyslexia (Casalis et at., 2004).

Using the Sentence Analogy Task (1997), Robertson et al. (2013) assessed inflectional morphological awareness in dyslexic and non-dyslexic children in the third and sixth grades. This task measured the spelling of regular past tense verbs, irregular past tense verbs, and non-verbs. Half of each set had a /d/ sound ending while the other half had a /t/ sound ending. All children generalized the *-ed* ending to irregular verbs more often than to non-verbs, demonstrating that children with dyslexia may use similar strategies as the typically developing children when spelling; however, the group with dyslexia was poorer than both spelling-age and

reading-age matched control groups in their ability to apply the *-ed* ending to regular past tenses (Robertson et al., 2013). The observation that children with dyslexia have difficulty with regular and irregular past tenses supports the hypothesis that language problems in dyslexia extend beyond the domain of visual word recognition and phonology, at least in comparison with age-matched controls. Children with dyslexia do not differ significantly from the younger control group on past-tense morphology elicitation tests, suggesting that they lag behind their peers in developing these abilities. These results are also consistent with the possibility that morphological deficits could be a consequence of reading experience and begin to introduce a morphological deficit related to both reading and spelling achievement (Robertson et al., 2013).

Bi-directionality between Morphological Awareness and Reading Accuracy

Law and Ghesquière (2017) examined the development of morphological awareness in the pre-reading phase through early literacy in a longitudinal study. The researchers followed children from kindergarten to the beginning of second grade and found that morphological awareness significantly contributes to later reading and spelling. Children in kindergarten were assessed on both their receptive and productive letter knowledge with the letter writing and naming subtests of the Wide Range Achievement Test (WRAT3, 2001). These tests presented children with a series of fifteen printed letters and asked them to name each letter. The Wug Test (1958) measured the morphological awareness of the children by requiring the addition of a suffix to a target pseudo-word, such a *wug.* Children who had literacy difficulties compared to the control group in second grade also had difficulties in morphological awareness in kindergarten (Law and Ghesquière, 2017). Law and Ghesquière (2017) found evidence of a bi-directional relationship between morphological awareness and reading achievement.

Morphological awareness can help children develop reading skills while reading accuracy can also help children to develop their morphological awareness skills. While deficits in phonological awareness were found to co-exist with morphological awareness throughout the stages of reading development in this study, phonological awareness was found only to make a significant contribution to morphological awareness development in the early stages of formal reading instruction in kindergarten. This further supports that in a case where a child has a pre-reading deficit in phonological awareness, both morphological awareness and early literacy achievement could be negatively affected (Law & Ghesquière, 2017). Early morphological awareness supports children in their learning to read. Likewise, early reading accuracy could also support children in learning morphological awareness skills (Deacon et al., 2013).

Processing Speed

Dyslexia not only affects the accuracy of children's reading, but also the speed at which they read. Egan and Pring (2004) compared the processing speed of inflected verbs in children with dyslexia to non-dyslexic poor readers, spelling-and reading-matched children, and chronological-age matched children. When it came to making decisions about verb tense on visually presented couplets of regularly inflected verbs, the dyslexic group performed at a slower pace than the control groups (Egan & Pring, 2004). Measures of grammar showed that the children were not deficient in their knowledge of grammar in terms of reading ability, but they processed regular inflections at a slower rate than typically developing children did. This may be because some children with dyslexia form lexical representations of regularly inflected verbs differently than other children do. It could also be that they store regular verb stems and inflections in a similar way to children of the same reading level, but the representations of verbs

and suffixes may not be developed sufficiently (Egan & Pring, 2004). Dyslexic children performed similarly to younger children of the same reading ability, and worse than children of the same age on morphological awareness tasks and spellings of regular past tense verbs and non-verbs (Egan & Pring, 2004).

Morphological Awareness and Spelling Accuracy

Flaps and Consonant Clusters

The problems that dyslexic children encounter in spelling tend to be more profound than their difficulties in reading and often persist into adulthood, even when adequate levels of reading have been attained (Egan & Tainturier, 2011). One way to examine deficits in spelling can be with the assessment of flaps and consonant clusters. In an alphabetic writing system, spelling involves the segmentation of a spoken word into individual sounds and then selecting a letter to represent each sound (Bourassa & Treiman, 2008). Links between phonemes and graphemes that are irregular or unpredictable cause difficulty for all language learners. In the case of a one-to-many link between sounds and letters, considering the sound's position in the word or syllable, or the identity of the surrounding sounds could aid the speller in choosing the correct letter (Kessler & Trieman, 2001 qtd. Bourassa et al., 2006). In cases that involve flaps this can be difficult. Flaps are are made with the tap of the tongue against the ridge that lies behind the upper teeth (Bourassa et al., 2006). The second consonants of words such as *water*, *writer*, and *rider* are almost always pronounced as flaps, and it is not possible to predict on the basis of a flap's sound whether it should be spelled as a *t* or *d;* the flap in *writer* sounds identical to the flap that occurs in *rider* (Bourassa et al., 2006).

Bourassa et al. (2006) explored how learning the morphology of one's language can help children to learn the irregularities in the mappings from sounds to letters. The researchers gave dyslexic and typically developing children two lists. The first list included morphologically complex *t*-flap and *d*-flap words. These words, such as *waiting* and *louder,* were inflected or derived forms of stems with final /t/ or final /d/. This list also contained morphological simple *t*-flap words such as *daughter*, which includes a medial flap spelled with a *t*, as well as simple words with a medial flap spelled with a *d*, such as *spider*. The second list contained the stems of the morphologically complex words from the first list.

Typically developing children have more difficulty choosing between *t* and *d* when these letters correspond to flaps than when they correspond to non-flapped /t/ and /d/. Older children with dyslexia also often misspell flaps. First graders who are typically developing are more likely to spell flaps as *d* than as *t*, but by third grade *t* spellings will outnumber the *d* spellings. The same pattern can be observed among the group of older children with dyslexia (Bourassa et al., 2006).

Morphological awareness also plays a role in young children's ability make decisions about word-final consonant clusters in inflected forms. Children will typically omit interior consonants of final consonant clusters for words that contain one morpheme. This results in spelling the word *sink* as "sik" (Bourassa et al., 2019). Children with dyslexia were given target words in a sentence context to write (Bourassa et al., 2006). The stimuli included thirty words with two-consonant final clusters and fifteen words with single final consonants. Among these words with final consonant clusters were fifteen in which the second consonant of the final cluster was an inflectional ending. On the other fifteen words with final consonant clusters, the second consonant of the cluster was not a separate morpheme. The fifteen words with single final

consonants were the stems of the fifteen morphologically complex words with final consonant clusters. This measure found that typically developing children, as well as the older children with dyslexia, are less likely to omit the first consonant of the final cluster in a morphologically complex word such as *learned* than in a simple word such as *blind*. Root words did benefit both younger non-dyslexic children and children with dyslexia in their spelling, but neither group used morphological information as much as they could have to aid their spelling, suggesting that the ability to use morphological information in spelling is fragile. The older children with dyslexia appeared somewhat less likely to maintain the entire spelling of the stem when writing an inflected word (Bourassa et al., 2006), showing deficits in both the inflections as well as the base words.

Root and Suffix Constancy

Impairments in morphological constancy can be observed in children with dyslexia. The choice among alternative spellings of a phoneme do not only rely on phonological and graphotactic considerations, but also on morphological considerations. In English and various other writing systems, the spelling of a morpheme often remains the same even if the morpheme is a part of a derived form and the pronunciation changes. This is known as morphological constancy. An example of this is in the spelling of *health*. The word *health* retains the *ea* spelling of its base form, *heal*, even though the vowel of *health*, /ɛ/, differs from the vowel of *heal*, /i/. This morphological constancy is commonly observed in English. Not all morphologically complex words will show morphological constancy in their spelling, though. For example, *angry* is not spelled as *angery.* Typical learners will use this principle of morphological constancy to

aid their spelling to some extent. Young children also show a sensitivity to root morphemes when spelling morphologically complex words (Bourassa & Treiman, 2008).

Bourassa and Treiman presented children with morphologically complex spelling-same words where a critical segment was pronounced differently than in the corresponding base word but spelled alike. For example, the *ss* of *discuss* remains in *discussion* even though the pronunciation changes from /s/ to /ʃ/. In another list of morphologically complex words, named the spelling-change words, the critical segment was spelled differently in the complex word than in the base form, resulting in a change in pronunciation. This can be observed as *explain* contains /e/ in the second syllable while vowel is spelled as *ai* (Bourassa & Treiman, 2008).

These measures found that children with dyslexia are as likely than younger typically developing children to use morphology to aid their spelling. These two groups performed similarly in the inclusion of the critical segment when spelling morphologically complex spelling-same items. Older children in the dyslexic group and younger typical children of the same spelling level were also equally likely to spell stems consistently in spelling-same base-complex word pairs. Both dyslexic and young non-dyslexic children also overextended the principle of morphological constancy to words in which morphological constancy does not apply. These findings continue to support the notion that the processes and strategies that children with dyslexia use in their spelling are similar to children who are developing more typically. While children with dyslexia are slower in their learning to spell and may always underperform compared to typical spellers, these children still follow the same general patterns of performance (Bourassa & Treiman, 2008).

Bourassa et al. continued to explore root constancy among inflected and derived forms using Deacon and Dhooge's (2010) eight quadruplet sets of words. Deacon and Dhooge had

asked second, third, and fourth graders to spell base, inflected, derived, and one-morpheme control words that contained the same critical letter-sound sequences. Items within each set of quadruplets began with the same initial letter-sound pattern (e.g., *sing, singing, singer,* and *single*). They then examined how accurate the children were in their spellings of the initial segment. They also examined constancy, specifically whether each spelling used in the inflected, derived, and control conditions was the same as the spelling that was used in the base condition, regardless of accuracy.

The children with dyslexia in this study were found to be as likely to use morphological root constancy to aid their spelling as typically developing younger children of the same general spelling ability. Both of these groups exhibited similar morphemic effects, or more accurate spellings of the initial sequences in inflected and derived items than in one-morpheme control items. This extends the previous research of flaps and final consonant clusters to whole root morphemes. Children with dyslexia do use root constancy to support their spelling accuracy to the same extent as non-dyslexic children of the same spelling level, and less than non-dyslexic children of the same chronological age. Accurate or not, children with dyslexia are equally likely to retain their base form of their spellings of the initial segments of inflected and derived forms as spelling-level matched control children. Children of the same chronological age also appear to follow this pattern. The consistency in base spellings was higher for these inflected and derived forms than for control items for children with dyslexia as well as both control groups. Extending the previous research on root constancy, Bourassa et al. (2019) found that children with dyslexia may have a relatively stable adherence to root constancy as do same-age matched peers. This is consistent with results of dyslexic children overextending their use of root constancy (Bourassa & Treiman, 2008).

Breadmore and Carroll (2016) were able to compare dyslexic children's understanding of derivational morphology and morphological constancy by comparing the spelling skills of children with dyslexia to children with otitis media, an inflammation of the middle ear. In a first experiment, children with dyslexia were matched with typically developing children by reading age and chronological age (Breadmore & Carroll, 2016). The children were all presented with non-words within a sentence context that indicated the morphological status of the non-word. Control and morphologically complex non-words were matched so that they had the same word-final phonemes. The control condition had multiple possible spellings for these phonemes and the morphologically complex condition included word-final phonemes that represented a suffix so that spelling could be determined by the morphological rule of suffix constancy. Suffix constancy was measured by an increased proportion of suffix spellings in morphologically complex non-words compared to one-morpheme control non-words with the same final phonemes. The root was presented elsewhere in the sentence so that it could be used to inform the spelling of the complex words in the morphologically complex condition. A second identical experiment was conducted with the children with otitis media.

The first study ultimately found that children with dyslexia demonstrated the least evidence for root constancy for both inflections and derivations. The chronological-age matched peers and children in the group with dyslexia did not differ in their use of inflectional suffixes for control non-words, but did differ on complex non-words, with dyslexic children producing fewer inflectional suffixes. Dyslexic children performed similarly to reading-age matched children on derivational suffix constancy but differed from chronological-age matched children in their use of derivational suffixes in both control and complex non-words (Breadmore & Carroll, 2016).

The second study found that children with otitis media have an at least literacy-ability appropriate use of root constancy. Children with otitis media did not differ from their reading-age matched peers in their use of inflectional suffixes on control non-words, but the children in the reading-age control group did produce significantly more complex spellings with inflectional suffixes than the children with otitis media (Breadmore & Carroll, 2016).

When compared to each other, children with dyslexia produced significantly fewer roots in complex non-words than the group of children with otitis media did. The children with dyslexia used derivational suffixes less than the children with otitis media did. Dyslexic and otitis media participants did not differ in inflectional suffix constancy, but dyslexic children did show less evidence of derivational suffix constancy than the children with otitis media. These results provide evidence that children with dyslexia will use the simpler morphemes first to guide their spelling and then incorporate derivational morphemes later in development (Breadmore & Carroll, 2016). Understanding root constancy in important for overall spelling accuracy. While both children with dyslexia and children with otitis media face deficits in spelling accuracy, children with dyslexia face this difficulty because of an underlying developmental deficit and those with otitis media are impaired in their ability to hear individual segments (Breadmore & Carroll, 2016).

Spelling Inflections

In a typically developing child, the morphological structure of words starts influencing spelling from the first year of primary education (Egan & Tainturier, 2011). The the ability to spell morphologically complex words occurs over the course of several years, and by the age of ten, children should be able to spell suffixes correctly a majority of the time. The developmental

pattern of representing inflectional forms happens first phonetically, then morphologically, and then orthographically (Hauerwas & Walker, 2003). An inflection serves a grammatical role in that derivations change word class (Breadmore & Carroll, 2016). Hauerwas and Walker (2003) assessed the spelling of inflected verbs in children with dyslexia compared to age and reading-matched non-dyslexic children. The ability to spell these verbs was assessed within a sentence context, list format, and base word spelling. Phonological awareness and orthographic awareness were also assessed. Overall, the age-matched non-dyslexic children performed better than the group of children with dyslexia and the reading-matched control group. There are also specific aspects of spelling inflected forms that cause difficulty for dyslexic children with spelling deficits that set them apart from younger typically developing children. Compared with their age-matched non-dyslexic peers, dyslexic children with spelling deficits demonstrate more difficulty with including the inflected ending. They also show difficulty with correctly representing the inflected ending phonologically, morphologically, and orthographically when they are spelling inflected forms in a sentence context.

While the dyslexic children with spelling deficits experienced difficulty on the list task, they were able to represent the inflected ending in a manner similar to that of their spelling-matched peers. Within a list context they first represented the form phonetically, then morphologically, and then finally they integrated the ending orthographically, consistent with the typical development of spelling (Hauerwas & Walker, 2003). While the typical pattern was still followed, children with dyslexia showed delays in their development of their orthographic skills, as they lagged behind age-matched peers in their ability to spell the inflected endings accurately.

Egan and Tainturier (2011) examined the spelling of regular past tense verb endings. The researchers presented children with dyslexia and two control groups matched for chronological

age and spelling and reading age with twenty-three regular past tense verbs such as *kissed.* They also included twenty-three one-morpheme words such as *feast* and *brand.* When comparing the spelling of morphologically complex forms with the spelling of matched one-morpheme words, children with dyslexia performed worse than chronological-matched peers across all measures. The group with dyslexia performed similarly to the spelling-age and reading-age matched group on all measures except when spelling regular past-tense verbs. This is evidence that children with dyslexia have a specific deficit in inflectional spelling in relation to younger children of comparable reading and spelling abilities. They are also less likely than these spelling and reading-age matched peers to generalize the *-ed* ending to one-morpheme words, which hints that they may not be following the typical pattern of morphological spelling development. This poor use of the inflectional *-ed* ending could be due to a deficit in orthographic memory. An abnormal use of morphological strategies in spelling is apparent as the children with dyslexia demonstrated an impairment in their spelling of stems presented in isolation (Egan & Tainturier, 2011).

Tsesmeli and Seymour (2006) found that children with dyslexia have impairments in their processing of one-morpheme base words as well as morphologically complex derivations. The researchers included stimuli that were Greek origin words and presented a group of children with dyslexia, as well as an age-matched control group and a reading level-matched control group, with two spelling lists. One consisted of morphologically related word-pairs of high familiarity in the children's vocabulary and the other contained word-pairs of base words and morphologically complex words of Greek origin. Using a list of words with Greek origin along with words of high familiarity resulted in the finding that the children with dyslexia demonstrated accurate spellings for almost a quarter of the familiar words and 16% of the less familiar word list (Tsesmeli & Seymour, 2006). These results demonstrate a severe impairment

in both the spelling of base words as well as derived words. A second study asked the children to give definitions of the words in each of the word-pairs from both lists and found that the children with dyslexia exhibited comprehension skills at the same level as their age-matched peers. This confirmed that the spelling difficulties in dyslexic children are not due to poor vocabulary knowledge, but to a greater underlying impairment. A word from the either of the two lists was then presented to the children followed by an incomplete sentence. The children were asked to complete the sentence with the appropriate form of the given word to test for morphological awareness. Children with dyslexia performed at the same level as their reading-level matched peers, but lower levels of morphological awareness were found for children in the dyslexic group compared to their age-matched peers. These findings support that there is a strong relationship between literacy and performance on morphological tasks (Tsesmeli & Seymour, 2006).

Segmentation

Arnbak and Elbro (2000) found that morphological awareness training for dyslexic children in schools had a positive effect on spelling accuracy. Children with dyslexia showed progress in their spellings of compound and derived words, suggesting that an awareness of morpheme units in words enabled the children to segment complex words into smaller units. The ability to maintain these segments, or morphemes, eases the load on a child's working memory while spelling (Arnbak & Elbro, 2000). Siegel (2008) furthered these findings with the Word Morphological Task (2000), in which a child is asked to select which one of four alternative words or pseudo-words is the correct item that fits in a missing part of a sentence. This task demonstrated a significantly higher correlation between morphological awareness and reading and spelling than between phonological awareness and reading and spelling skills. This further

provides evidence that training in morphological awareness can help children to develop their spelling and reading accuracy skills (Siegel, 2008). Ultimately, the correlation of morphological awareness with reading and spelling is not simply the result of a mediating skill in phonological awareness. Morphological awareness greatly impacts both reading and spelling skills. Children who understand the morphological structure of English will be able to segment words into meaningful units with more ease (Siegel, 2008).

Deficits Across Languages

The relationship among morphological awareness and spelling and reading accuracy is challenging in many languages in addition to English. Two research studies have indicated that these deficits occur not only in English speaking children with dyslexia, but across languages. Lyytinen and Lyytinen (2004) followed Finnish children at familial risk for dyslexia from birth to school age, observing language development and impairments in inflectional morphology. Children are considered to be at familial risk for dyslexia if they have a parent and at least one other close relative with dyslexia (Lyytinen & Lyytinen, 2004). Longitudinal studies comparing children at familial risk to typically developing age-matched peers can help to identify early precursors of later reading ability. This longitudinal study found that children who were at familial risk for dyslexia revealed impairments in vocabulary and inflectional morphology starting at the age of three. Inflectional morphology showed differing predictive patterns for children in the familial risk group and age-matched controls. Inflectional morphology skills provided a significant prediction for the subsequent language development from the children in the familial risk group from the ages of two up to five years. The corresponding prediction was

only found in the non-dyslexic children between the ages of two and three (Lyytinen & Lyytinen, 2004). Children in the familial risk group also produced shorter utterances as measured by the mean number of morphemes than the typically developing children. Inflectional morphology was ultimately found to be the earliest grammatical marker that distinguished children with and without familial risk for dyslexia. Similar results were found among Hebrew speaking children (Schiff & Levie, 2017).

Hebrew orthography is linked to the morphological makeup of words by roots and function letters, not simply by phonological segments (Schiff & Levie, 2017). Dyslexic and non-dyslexic children were tested on their ability to spell noun plurals as well as their spelling of morphologically complex words with function letters within sentences. Typically developing children scored higher than the children with dyslexia on all of these measures. The differences between the two groups became greater as the spellings became more morphologically complex and the nouns more irregular (Schiff & Levie, 2017).

Children with dyslexia face difficulties with inflectional morphology in languages other than English; however, this comparison cannot be extended to typically developing children learning English as a second or additional language (Siegel, 2008). English language learners will still follow a typical track of development, making them more similar to typically developing native English speakers. In tasks of morphological and phonological awareness, English language learners perform better than English speakers with dyslexia, and sometimes better than typically developing native English speakers (Siegel, 2008). This comparison does demonstrate, though, that dyslexia is not simply a difficulty in learning a language, but a deeper developmental deficit.

Conclusion

While a majority of research posits phonological deficits as the core of reading and spelling impairments among people with dyslexia, morphological awareness also appears to be a large contributing factor that should be brought more to the forefront of research on dyslexia. Children at a familial risk for developing dyslexia may begin to show impairments in their literacy skills as early as the age of two. This could then affect achievement in school, as children are expected to be proficient in their native language by the time they enter the education system around the age of five. These findings can have implications for parents of children with dyslexia or for professionals in the education system. Children with dyslexia face impairments in their morphological awareness and lag behind peers of the same age in developing reading and spelling accuracy. If children with spelling and reading difficulties can be supported in their development of morphological awareness skills, they may also show improvements in their ability to read and spell accurately. Research has shown that the ability to understand the morphemic structure of English does aid children with dyslexia in learning to develop both spelling and reading skills. Further research should be done to find exactly how morphological awareness is impacted among children with dyslexia and the most appropriate ways to help children grow in their knowledge of their language's morphemic structure. Training in morphological awareness could then possibly be integrated into schools to help all children develop stronger reading and spelling accuracy.

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