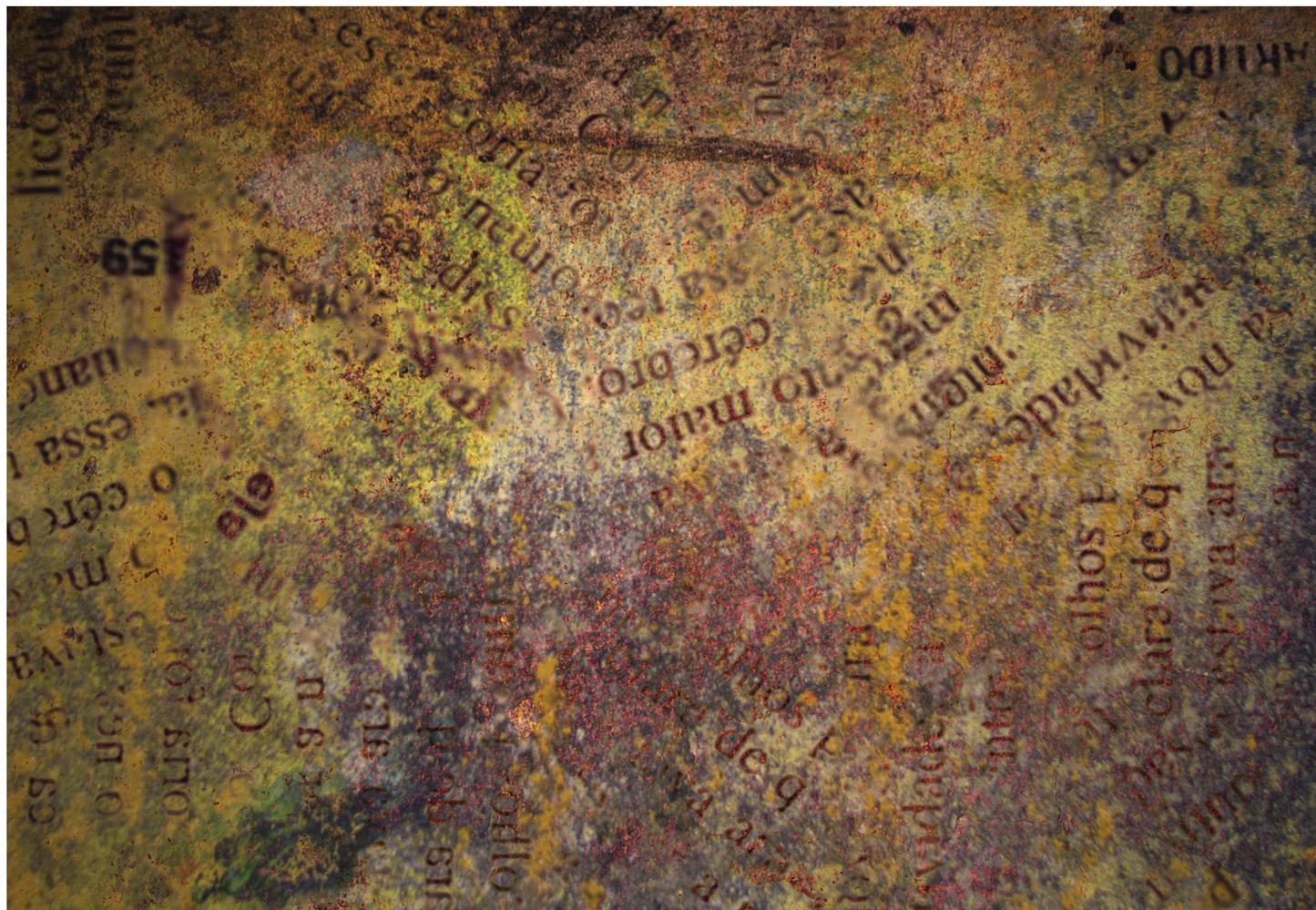# Wording up on dyslexia

Annie Facchinetti

If you can read this effortlessly, you are not one of the estimated 10 per cent of Australians who have dyslexia (National Institute of Child Health and Human Development, 2000), a figure that makes it particularly surprising that it has only recently been recognised as a category of exceptionality in Australia. Part of the problem stems from the lack of clarity and agreement about the very definition of dyslexia. This is further compounded by the abounding volume of information, and misinformation, about the condition. What is indisputable, however, is the importance of literacy to being able to function effectively in our society (National Literacy Trust, 2017). Understanding dyslexia and how to support students who exhibit dyslexic characteristics, is therefore critical for educators.

With no consistent definition used across Australia (Australian Government Department of Education, 2014), the *Diagnostic*

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and Statistical Manual of Mental Disorders (American Psychiatric Association, 2013) definition of dyslexia as "an alternative term used to refer to a pattern of learning difficulties characterised by problems with accurate or fluent word recognition, poor decoding, and poor spelling abilities" offers a succinct summary. An identifying trait of dyslexia is that it persists despite adequate teaching that could reasonably be expected to result in progress (Gough & Tunmer, 1986; International Dyslexia Association [IDA], 2002; Wajuihian, 2011), or as Bond, *et al.* (2010) suggest, there is a difference

between "instructional casualties" and "people with dyslexia" (p.5). Dyslexia also affects people across the spectrum of intelligence (Grigorenko, 2001), a finding that will resonate with teachers who have observed students who are articulate and have strong reasoning skills yet struggle to get the words off the page.

In addition to the impact that dyslexia can have on academic performance, the social-emotional ramifications for students are well documented. Students may suffer from poor self-efficacy as a result of their learning difficulties (Firth, Frydenberg, Steeg, & Bond, 2013) or develop anxiety towards reading and engage in avoidance strategies (Australian Government Department of Education, 2014; Hudson, High, & Al Otaiba, 2007; Singer, 2005). Students who have the condition therefore understandably often fall into the 'reluctant reader' category. Worse still, they may be branded as lazy (Gilmore & Boulton-Lewis,

2009; Glazzard, 2010) by teachers who do not recognise the enormous effort it takes to try and fail at reading each day. Add to this the damage to self-esteem caused by recognising that their performance comparative to their peers is low and the potential for bullying (Firth, *et al.*, 2013; Singer, 2005), and the imperative to adequately cater for students with dyslexia becomes urgent.

Recent research has validated the existence of dyslexia from a neurological perspective. Students with dyslexia show under-activation in components of the language network in the left hemisphere of the brain (Pennington and Peterson, 2012, p. 2001). In particular the temporoparietal region (including Wernicke's area), responsible for auditory and phonological processing among other things (Hudson, *et al.*, 2007; Richlan, Kronbichler, & Wimmer, 2009), and the occipitotemporal region, responsible for visual processing, have been implicated (Richlan, *et al.*, 2009). This is consistent with findings that link dyslexia and phonological difficulties (e.g. Snowling & Stackhouse, 2006).

Notable differences between the brain structures of students with and without dyslexia have also been observed. Pennington and Peterson (2012, p. 2002) cite evidence of inconsistencies in the white matter of the temporoparietal regions and the left inferior frontal gyrus of people with dyslexia, a finding supported by Booth and Burman (2001) and Klingberg, *et al.* (2000). Given Hudson, *et al.*'s (2007) assertion that, "Having less white matter could lessen the ability or efficiency of the regions of the brain to communicate with one another" (p.509) and that a greater density of white matter is linked with increased reading skill (Klingberg, *et al.*, 2000; Pennington & Peterson, 2012), this finding is compelling. Studies have also shown that people with

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dyslexia have decreased grey matter density in the left temporoparietal area (Hudson, *et al.*, 2007), and specifically the medial temporal gyrus (Pennington & Peterson, 2012), an area that has been linked with language and semantic memory processing (Onitsuka, *et al.*, 2004).

What's noteworthy is that targeted intervention can literally change the brains of people with dyslexia. Richards and Berninger (2008), for example, evaluated whether targeted teaching of the alphabetic principle would affect the connectivity between the left inferior frontal gyrus, which is believed to coordinate phonological processing, and other key areas of the brain. They found that, "Although the children with and without dyslexia differed significantly in functional connectivity from the left inferior frontal gyrus seed point before treatment, after treatment there were no significant clusters in the group difference map comparing those with and without dyslexia" (p.301). Similarly, Aylward, *et al.* (2003) observed that initial differences in brain function of students with dyslexia in areas including the left middle and inferior frontal gyri and the bilateral superior parietal regions were almost eliminated after intensive reading instruction.

Unlike students with global developmental delays who may follow the same developmental pathways as more typical students but on a slower trajectory (Paul, 2007; Wang, 2015), research shows that although treatments may result in improvements in reading and

neurological changes, dyslexia is not 'curable' (Hudson, *et al.*, 2007). The goal is then to find strategies and interventions that will best help a student with dyslexia progress.

A comprehensive approach to reading for students with dyslexia should address both academic needs, and motivational and social-emotional factors. The concept of dyslexia friendly learning environments has gained recent prominence (Australian Government Department of Education, 2014; Reid & Green, 2008; Rose, 2009) with advances in understanding of how best to support students with dyslexia. It is generally thought that a whole-school endeavour that builds consistency of approach and practice is most effective (Dyslexia Foundation of New Zealand, n.d.; Firth, *et al.*, 2013; Reid, 2009). Strategies might include establishing whole school inclusion policies (Reid, 2009), parent partnerships (Australian Government Department of Education, 2014; Woolley, 2011) and professional development to equip staff with appropriate classroom approaches (Snowling & Stackhouse, 2006).

Regular, ongoing formative assessment is an essential component of any differentiated teaching program (Goss & Hunter, 2015; Griffin, *et al.*, 2010). Both Gagné (1980) and Vygotsky (1978) emphasise the importance of learner preparation and teacher knowledge of where students are at. Formative cognitive literacy resources such as Macquarie University's Macquarie Online Test Interface (Macquarie University, n.d.) can yield specific data to inform teaching. For example, the Diagnostic Reading Test for Nonwords provides detailed information about a child's letter-sound knowledge that can be used to target aspects of phonemic awareness that a student with dyslexia hasn't yet mastered (Colenbrander, Nickels &

Kohnen, 2012). Identifying which component skills of reading are causing difficulty enables teachers to tailor learning activities to student needs (Hempenstall, 2009; Kame'enui, *et al.*, 2006).

Information gained from formative assessment can help to address the specific decoding, phonemic awareness and phonic skills difficulties that are characteristic of dyslexia (Munro, 2017; Rose, 2009; Richards & Berninger, 2008). Explicit and systematic teaching of phonic and phonemic skills, including hearing sounds, segmenting words into onset and rime, and blending, building on known sounds and patterns (Department of Education and Training Victoria , 2017; Munro, n.d.; Pullen, 2005) is therefore essential.

Many general inclusive classroom management strategies are also appropriate for students with dyslexia, such as setting clear expectations and maintaining a positive working environment (Duchesne, *et al.*, 2015; Tomlinson, 2014). Establishing strong teacher-student relationships is important to nurturing motivation and self-esteem (Opdenakker & Minnaert, 2014), as is developing social skills and student collaboration (Wyatt-Smith & Gunn, 2007).

A range of simple adjustments to classroom management and routines can also make life easier for students with dyslexia. For example, arranging seating to maximise concentration and monitoring background noise (Sutton & Shields, 2016) can contribute to better outcomes. Students with dyslexia often have difficulty with organisation (Hannell, 2004; Woolley, 2011) and therefore ensuring that required materials are clearly labelled or easily within reach is another straightforward adjustment (Sutton & Shields, 2016). Given that processing of information can be slow and effortful (IDA, 2017; Nicolson & Fawcett, 1994), it may also be necessary to ensure that workloads allocated to students with dyslexia are realistic and manageable in the time available (Hannell, 2004; Sutton & Shields, 2016). Keeping instructions short and step-by-step can also help (IDA, 2017).

Assistive technologies are proving especially useful. Swanson, Harris & Graham (2013, p.579) describe assistive technologies as having potential to allow students with dyslexia to access text and participate in reading activities despite their skill difficulties. Audio recording devices, speech-to-text software and audio books (IDA, 2017: Sutton & Shields, 2016) can support inclusion in text analysis and other literacy tasks that might otherwise be challenging for students with dyslexia. Text-to-speech software is also being integrated with tools such as a dictionary and thesaurus that can aid in areas of common difficulty such as distinguishing homophones (Smith & O'Connor, 2012).

Each student with dyslexia has unique talents, needs and difficulties. There is therefore no one-size-fits-all or single program that will magically open up the world of reading to them. Unfortunately, there is generally no specific funding available to support students with dyslexia either, despite its recognition as a genuine disability. This means that schools and educators often have to make do with very little resourcing or intervention for affected students. For schools to take the time to understand dyslexia, its symptoms and how to effectively support students is therefore critical if students with dyslexia are to meet their full potential.

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