1

Introductory Chapter: Dyslexia and Difficulties with Study Skills

1.1 Introduction

The Introductory Chapter will set the scene on the nature of dyslexia within the context of higher education by, firstly, presenting useful definitions of dyslexia. 'Useful' definitions are those that characterise 'dyslexia' as an umbrella term to describe a range of heterogeneous conditions. This explanation of dyslexia helps to highlight the array of difficulties that the student diagnosed with dyslexia may face whilst at university, rather than narrowly focusing on literacy difficulties.

As we have drawn attention to the diverse spectrum nature of dyslexia as a condition which leads to complex problems, the second part of the chapter is a discussion outlining types of cognitive difficulties that students with dyslexia may meet when undertaking academic tasks. For instance, difficulties range from the phonological (which,

in the case of students with dyslexia at university level, may be more likely to be moderate to mild, but can still present as problems with reading speed, the recognition and pronunciation of unfamiliar words, and trouble with spelling) to deficits with short-term/working memory which manifests as obstacles when it comes to remembering learning for exams. Or there may be sensory processing difficulties, which become noticeable when the student is trying to listen and keep pace with the lecturer during taught sessions, or when the student is attempting to follow spontaneous group discussion in seminars. The production and reception of verbal language may be an area affected, so there could be anxieties around contributing ideas during seminars, or an avoidance of presentations. If dyslexia is comorbid with dyspraxia, there will be difficulties with motor coordination, so tasks involving manual dexterity, such as handwriting and learning to drive a car, will be problematic. Dyspraxia may also affect the student's ability to be organised, so they could benefit from support with time-management strategies. If a magnocellular deficit (problem with the visual system) is present, the student will have visual difficulties and may get headaches when reading black text on white backgrounds. They may also miss lines of text when reading and require support with selecting appropriate coloured overlays to make reading easier.

Consequently, tasks involving reading, writing, spelling, exams, presentations, organisation, seminar discussion and note taking all present barriers for students with dyslexia. These difficulties are explained in relation to each study skill, and reasons for these problems are specified. In essence, the reader will gain an understanding of how dyslexia deficits such as problems with phonology, information processing, working memory, retention and retrieval impact negatively upon the ability to competently undertake study tasks. The ways in which this affects students with dyslexia emotionally are presented, and it is explained how negative emotion such as anxiety

can also impede academic performance, perhaps to a greater extent than the cognitive difficulties associated with dyslexia.

1.1.1 Definitions of Dyslexia

Historically, definitions of dyslexia have been riddled with uncertainties, and there has been little consensus regarding the characteristics that constitute dyslexia. For instance, some definitions focus solely on difficulties with literacy learning and development at the 'word level'. An example is the explanation provided by the British Psychological Society (BPS), who suggest that 'dyslexia is evident when accurate and fluent word reading and/or spelling develops very incompletely or with great difficulty' (Reason et al., 1999). Other definitions, however, provide a more comprehensive description of dyslexia by taking co-occurring difficulties associated with dyslexia into consideration, which helps us to understand the types of difficulties encountered when studying at university. For example, Rose's (2009) six-part definition, embraced by Dyslexia Action (2009), not only describes the characteristic features of dyslexia at the cognitive level as 'difficulties in phonological awareness, verbal memory and verbal processing speed' (Rose, 2009, p. 10), it also acknowledges that there are other connected difficulties experienced by some (but not all) individuals with dyslexia: 'Co-occurring difficulties may be seen in aspects of language, motor co-ordination, mental calculation, concentration and personal organisation, but these are not, by themselves, markers of dyslexia' (Rose, 2009, p. 10). These co-occurring difficulties are often prevalent in individual students diagnosed with dyslexia, and they require a varied range of interventions. Another useful definition for understanding adult dyslexia and types of problems encountered with study skills is provided by the British Dyslexia Association (BDA). This describes dyslexia as a condition that is 'likely to be present at

birth and to be lifelong in its effects. It is characterised by difficulties with phonological processing, rapid naming, working memory, processing speed, and the automatic development of skills that may not match up to an individual's cognitive abilities' (BDA, 2007).

Another valuable definition is provided by psychologist David Grant in the book *That's the Way I Think: Dyslexia, Dyspraxia and ADHD Explained* (2010). Grant's work as a psychologist involves screening for dyslexia and diagnosing it if evident. He argues that clients he diagnoses with dyslexia have what he refers to as 'spiky profiles' which reveal not only cognitive weaknesses, but also strengths in certain areas. For example, in Grant's testing for dyslexia, he uses the Wechsler Scales of Intellectual Abilities, which consist of a series of subtests used to measure 'performance on a range of different skills including knowledge of vocabulary, mental arithmetic, three-dimensional thinking and speed of copying symbols' (Grant, 2010, p. 31). Grant suggests that a typical Wechsler dyslexic profile will reveal high scores for verbal reasoning (the ability to understand and logically work through concepts and problems expressed in words) and visual reasoning (analysing visual information and being able to solve problems based upon it), yet scores will typically be lower for short-term memory and speed of visual processing. Grant argues that when no specific learning difficulty such as dyslexia is present, 'the Wechsler profile will be fairly flat, not spiky' (Grant, 2010, p. 32). In his text, he goes on to present a classic profile of a dyslexic student which shows that 'she scored above average on verbal and visual reasoning skills and below average on working memory and processing speed. Whereas her Verbal Comprehension (verbal reasoning) and Perceptual Organisation (visual reasoning) scores put her in the top 20 per cent and top 23 per cent of the population respectively, her scores for Working Memory and Processing Speed put her in the bottom 9 per cent and 32 per cent respectively' (Grant, 2010, p. 32).

Consequently, this discrepancy-based definition of dyslexia focusing on the amalgamation of both cognitive strengths and weaknesses is more useful for our understanding of adult students with dyslexia within higher education than the definitions that merely centre upon cognitive difficulties. Whilst the cognitive deficits exist and work to undermine the intellectual abilities which can be in the above average range, Grant's explanation of a typical dyslexic profile enables us to comprehend the types of frustrations faced by so many students with dyslexia in relation to their academic work. This is because, often aware of their intellectual ability, they become annoyed when they are unable to demonstrate this in exams owing to deficits in memory processes and speed of information processing.

Although the definitions provided by Rose (2009), Dyslexia Action (2009), the British Dyslexia Association (2007) and Grant (2010) are more appropriate in drawing attention to the varied range of strengths and difficulties associated with dyslexia, what is missing is mention of associated problems that may not be in the cognitive realm, but are connected with the behavioural realm, and are directly influenced by dyslexia, such as anxiety, stress and other negative emotional consequences. Whilst definitions of dyslexia have focused on the cognitive effects of dyslexia, behavioural effects have to a great extent been neglected.

1.2 Types of Cognitive Difficulties Faced by Students with Dyslexia

This section will present a brief explanation of some of the causes of dyslexia which have been theorised in the field of dyslexia: the phonological deficit regarded as a core characteristic of dyslexia; short-term/working memory difficulties; the cerebellar deficit; weaknesses

in temporal processing; and finally deficits in the visual transient/magnocellular system. However, rather than going into depth on each of the theoretical causes, discussing the theorists and researchers who have focused on investigating them, and debating any criticisms or shortcomings of the individual causes as considered in the research literature, this section will instead supply a concise description of each cause and outline how this might relate to difficulties in studying. This is in the hope that if a student diagnosed with dyslexia sees a term such as 'phonology' or 'working memory', in their screening report, they will have more of an understanding of the implications of these difficulties for their studies. From practitioner experience, students can often be confused about the wording used in their psychological assessments and are not always sure what the problems identified from the assessment mean for them in connection with their academic work. If the reader is interested in looking at a more detailed analysis of causal theories of dyslexia, please see Abbott-Jones (2022), *Dyslexia in Higher Education: Anxiety and Coping Skills*.

1.2.1 Phonological Deficit

Phonology relates to a child's perception of and production of the units of sounds used in language. In learning to read, a child is required to identify and manipulate sounds as distinctive units (segments). For example, /p/ and /b/ are separate units of sound, referred to as phonemes. Basically, a child begins to map sounds (phoneme awareness) onto graphemes (the units and representations of letters in written language, for example the alphabetic letters). If a child has difficulty with or is unable to create these patterns of association, mappings, this impairs the development of the phonological pathway and delays the development of reading for meaning (semantics).

Consequently, if the mapping of sounds to letters is problematic, the child's progress in reading becomes significantly delayed.

When applied to an adult student with dyslexia in higher education, whilst the student may to an extent have compensated for difficulties in reading, if as a child they had a noticeable phonological deficit, they may still struggle with the sounds of unfamiliar words when reading for university. This is important to understand when students are taking specialist courses, such as medicine or pharmacy, where a lot of medical terminology is required. Some nursing students have commented on their embarrassment at being unable to accurately pronounce or read aloud names of certain medications.

Another symptom of the phonological deficit is that of word-finding difficulties which may interfere with the fluency of spoken language. Word-finding difficulties and problems with pronunciation of unfamiliar words help to explain the anxieties that students who present with these types of difficulties have when it comes to academic tasks, such as delivering presentations and verbally contributing to seminar discussion and debate. If there are problems with the acquisition and production of spoken language combined with word-finding difficulties (Hulme & Snowling, 2009) then, from practitioner experience, it is understandable that students with deficits that impact on speech rate and on speech production frequently attempt to avoid presentations and the delivery of verbal ideas during taught sessions.

1.2.2 Short-Term Memory and Working Memory Deficits

Other dyslexia theorists, notably Ramus and Szenkovits (2008) (please see Abbott-Jones, 2022), propose that the phonological deficit is caused by underlying processes of short-term/working memory, and

it is a deficit in this area that is the cause of dyslexia. Short-term memory is defined as the capacity to hold a small amount of information in the mind for a short period of time and to be able to retrieve that information efficiently after the short period of time has elapsed. Working memory, as part of short-term memory, is a cognitive system responsible for the transient holding, processing and manipulation of information. Working memory is necessary for conducting mental multiplication tasks, such as when required to hold numbers in short-term memory to carry over, followed by retrieving the information whilst, at the same time, doing another component of the task.

Difficulties in short-term/working memory processes cause problems when the student is under time constraints in exam conditions where effective memory is an essential requirement for productive performance. Inefficient memory can also exacerbate the phonological difficulty. For instance, from practitioner experience, students have frequently commented on how they struggle to decode text and accurately read questions on the exam paper when placed under time pressure.

1.2.3 Cerebellar Deficit

The cerebellum refers to a part of the brain responsible for coordinating and regulating muscle and motor activity. If there is a mild disorder in the cerebellum, this will not just have an impact upon the development of reading skills, but will also affect balance, motor skills and sensory processes (see Abbott-Jones, 2022).

Students with dyslexia affected by the cerebellar deficit frequently present with a diagnosis of dyslexia which is comorbid with dyspraxia. As with dyslexia, which takes different forms and consists of a range of co-occurring difficulties, dyspraxia should also be used as an umbrella term covering a range of physical and cognitive difficulties.

Adult students who present with the combination of dyslexia and dyspraxia tend to need more support with developing organisational skills, implementing time management strategies, structuring written work, and developing skills for articulating ideas verbally and writing fluidly and fluently.

1.2.4 Weaknesses in Temporal Processing

Temporal processing refers to the perception of sound. If there are weaknesses in this area, this will present as a defect in perceiving rapidly changing auditory sounds, which can lead to difficulties in the linear sequencing of sounds and letters in a word.

Problems with temporal processing help to explain why students with dyslexia experience barriers when processing auditory, visual and sensory information in lectures and debates. There will also be obstacles in efficiently following rapid verbal information in the form of instructions. It has all too often been said by students with dyslexia that they find it difficult to keep pace with what the lecturer is saying.

1.2.5 Deficits in the Visual Transient and Magnocellular System

The visual transient and magnocellular system is the pathway required for visual input to be effectively signalled to the cerebellum. This pathway is also responsible for controlling eye movements and the allocation of visual attention.

A manifestation of the magnocellular deficit occurs when students have visual difficulties, often referred to as scotopic sensitivity. They may find reading black text on white backgrounds difficult and require use of either a background colour on a computer screen or a

coloured overlay over printed hardcopy text to make reading easier. They may also get visual strain and headaches when reading without use of coloured backgrounds, overlays or glasses with tinted lenses. Text may look blurred or appear as though it is moving or swirling on the page. Additionally, the student may mistakenly skip words or lines of text during reading and may need to place a ruler under each line of text to focus more accurately.

The different causal theories discussed above are helpful for our understanding of adult dyslexia, as they reinforce our understanding that dyslexic university students' difficulties are not merely confined to problems with reading, but exist in all aspects of processing auditory, visual and sensory information. Whilst a phonological deficit is usually described as a core characteristic of dyslexia, other aspects may or may not be prevalent in a dyslexic student's profile, which is why support needs vary enormously with each individual. As such, it is useful to think of subgroups of dyslexics. For example, some students may just have a phonological deficit, whilst others could have a combination of phonological with short-term/working memory deficits, or phonological with sensory processing difficulties explained by both the temporal processing theory and the visual magnocellular theory. This demonstrates the spectrum nature of dyslexia and delves deeper into what underlies the specific individual difficulties manifested by the student's own unique profile.

Now that we understand the types of cognitive difficulties underlying dyslexia, next we look at barriers presented by various academic tasks required in all courses at university level, such as organisation, note taking, reading, spelling, essay writing, exams and revision, presentations and seminar debate. Consequently, the reader will gain an in-depth understanding of how the requirements of these various tasks produce obstacles for the dyslexic learner, together with the specific reasons for these obstructions.