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**Understanding dyslexia: competing theories, expanding definitions and ongoing controversy**

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**Abstract**

Concrete biological evidence of dyslexia remains lacking and, over the years, competing theories of and expanding definitions of dyslexia - which now consider traits outside of literacy difficulties - have been developed. Growing alongside this has been controversy over whether dyslexia as a separate condition exists, whether it is simply a label that some people have better access to for explaining their children's poor reading abilities, or whether it is the result of modern literacy standards dictated by a Western society that does not consider individual diversity. This paper explores some of these issues within an educational context.

**Introduction**

Research into dyslexia has come a long way since the first recorded case by Morgan (1896), progressing from a condition commonly thought to be caused by deficits in the visual processing system (Hinshelwood, 1917) to one widely considered to be the result of a difficulty in phonological awareness (Snowling, 2000). Whilst it has largely been accepted as a disability or special educational need (British Dyslexia Association, 2016a; Equality Act 2010), some researchers and academics argue that dyslexia does not exist and that the labelling of individuals as such is simply the result of our changing societal structure and expectations that are not flexible enough to accommodate the differences of people (Elliott & Gibbs, 2008; Elliott et al., 2016). The validity of this viewpoint is arguably strengthened by the difficulties in establishing clear diagnostic criteria and in categorising dyslexia as a condition separate from poor reading.

Throughout this essay, I will explore the difficulties in defining dyslexia, the proposed causes of dyslexia and the theoretical models which attempt to explain these causes and outline the identifying features of the condition. I will look at these within the context of notions of literacy and literacy difficulties to provide a context within which my understanding of dyslexia has been formed as well as considering wider social, cultural and environmental factors which influence understanding of dyslexia.

**Defining Dyslexia**

There is no universal definition of dyslexia. Difficulties in reading are typically divided into dyslexia or reading comprehension impairment, but neither of these conditions have clear diagnostic boundaries (Rose, 2009; Snowling, 2009) and whilst there are cases of people who have one or the other, many individuals with reading difficulties will have aspects of both (Snowling & Hulme, 2012). Between definitions of dyslexia, there can be considerable variation and this lack of a consistent and appropriate definition may impact on dyslexia research (Reid-Lyon, 1995). Reid (2016, p. 5) defines

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dyslexia as a processing difference that is “often characterised by difficulties in literacy acquisition” but highlights that other cognitive processes such as motor planning and organisation will likely be present. Given that some argue that the only key element between the different dyslexia definitions is the presence of literacy difficulties (Elliot, Davidson & Lewin, 2007), Reid’s choice of phrasing in “often characterised” is an interesting one and hints towards the claims that have been made that the definition of dyslexia is too broad and all encompassing (Fitzgibbon & O’Connor, 2002; Grove, 2014).

The International Dyslexia Association (2002) is more focused on the aspect of literacy acquisition - defining dyslexia as a neurologically based specific learning difficulty that is characterised by “difficulties with accurate or fluent word recognition, poor spelling and decoding”, although there is less focus on the broader cognitive difficulties associated with dyslexia. Snowling (2000) argues that dyslexia is characterised by “severe reading and/or spelling difficulties at the word level”, but other researchers have maintained that these differences do not need to be severe, and that there are variants of dyslexia which involve minor literacy problems (Miles, Wheeler & Haslum, 2003), or that dyslexia-associated difficulties may be masked by strengths in working memory, grammar or vocabulary, especially in gifted children (van Viersen et al., 2014).

Researchers are considering that dyslexia, like conditions such as autism, is a spectrum condition with no clear cut-off (Snowling and Hayiou-Thomas, 2006), and this comes with another set of difficulties such as the allocation of allowances and accommodations. This move towards a broader definition of dyslexia combined with the difficulties in distinguishing between dyslexia and false positives (Miles, Wheeler & Haslum, 2003) has led to some researchers claiming that dyslexia as a condition that differs from generalised “poor reading” does not exist (Elliott & Gibbs, 2008). Researchers who take this position argue that dyslexia cannot be differentiated from general ‘poor reading’ arising from environments such as deprivation or neglect, or from co-morbid conditions that might impact reading such as intellectual disability, autism or Attention Deficit Hyperactivity Disorder (ADHD) (Elliott & Grigorenko, 2014). Furthermore, they argue that the definition itself does not even matter because the interventions that would be used for “dyslexics” would also be used for “poor readers”. By segregating children into dyslexia or poor reader categories - those that fall into the poor reader category are more likely to be held responsible for their difficulties in reading and are less likely to receive the same support that those with a diagnostic label will receive (Elliott & Grigorenko, 2014). When this is combined with the argument that children from white, middle-class families in wealthier neighbourhoods are more likely to be diagnosed with dyslexia than their counterparts in black and ethnic minority or lower class communities (Mortimore et al., 2012; Selikowitz, 2012), there is some suggestion that the broad definitions of dyslexia have become a way for people to “buy accommodations” for their children, which will remain with them through to university and the workplace (Didau, 2014).

### **Causes of dyslexia**

Given that there is no universal definition of dyslexia, it should be no surprise that there is also no universally agreed upon cause. In the early years of dyslexia research, it was thought that the condition was the result of some kind of congenital ‘word blindness’ (Pringle, 1986; Hinshelwood, 1917; Snowling, 1996) and that it was caused by deficits in the visual processing system. While the field of research has now moved away from this as the main cause, there are still reports suggesting that the visual processing system has some involvement (Stein & Walsh, 1997). The Phonological Theory is perhaps the most widely accepted cause of dyslexia (Snowling, 2000; Vellutino et al., 2004) in current times. Snowling and Hulme (2012) argue that language and phonological skills are the foundations for literacy development, and the acquisition of skills such as phonological awareness,

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verbal short-term memory and rapid automatized naming are both necessary phonological skills and crucial to being able to read (Snowling, 2000). A phonological deficit results in difficulties with connecting sounds to letters (Vellutino et al., 2004), and it is easy to see how this could lead to great difficulties in reading. Researchers argue that difficulties in phonological decoding are the key distinguishing factors between dyslexics and non-dyslexics (Snowling & Hulme, 2012), although this claim is difficult to qualify when studies have a tendency to involve “poor readers” against a control group of “average or good readers” as opposed to two separate groups of poor readers - one dyslexic and one not (Elliott & Gibbs, 2008).

Given the recent shift towards viewing dyslexia as a spectrum condition, there have been some attempts to develop sub-types or classification systems within dyslexia (Nelson, 2015). While it is widely accepted that phonological awareness deficits are at the core of dyslexia (Stanovich, 1988; Torgesen, 2002), some researchers have argued that it does not fully explain the breadth of impairment or severity that some individuals display (Wolf & Bowers, 2000). Wolf and Bowers (2000) proposed the idea of a “double deficit” theory, where Naming Speed - the retrieval of verbal labels for visual stimuli - is a second core deficit and that dyslexics fall into three sub-types: phonological awareness deficit, naming speed deficit, and both or double deficit, with those in the latter group experiencing the most impairment in reading. The existence of Naming Speed deficit is not disputed - for example, it has been observed and recorded with ADHD - but so far research into a double deficit leading to more severe reading difficulties in dyslexia has seen inconsistent outcomes (Kirby et al., 2010).

Dyslexia is often co-morbid with other conditions (Gooch et al., 2014) with studies reporting that over 50% of individuals who met the diagnostic criteria for dyslexia also had another condition (Kaplan et al., 2001; Iversen et al., 2005) – with Specific Language Impairment, ADHD and dyspraxia being the most common co-morbid conditions (Caravolas et al., 2012). Many of the double deficit studies have poor sample sizes or participants who are not “strong dyslexia” diagnoses (Nelson, 2015), and fail to control for co-morbid conditions such as ADHD where Naming Speed deficit is already well documented (Rucklidge and Tannock, 2001). It is possible that the most severe reading difficulties are simply a result of more severe phonological awareness difficulties, or that individuals who experience more severe reading difficulties are the ones who have a co-morbid condition.

### **Theoretical Models**

The competing theories of the causes of dyslexia and the confusion caused by the presence of co-morbid conditions - more the norm than the exception within neurological disorders (Kaplan et al., 2001) - has typically caused significant debate within fields of research. Frith’s (1999) Causal Model Framework attempts to bring together some of these theories, arguing that they may not be completely different theories, rather that they are different aspects of the same overarching cause. The model works on the basis of a causal chain, starting with biology and demonstrating how this might affect cognition and ultimately behaviours. Within this model, a single biological cause could result in multiple cognitive causes and observable behaviours - all influenced by environmental factors - and it may be that different theories are different levels of the same cause, one at the biological level and one at the cognitive. For example, Frith (1999) demonstrated how brain abnormalities in the left hemisphere of the brain could arguably result in a phonological deficit which could feed into poor grapheme and phonological knowledge. Depending on the child’s environment, this knowledge could be improved or further impacted, which will then result in more or less severe difficulties in behaviours such as naming speed, short term memory, phoneme awareness and reading.

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Frith's model also helps to visualise the potential overlap involved with co-morbid conditions. It is possible that single biological causes can lead to both dyslexia and other conditions. Due to the lack of a definitive genetic or biological cause, the model cannot suggest why every person with dyslexia does not also have ADHD or vice versa. On the other hand, Frith's model might suggest that differences such as these can be explained by mitigating or protective factors within the environmental aspect - that their presence means an individual only has dyslexia and their absence results in co-morbid conditions. This is only theory, however, as there is nothing to indicate that there are definitive criteria that result in "pure" dyslexia as opposed to any other form - although given the lack of universal definition it would be difficult to classify "pure dyslexia" with our current level of understanding.

Frith's model is arguably self-fulfilling. You could, with some creative thinking, fit together a wide range of biological, cognitive and behavioural factors. The model is broad - necessary for it to be simple enough to apply to a range of conditions - and whilst research is beginning to make use of technology such as MRI and fMRI to examine brain activity whilst participants engage in activities such as reading and spelling (Shaywitz et al., 2006; Schulz et al., 2008), there is little in the way of concrete evidence for the Causal framework. In addition, because the model is so broad, starting from a behaviour and working backwards to find a cause is not as helpful as might be indicated given how many cognitive aspects may result in particular behaviours. While the visual processing model has long been replaced by the phonological theory - the fact that two very different theories could equally well explain dyslexia behaviours demonstrates the failings of the Causal Model. The visual processing model would quite easily fit into the causal framework, and while the phonological theory is well accepted - researchers such as Wolf and Bowers (1999) have questioned whether it explains the full breadth of difficulties that dyslexic readers demonstrate.

Whilst the concrete evidence for Frith's model may be lacking it still serves an important purpose, particularly when considering the long-term prognosis and impact of dyslexia. A student with dyslexia may find their difficulties in behaviours relating to reading are significantly reduced by the presence of consistent and good quality interventions and supportive home and school environments (Frith, 1999; Reid, 2016). Without considering the Causal Model Framework, it would appear as if the student were no longer experiencing difficulties and that the difficulties had a behavioural source. In such a situation, supports might be withdrawn, or situations may change, leading to an increase in the previous difficulties. The Causal Model demonstrates how just because the behaviour has changed does not mean that the underlying deficits have disappeared (Frith, 1999).

### **Identifying features of dyslexia**

As I stated earlier, there is one universal accepted component of dyslexia definitions - the presence of literacy acquisition difficulties. The exact nature and severity (Snowling, 2000; Miles, Wheeler & Haslum, 2003) of these literacy difficulties are often debated - particularly when considering dyslexia in correlation with intellectual disability or with giftedness. Definitions such as the one used in the Rose Report (2009) focus on dyslexia affecting skills within reading and writing such as word reading and spelling. Teachers might expect to see individuals who find reading or writing more difficult than their intellectual capabilities or performance in other areas. Whilst dyslexia historically focused on individuals who had high IQs but poor reading scores (Reid, 2016), more recently there has been acceptance of the idea that dyslexia can exist regardless of intelligence (Rose, 2009) - making it difficult to determine whether difficulties in reading are caused by intellectual disability or by a specific reading disability.

There are reports of what might be considered stereotypical behaviours that many commonly

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associate with dyslexia such as copying one letter at a time from the board; the reversing of particular letters; good comprehension or world knowledge coupled with significantly below average decoding skills; or stilted and inaccurate reading that persists despite intervention attempts (Pavey et al., 2013; Reid, 2016; British Dyslexia Association, 2016b). Whilst behaviours such as these are not always present within individuals with dyslexia; they can be useful indicators for professionals such as teachers as to which students may benefit from more official assessment (Neanon, 2002).

With the suggestion that dyslexia is less prevalent in other languages such as Spanish due to the structure of the phonological system in their language (Ziegler et al., 2003) - researchers have also looked for indicators of dyslexia beyond literacy difficulties. They argue that other cognitive processes are affected by dyslexia - particularly working memory (Smith-Spark and Fisk, 2007), organisation (Reid, 2016) or executive function (Varvara et al., 2014). Again, it is difficult to separate these from co-morbid conditions that might be causing them. For example, deficits in executive functioning – cognitive process covering a wide range of systems including planning, inhibition, and emotional regulation - might be a key component of dyslexia or it could be a separate condition that is highly co-morbid with a range of conditions. For a teacher perhaps it is irrelevant, as the behaviour exhibited remains the same and the interventions that show positive outcomes can be applied regardless.

### **Competing notions of literacy**

Elliott and Gibbs (2008) have been strong proponents of the idea that dyslexia as a condition separate from “garden-variety poor readers” (Stanovich, 1988) does not exist, and argue that instead, it is the product of Western society, in particular, enforcing an idea of global literacy. Others have gone so far as to suggest that dyslexia is simply a condition made up to satisfy middle-class families unable to accept that their children do not excel in literacy (Beaton, 2004). This situation has become more difficult with the changing definitions of dyslexia. The inclusion of difficulties with organisation or motor skills may indicate a potential area for differentiation between poor readers and dyslexics, but given the difficulty in separating dyslexia from common co-morbidities, others have argued that these are not dyslexic traits at all - they are traits from co-morbid conditions being misapplied to attempt to justify dyslexia as a condition (Elliott & Grigorenko, 2014).

The emphasis on universal literacy is a modern concept, and it is argued that the Western view of literacy and standards of literacy skills are influencing the diagnostic rates of dyslexia (Mackay, 2004). While there are studies into the rates of dyslexia in other languages which find consistent deficits across cultures (Paulesu et al., 2001; Siok et al., 2009), these studies still frequently focus on countries where high standards of literacy are an important aspect of day-to-day life and culture. By continuing research within countries where skills related to reading, writing and spelling from a Western concept are less prominent, it might indicate whether dyslexia is a diagnosis predominantly characterised by difficulties in literacy or whether it has a broader impact.

Reading expectations within the UK are increasing over time (Cambridge Assessment, 2013), and whilst there are attempts to link literacy to purpose in the discussion of ‘functional literacy’ (Lawton & Gordon, 1996) it is difficult to find a clear definition of what this might be. Literacy as a concept does not exist in a vacuum, and it changes as society changes (Meek, 1991). As a society in the UK progresses towards higher expectations of literacy standards, it is possible that diversity of both populations and their notions of literacy are being forgotten (Cambridge Assessment, 2013).

### **Conclusion**

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Dyslexia is a controversial diagnosis – with some researchers going as far as to argue that it does not exist as a condition separate from generalised poor reading (Elliott & Grigorenko, 2014). A universal definition does not exist and whilst all definitions include difficulties associated with literacy, many are beginning to include broader areas such as organisation or difficulty with attention (Reid, 2016). There have been a number of theories as to the cause of dyslexia over the years, and Frith's (1999) Causal Model attempts to demonstrate how multiple theories may be different parts of one single over-arching biological cause, but due to a current lack of definitive biological cause, there is no way of proving this. For a teacher of a dyslexic student, or indeed for a dyslexic individual, it may not be important whether dyslexia does or does not exist as the interventions and supports which are shown to help those diagnosed with dyslexia are also equally effective for others with literacy difficulties (Elliott & Grigorenko, 2014).

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