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WHAT IS NEURODIVERSITY?

In this chapter we will consider:

- the current understanding of the language relating to neurodiversity;
- the concept of neurodiversity and what this means in the context of education;
- how we are moving from a condition-specific approach to a person-centred approach, which captures strengths as well as challenges;
- how we, and our environment, can change over time, and the impact this has on our functioning.

WHAT IS NEURODIVERSITY?

Neurodiversity describes the different ways that we all think, move, hear, see, understand, process information and communicate with each other. We are all neurodiverse. We each have an amazing 86 billion brain cells connected in billions of different ways.

The word 'neurodiversity' is credited to Australian sociologist Judy Singer and the US journalist Harvey Blume who were both using it at around the same time in the late 1990s. Blume described neurodiversity as: 'being as crucial for humans as biodiversity is for life in general'. Every ecosystem contains a unique collection of species (humans being one of them), all interacting

with each other and specifically surviving in that setting. In the same way that we consider plants, animals and reptiles, we can consider humans and how we have adapted over time to succeed and survive in specific settings. Therefore, we all have our place in the world.

The current education ecosystem not only doesn't fit all students but also doesn't encourage those with certain traits. This means we can all miss out and not benefit from the potential that exists and can result from such diversity. What we have in some ways is a mismatch between where education is and what it values, and evolution having maintained some specific and useful neurodivergent traits. These traits have been retained as a part of natural selection and in the 21st century, if they are recognised and harnessed, they can be extremely useful for society.

UNPACKING NEURODIVERSITY

As we have identified, neurodiversity is not a narrow concept relating to one condition or one area of cognition. However, for many years researchers hunted for specific genes to try to understand and locate the underlying mechanisms for a specific condition such as dyslexia, so that they would know how to support students.

It was believed that if we knew what the underlying 'cause' was, then we could seek a cure for 'the condition'. The approach was very much grounded in a *deficit* model with the aim of fixing 'faulty' brains rather than seeing the variation in society that actually exists. In recent times there has also been a backlash from those with lived experience of autism spectrum conditions (ASC) who have expressed some concerns that gene studies could lead us towards eugenics and potentially deleting what may be seen as 'faulty' genes.

We will explain later about the different conditions often considered under the umbrella of neurodiversity (see Figure 1.1). These days we talk far more about spectra of conditions and seeing neurodiversity as multidimensional instead of focusing on one specific condition in isolation and as a narrow categorisation.

Extensive research into conditions such as attention deficit hyperactivity disorder (ADHD) and ASC in the last few years has shown that while there are in fact many genes relating to each condition there are also many genes that influence both conditions. The concept of neurodiversity embraces this understanding. Appreciating the concept of co-occurrence is important because it goes to the heart of understanding each student and not delivering support according to one diagnosis or another. The reality is that while gene studies may lead us to a greater understanding of the underlying mechanisms of actions, it is far more complex than a simple linear relation between the genes and behaviours we see. The environment you are in, now or in the past, can also react with genes and shape our experiences and alter outcomes at all stages of our life.

The neurodiversity paradigm moves us away from the 'good brain/bad brain' narrative and embraces the understanding that autism spectrum conditions – and other – conditions represent a necessary part of human diversity. These differences continue to be present in humans because traits confer some advantage regarding natural selection.

The increasing value placed on understanding the environment is important for educational professionals as it means we need to consider the past and present ecosystem of the student when planning support. In **Chapter 3** we will look at what happens when we do not consider the ecosystems and the individual's potential and how this can result in some students being missed, misdiagnosed or misunderstood.

Teachers have a crucial part to play in shaping success for every student by creating a more inclusive world, and can either encourage participation in our society or create barriers or interferences to growth and success. Understanding the link between the student and their environment is fundamental to achieving greater success.

WHAT TERMS ARE ASSOCIATED WITH NEURODIVERSITY?

Neurodiversity is still a relatively new word for many people, so terms associated with it and their usage are still evolving. Figure 1.1 shows a selection of the terms that some people are beginning to use that you may

find useful. This figure shows a bell curve with neurodivergent traits positively skewed to the right and neurodivergent challenges skewed to the left.

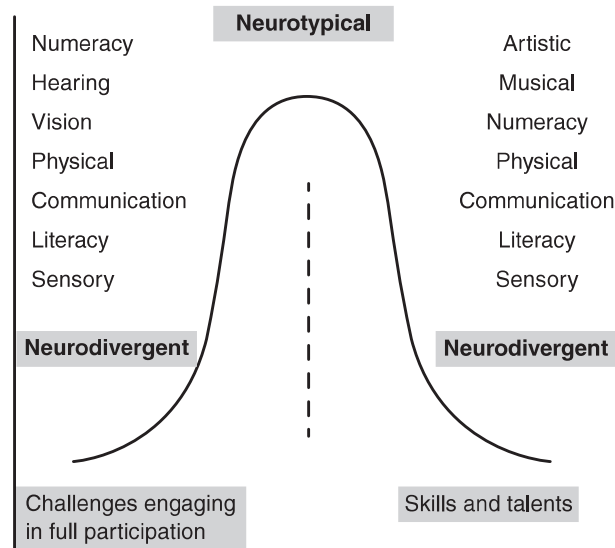


Figure 1.1 Bell curve showing strong skills and challenges

DEVELOPMENTAL AND ACQUIRED NEURODIVERSITY

When we talk about neurodivergent traits there are some conditions that we usually consider under this umbrella term. These conditions or traits may either be *developmental* (born with) and/or *acquired* through child and adulthood. People can be both born with traits that diverge from the typical presentation and/or acquire other challenges later in life because of trauma or developing a specific condition affecting their cognition. Someone could also be born with dyslexia and, for example, develop Parkinson's syndrome as well later in their life.

NEUROTYPICAL

'Neurotypical' is a term used when someone fits within the socially and culturally defined cognitive norm. What is deemed neurotypical in one setting, location or context may not be in another. The way children are parented for example varies globally and this may result in differences in child development rates such as the age of walking. When we ignore cultural variation and consider development only from a Western perspective, we may create 'blind spots' in our understanding of child development.

As an example, the Pirahã indigenous people of the Amazon rainforest are cognitively able but anumeric (i.e., don't count). This is very unusual, as only a small portion of the world's languages are anumeric or nearly anumeric. But this is one example that demonstrates that having the terms and skills to associate items with numbers is not universal to human beings. When people do not have number words, they struggle to make quantitative distinctions that probably seem natural to those who use maths in everyday life.

NEURODIVERGENT

The term 'neurodivergent' refers to someone diverging from the average or socially derived norm (see Figure 1.1). If we consider the different cognitive elements such as our ability to spell, read, move and understand, we can *positively* diverge if we have strengths in specific areas, such as being very good at maths, and *negatively* diverge if, for example, we have challenges with literacy skills such as those associated with dyslexia.

SPIKY PROFILES

Each of us will have different 'spiky' profiles (see Figure 1.2). Our spikes represent our strengths. Nobody is 'good' or 'bad' at everything but some of

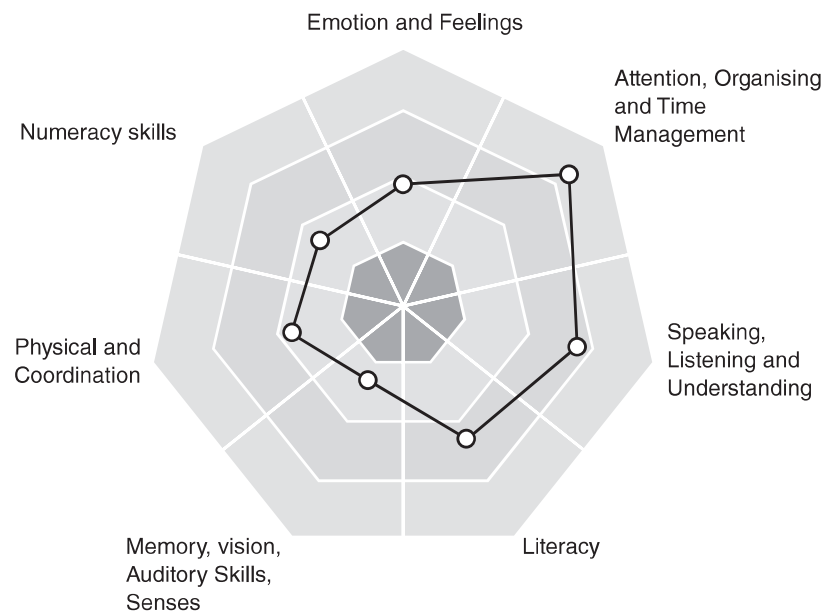


Figure 1.2 Spiky profile (Kirby, 2022)

us will have 'spikier' profiles where there are greater differences between and among our skills and challenges that impact on our day-to-day functioning. We also may have exceptional or hidden skills in some areas that we cannot showcase unless we are given an opportunity to do so. When we can understand our strengths and know how to use these to the maximum, we can offset some of the challenges we experience. When we do this effectively our strengths are often in the areas that we end up focusing on for our careers.

DEVELOPMENTAL CONDITIONS

Developmental conditions are generally categorised using two international classification systems organised by the World Health Organization (WHO) and American Psychiatric Association (APA). They describe each neurodevelopmental condition using a set of behavioural characteristics.

Developmental conditions may include:

- attention deficit hyperactivity disorder (ADHD), including attention deficit disorder (ADD)
- autism spectrum conditions or disorder (ASC/ASD)
- dyslexia
- dyscalculia
- developmental coordination disorder (DCD), also known as dyspraxia
- developmental language disorders (DLD), also known as speech, communication and language impairments (SCLI)
- tic disorders (including Tourette's syndrome).

This list is not exhaustive and other conditions may include traumatic brain injury (TBI) and foetal alcohol spectrum disorder (FASD).

The developmental conditions listed above are grouped or clustered together because they often overlap or co-occur with each other. Different terms have been used by health and education professionals for the groupings. Health professionals tend to use terms like *neurodevelopmental disorders*, whereas educators more often refer to *specific learning difficulties*.

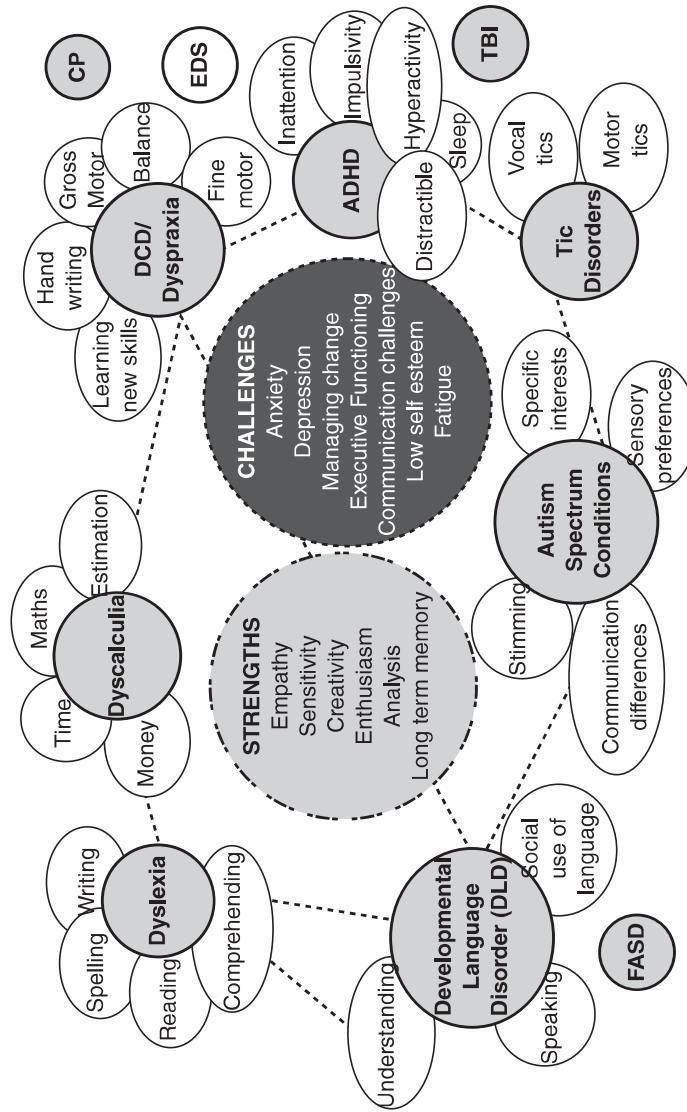


Figure 1.3 Different conditions commonly associated with neurodiversity

Note: ADHD – attention deficit hyperactivity disorder; CP – cerebral palsy; FASD – foetal alcohol spectrum disorder; DLD – developmental language disorder; TBI – traumatic brain injury.

One problem with the groupings is there is not only a lack of consistency in definition for each term and conditions included in each grouping but the definitions may differ by professional grouping as well. For example, dyspraxia, also known as developmental coordination disorder (DCD), can sometimes be seen as an 'educational' condition and included in the group 'specific learning difficulties' whereas in fact it is defined in the American Psychiatric Association categorisation system DSM-5 as a medical condition. Inconsistent terminology can lead to confusion for parents trying to navigate health and educational systems as well as for educators when trying to ensure their students thrive.

Figure 1.3 shows an example of groupings we often associate with some common neurodivergent traits. The central two circles show common themes of both strengths and challenges that may co-occur with different conditions. The circles at the edges show the clustering of certain characteristics that are related to each specific condition.

ACQUIRED CONDITIONS

Today we recognise that throughout our lives our brains can change – especially in later adolescence. Synaptic pruning happens as part of the developmental process in these teen years and is especially important in the development of more mature organisation and planning skills. During synaptic pruning, the brain eliminates extra synapses. Synapses are brain structures that allows the neurons to transmit an electrical or chemical signal to another neuron. We explore this in some more detail in **Chapter 4**.

As we mentioned above, we may also acquire new cognitive conditions during our lifetime, such as Parkinson's disease. Here, neurons that produce the neurotransmitter dopamine die off in the basal ganglia, an area of the brain that controls body movements. This causes difficulty initiating movements and can also alter the way that someone processes information and communicates.

Other conditions can be acquired either through inheriting specific genes (such as Huntington's disease) associated with the condition, or through environmental challenges such as having a head injury. This can also result

in an alteration of the way you process information, think, act and move. Other examples are:

- multiple sclerosis (MS)
- traumatic brain injury (TBI)
- cerebrovascular accident (CVA), also known as a stroke
- brain tumours.

NEUROMINORITY

A neurominority is defined as a distinct group or groups of people who diverge from a social norm. The term has been associated with people with conditions such as ASC, ADHD, dyslexia, DCD, DLD and tic disorders. Some people, because they are defined as belonging to a group differing from others, can feel a sense of separation and exclusion from participation and feel more marginalised by the society they live in.

Recognising you belong to a specific minority can, however, help you reframe yourself in a positive way and be a means of finding others who are having similar life experiences and have a shared understanding. Some campaigners describe themselves as being a part of a 'neurodiversity movement', recognising they have a condition or conditions in common with others so that they can better advocate for themselves.

UNDERSTANDING OF NEURODIVERSITY VARIES ACROSS COUNTRIES

The government and laws of a specific country can either open or close access to identification, support, recognition and services for those who are neurodivergent. This may be related to the way categorisation of need is defined. In England, for example, laws such as the Autism Act (2009) have been passed and enforce the delivery of specific actions and services for those individuals who have gained a diagnosis of autism.

This may be helpful for some but not for all. While awareness has increased especially in relationship to autism, the approach of singling out and favouring one specific condition over others may indirectly result in further inequity.

The reason for focusing on one specific condition more than others may result from lack of recognition of overlap, lack of services, or lack of knowledge by professionals of these other conditions. Individuals may have the same level of challenge in accessing education and participating in society as those with autism but may have the 'wrong' diagnosis, in terms of what currently attracts funding and support. Today we are increasingly recognising that the different developmental conditions overlap and why we need to move from a narrow 'condition-specific' approach to understanding the pattern and needs of each student.

MOVING FROM DEFICIT TO DISCOVERING STRENGTHS

Until relatively recently our view of students with learning differences has tended to focus more on negatives, with a diagnosis usually based on emphasising these. Furthermore, a diagnosis only provides a snapshot of ability in a moment in time and does not capture what a learner may be capable of in the future or with the right support, or how they have performed in the past in a different setting.

We describe conditions with terms such as *dyslexia* meaning difficulties with reading, or attention *deficit* hyperactivity *disorder*. When people see themselves defined in terms of what they can't do, it can have a long-term impact on their sense of self. They can feel different from others around them and have a sense of shame, low self-esteem and lack self-confidence. These feelings can remain with that person throughout their life. There is extensive evidence across the field of neurodiversity of increased rates of mental health challenges and lowered self-esteem compared to those who travel through education and life with ease. We will explore this more in detail in **Chapter 4**.

Excitingly, more recently we have begun to consider how the positive skills associated with neurodivergent profiles can bring advantages to the indi-

vidual and society. This echoes Blume's thoughts on how crucial neurodiversity is for society. Some people with dyslexia, for example, have been noted for their visual thinking ability and entrepreneurial strengths. Some people with ADHD can thrive where they can use their skills in developing novel solutions to complex problems. People with ADHD may also be more inclined to take calculated risks and be more entrepreneurial. Some individuals with autism spectrum have good analytical skills relating to computer programming or mathematical computation. Some people even talk about 'superpowers' associated with neurodivergent thinkers.

We should not overplay this, however. While essential to seek out strengths in each person, we must also be careful not to create stereotypes such as assuming that all autistic people are good at IT or mathematics, or that all dyslexic people are creative. We cannot attribute a set of thinking approaches to a single label because each person will be different. Additionally, we mustn't forget that some students will continue to face huge barriers to accessing education because of, for example, physical or linguistic challenges and some students may need high levels of day-to-day support. While we are not saying that every neurodivergent individual will go on to be a genius, it is important that we get better at identifying interference in all its forms so that each learner fulfils their potential.

DELIVERING FOR ALL

We have identified the importance of considering the ecosystem in terms of ensuring we better understand, support and harness those who are seen to diverge from present-day social norms. We will talk about this in greater detail in **Chapter 3**. Nowhere is the ecosystem more important than in the education system, yet schools have delivered education predominantly in the same way for more than two centuries. Children are grouped in classes, and the content is often delivered at one pace with a teacher facing the class for set periods of time. It has been designed for an 'average' student and mainly for efficiency. But this approach means that it will favour some students more than others. We sometimes use the metaphor 'fitting a square peg in a round hole' (see Figure 1.4).

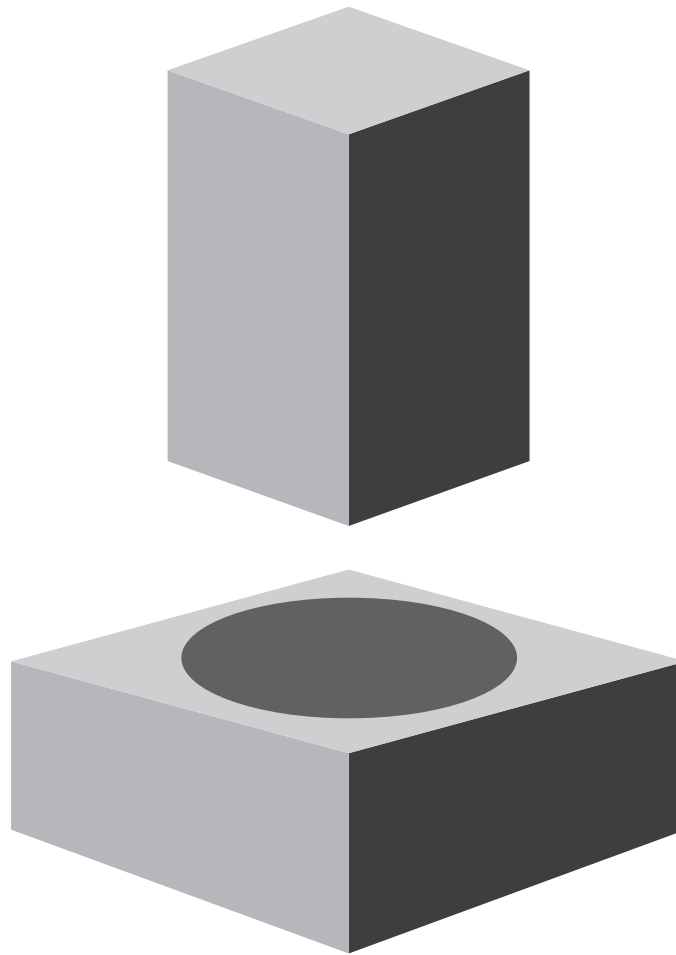


Figure 1.4 A square peg in a round hole

If you are a 'round peg'-shaped student – that is, a student who thrives using the dominant modes of teaching and learning – you may glide through school because you fit the shape of current educational provision and expectations. You can engage in lessons, join in with team games and communicate reasonably well with your peers. However, if you are a 'square-shaped' peg, then education may be harder for you to navigate as you may not be able to participate as easily or play team sports well, or stay focused in a lesson for more than ten to 15 minutes.

CHILDREN LEARN AND PROGRESS AT DIFFERENT RATES AND IN DIFFERENT ENVIRONMENTS

The concept of neurodiversity challenges our perception of what normal, typical, or average is. Not all children and adults learn to read when exposed to one type of teaching. An example of this is phonic-based reading programmes, which have been hailed as the way to teach all children to read. While such programmes remain a robust approach to teaching reading skills for many, they are now recognised as not the only route to reading.

Each student will vary in their rates of development and acquisition of skills, and consequently we will need to vary our approaches to teaching and learning. In one class you may have one student who is slower at developing reading skills and may still be struggling at a word level, and there may be a higher-performing student who is a fluent reader with advanced comprehension skills. However, it is also possible that you may encounter a child who struggles to decode text and finds reading tiring, but also has heightened skills in terms of their ability to analyse and identify meaning. They could be seen as slower reader, but quicker thinker.

In order to optimise someone's skills, you need to identify and choose varied techniques and experiment with different tools to find the best fit. We need to consider variation in patterns of challenges and strengths as these do not often cluster neatly. All children with dyslexia will be different and assumptions cannot be made. Some students may have challenges with spelling alone and others with reading and writing, for example. When adjustments are made this can also open opportunities for better engagement and change the way we view that student's potential. A student who is allowed to dictate or use speech-to-text software may suddenly be able to produce rich content and use more elaborate words and phrasing.

There is evidence that some students with Down's syndrome have very specific patterns of reading skills and may typically have an uneven profile

with stronger visual than verbal skills, stronger receptive vocabulary than expressive language and grammatical skills, and strengths in reading abilities. Another student may be verbally able but has challenges putting onto paper. What we may see in common in each of these students is that they get bored and disaffected by a one-size-fits-all approach.

Some other examples of neurodivergent students not fitting education include:

- the fidgety student who finds it hard to sit still for long in an English class may do better in classes such as science where they can stand and move around more and participate actively;
- the student who has difficulties with handwriting may be disruptive because they are embarrassed for others to see their writing when they need to record information and, as a result, produce little written work but may be verbally able and vocalise great ideas in class discussion;
- the student who requires longer to process information, reflect and respond may not perform so well in a timed exam but does much better when given a written assignment;
- the student who needs information repeated or broken down and loses meaning if the pace is too fast, or who may appear to be frustrated or disinterested, but does well if information is also provided visually by their teacher.

We will discuss throughout the book – above all in **Chapters 7 and 8** – how we need to vary our approaches to teaching, learning and assessment so that we don't favour some learners' skills more than others. This is particularly important when we consider that the skills society values are socially constructed and are likely to change over time.

THE NEURODIVERGENT STUDENT AND CHANGING ENVIRONMENTS

As students move through the educational system the environment becomes more complex and the demands on each student will increase. The external

factors in our lives, such as where we are studying or working, and the demands of others, can influence either positively or negatively our outcomes.

There is extensive research showing that students with ADHD, dyslexia and developmental coordination disorder experience increased levels of executive functioning challenges. This can result in them having greater challenges with planning, self-organisation and regulating their emotions. These are the exact skills you need as you progress through education and eventually into employment. While some neurodivergent individuals may find tasks requiring good executive functioning more challenging, we know that with the right support and strategies put in place such barriers can either be removed or reduced. It is important to recognise that different ways of thinking may also result in a student generating an alternative way to solve a problem that may not have been previously considered by even the teacher!

A move from primary school to secondary school will require greater self-organisational skills. In high school the student may begin to travel independently to a bigger school, move from class to class and have an array of teachers with different teaching styles and approaches. These changes also require that the student has the right kit with them, can plan their work and meet deadlines.

As educators we may see a student who has coped reasonably well in primary school quickly start to struggle when they transition from primary to secondary school. We need to ensure that transition planning starts early enough and recognise that increasing demands, and a changing environment, may be tipping points for some students. By doing this in a timely manner, the parent, teacher and individual can help each student meet their potential.

In adulthood, in addition to studying or working, we usually need to manage our home, social and work lives. This requires good planning and time management skills and the ability to juggle priorities. Taking a lifelong approach to supporting neurodivergent students is essential. We explore further in later chapters how strategies which work can often be adapted to be used in different contexts so that students have access to and transferable strategies they can call on throughout their lives.

We need also to consider the adults who are in and interact with our educational ecosystems and who are neurodivergent as well. For example, we know that around 20 per cent of parents of children with ADHD will also have ADHD. In **Chapter 10** we will discuss more about how to support neurodivergent teachers – and teachers working with parents – in education workplaces, and consider what adjustments may be helpful.

The concept of neurodiversity coined by Singer and Blume provides a rationale for considering how we must support all students and create settings that are more inclusive. Embracing this language positively and consistently across education, health and other services means we can develop a framework for action. We will discuss these frameworks throughout this book. Understanding the concept of neurodiversity and recognising the importance of inclusivity is important, otherwise we could end up with neurodiversity being associated once again with deficit and disorder rather than harnessing our differences.

KEY TAKEAWAYS

- Neurodiversity is about us all and is not associated with one specific condition.
- Neurodiversity describes the different ways that we all think, move, process information, hear, see, understand and communicate with each other. We are all neurodiverse.
- You can be born with neurodivergent traits or acquire them throughout life.
- We can have both strengths and challenges which will vary from person to person.
- Our environment can change over time and may result in increased demands on executive functioning skills which may make it more challenging at times of transition for those who are neurodivergent.
- The environment in which we live, study and work influences what we see as typical (or not) and this can shape our ability to engage or disengage in education.