Supporting Children/Students with Learning Conditions

Sabine Stienert-Parker
Registered Psychologist

Jean Annan, PhD
Registered Psychologist

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Attention deficit hyperactivity disorder (ADHD)

Definition
ADHD is a neurodevelopmental disorder, characterised by difficulty paying attention, excessive activity, and age inappropriate behaviour without regard to consequences. Up to two out of every three children with ADHD continue to have symptoms as adults (Sroubek, Kelly, & Li, 2013).

Characteristics
ADHD can have a significant impact on children's lives, and is generally considered to have three component features: inattention, hyperactivity and impulsivity – with the severity and combinations of symptoms varying between individuals and across a lifespan (American Psychiatric Association, 2013). Criteria include signs occuring before a child is twelve years old, and being present for more than six months. Difficulties must be evident and causing problems in at least two settings, such as school, home or recreational activities (Dulcan, & Lake, 2011).

Diagnosis
ADHD can be difficult to differentiate from other conditions, as well as to distinguish from high levels of activity that are still within the range of normative behaviours (Dulcan, & Lake, 2011). Diagnoses are made by specialists such as psychiatrists or paediatricians (American Psychiatric Association, 2013).

Origins
Despite being the most commonly studied and diagnosed mental disorder in children and adolescents, the exact causes are unknown (NIMH, 2013). A genetic links may be possible link(Terrel, & Passenger, 2005) although the expression or suppression of genes is naturally influenced by the child's experience and environment (Arden, 2019).

Recommended Approaches to Supporting Children
ADHD support recommendations vary by country but usually involve a combination of therapy, lifestyle changes (e.g. diet and exercise) and medication (NIMH, 2016). Positive behaviour therapies are often employed to support children with ADHD. These interventions are the recommended in the first instance for those with minor challenges or who are preschool-aged (Kratochvil, Vaughan, Barker, Corr, Wheeler, & Madaan, 2009). Regular physical exercise, especially aerobic exercise, is an effective in mangaing ADHD in children and adults, and can be combined with stimulant medication.

UK guidelines recommend medication as an intervention only for children with severe symptoms or those who may be considered to show moderate symptoms and do not respond to the counselling and environmental adaptions above (National Collaborating Centre for Mental Health, 2009).

School and Classroom Support
As for most children, those with ADHD require structure, boundaries and encouragement that may include the following strategies.

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- Enjoyable exercise to work off excess energy, enhance focus, and stimulate hormones and neurochemicals beneficial for learning.
- Access to a table/list to refer back to, as well as reminders, repetition and clear direction.
- Paying particular attention to the emotions involved in the learning process to prevent feelings of failure and frustration.
- Maintaining eye contact to retrieve a child from a daydream, to give permission or reassurance.
- Setting clear limits/boundaries and preventing lengthy discussion of fairness.
- Predictability of daily/weekly schedules with any changes or transitions announced beforehand.
- Permission to leave, if necessary, to support developing self-observation and self-modulation skills.
- Quality rather than quantity of homework to prevent children from becoming overloaded.
- Monitoring progress and providing frequent feedback. Supporting children in viewing learning steps is important to ensure they stay on track and know what is expected of them.
- Maintaining an organised classroom environment to avoid overstimulation.
- Enhancing children's motivation and self-esteem through regular positive reinforcement and encouragement.
- Providing regular feedback to enable children to become more self-observant.
- Making expectations explicit.
- Using an incentive or reward system as part of behavioural modification.
- Teaching of specific exam or test-taking skills to enhance achievement level.
- Encouragement and structure for self-reporting and self-monitoring to support positive behavioural choices.
- Giving advance notice for any unstructured time to allow children to internally prepare themselves and to prevent over-stimulation.
- Frequent praise, approval, encouragement and recognition to develop children's motivation as well as self-belief.
- Self-organisation (e.g. ensuring children have all necessary equipment prior to coming to school) will help in mastering the daily curriculum.

Changes to the Physical Environment

- Reduction of environmental distractions to improve performance.
- Provision of physical reminders and other memory supports for multi-step tasks.
- Attaching the child's daily schedule or timetable to a notebook that is taken home on a daily basis.
- Designating a quiet area in the classroom to help minimise distractions.
- Good organisation of whiteboard for daily information.
- Seating children close to the teacher or within the teacher's peripheral vision, next to high achieving peers/non-talkative children, to enhance focus.

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Assessment Accommodations

- Use of open-ended questions with more than one correct answer.
- Use of electronic assistance when completing class work or tests.
- Use of oral testing for formal assessments and extended time if appropriate.
- Providing supervised breaks during tests/exams or dividing long tests into multiple sittings of shorter duration across a few days.
- Provision of reader/writer in exams.
- Use of tests and exams requiring minimal written output to accommodate for slow writing fluency (e.g. multiple choice, true/false and short answer formats where child fills in blanks etc.).

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Auditory Processing Disorder (APD)

Definition

Auditory processing disorder (APD), also known as auditory disability with normal hearing (ADN), is an umbrella term for a variety of conditions that affect the way the brain processes auditory information (American Academy of Audiology, 2010). APD has been defined in the US as difficulty in the efficiency and effectiveness by which the central nervous system (CNS) utilises auditory information (ASHA, 2007).

Individuals with APD usually have normal structure and function of the outer, middle, and inner ear (peripheral hearing), though cannot process heard information in the same way as others. This leads to difficulties recognising and interpreting sounds, especially speech.

Characteristics

According to the NZ Guidelines on APD (Esplin & Wright, 2014), the following checklist of key signs and associated conditions can be used to identify children who would benefit from being referred for audiological and APD assessment:

- Difficulty following spoken directions unless they are brief and simple.
- Difficulty attending to and remembering spoken information.
- Low speed in processing spoken information.
- Difficulty understanding in the presence of other sounds.
- Being overwhelmed by complex or "busy" auditory environments (e.g. classrooms, malls).
- Poor listening skills.
- Insensitivity to tone of voice or other nuances of speech.
- Acquired brain injury.
- History of frequent or persistent middle ear disease (otitis media, 'glue ear').
- Difficulty with language, reading or spelling.
- Suspicion or diagnosis of dyslexia, or language disorder/delay.

NZ guidelines suggest behavioural checklists and questionnaires are best used only for referral guidance, information gathering (e.g. prior to assessment or as outcome measures for interventions), and to describe the functional impact of APD. They are not sufficient for the purpose of actual diagnosis.

Diagnosis

APD is characterised by difficulties in one or more auditory processes known to reflect the function of the central auditory nervous system, and is noted to be a difficult disorder to detect and diagnose (American Academy of Audiology, 2010). Subjective symptoms leading to evaluation include an intermittent inability to process verbal information, leaving the child to guess when making sense, as well as disproportionate difficulties decoding speech

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in noisy environments. Depending on how it is defined, APD may share common symptoms with ADHD, specific language impairment, and autism spectrum disorders (O'Connor, 2011).

Origins

Auditory processing disorder can be developmental or acquired. Acquired APD may be caused by damage to or dysfunction of the central auditory nervous system, causing auditory processing problems (Lew, Weihing, Myer, Pogoda, & Goodrich, 2010). The ability to listen to and comprehend multiple messages at the same time is influenced by both genes and experience. In the majority of developmental of APD cases, the cause is unknown. Suggested causes have ranged from patterns of neural circuitry to adverse experience as with other learning conditions (National Centre on Deaf-Blindness, 2011).

Recommended Approaches to Supporting Children

Supporting children with APD typically focuses on three primary areas: changing the learning environment, fostering higher-order skills to compensate for challenges, and strengthening the auditory processing system itself (Bellis, 2004). While many interventions are incorporated into computer-based auditory training programs, overall evidence for their effectiveness in improving language and literacy is, at this stage, inconclusive (Loo, Bamiou, Campbell, & Luxon, 2010).

School and Classroom Support

Key teaching strategies for children with APD include the following (Rosen, 2003):

- Repetition or rephrasing of key information.
- Placing children at the front of the classroom away from potential distractions.
- Presenting information at slow and clear pace.
- A signal to prompt the child when an important point is being made.
- Use of an assistive listening device to make it easier to hear the teacher's voice.
- Use of visual tools such as whiteboard/computer to support verbal lessons.
- Use of images and/or gestures to engage the child.
- Provision of a quiet area for independent work.
- Implementing a peer support system to share notes with the child.
- Allowing time in class to enable the child to display strengths.
- Lenience on potential spelling errors.
- Provision of learning material before a new topic is introduced.
- Clear guidelines of homework instructions and a homework list for each week.

Assessment Accommodations

- Allowing additional time in standard-length tests.
- Access to visual support (if appropriate).
- Use of open-ended questions with more than one correct answer.
- Use of electronic assistance when completing class work or tests.
- Use of oral testing for formal assessments, and extended time if appropriate.

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- Provision of supervised breaks during tests/exams or dividing long tests into multiple sittings of shorter duration across a few days.
- Provision of reader/writer in exams.
- Minimising written output requirements to accommodate for slow writing fluency (e.g. multiple choice, true/false and short answer formats etc.)

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Autism Spectrum Disorder (ASD)

Definition
Autism spectrum, also known as autism spectrum disorder (ASD), refers to a range of neurodevelopmental disorders including autism and Asperger syndrome (APA, 2013).

ASDs tend to occur simultaneously with other disorders, including epilepsy, intellectual disabilities, learning disabilities, anxiety disorders, depression and sensory processing disorders.

Characteristics
Autism is characterised by persistent challenges in social communication and interaction across multiple contexts, as well as restricted, repetitive patterns of behaviour, interests, or activities. These challenges are present in early childhood, with symptoms typically being recognised between one and two years of age, with significant functional difficulties (APA, 2013).

Symptoms of ASD include:

- Restricted and repetitive behaviours (RRBs) including a large range of specific gestures and acts (Richler, Huerta, Bishop & Lord, 2010).
- Slow development of social and learning skills, and difficulties creating connections with other people, with a tendency towards isolation (Autism Spectrum Australia, 2018).
- Intense/unusual responses to sensations including sights, sounds, touch and smell.
- Difficulties maintaining a consistent speech rhythm, which can influence a child's social skills and lead to potential problems in how they are understood by their peers.

Diagnosis
Autism spectrum disorders have been redefined to encompass four separately recognised disorders under one umbrella (DSM-IV) (autistic disorder, Asperger's disorder, childhood disintegrative disorder, or PDD-NOS [pervasive developmental disorder not otherwise specified]) for consistency. Under the newer DSM-5 criteria, individuals with ASD must show symptoms from early childhood, even if these are not recognised until later (APA, 2013).

Recommended practice parameters for assessment of ASD mean that evaluation of children with suspected ASD should occur within a developmental framework, include multiple informants from diverse contexts (e.g. parents, teachers, home and school), and employ a multidisciplinary team of professionals (e.g. psychologists, neuropsychologists, and psychiatrists) (Ozonoff, 2005).

Origins
The causes of autism spectrum disorder are uncertain (NIMH, 2016) and there is no known cure. Inherited, genetic factors have been suggested as in 64% and 91% cases a family

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history of autism has been observed (Tick, Bolton, Happé, Rutter, & Rijsdijk, 2016). Prenatal and perinatal risk factors have also been reported. Gardener, Spiegelman, and Buka (2009) suggested that certain perinatal factors may play a part including, maternal health, parental age, and medication. Particular vitamins, for example Vitamin D, are also on the list of possible influences on the development of ASD (Mazahery, Camargo, Conlon, Beck, Kruger, & von Hurst, 2016). It must be stressed that, with regard to Autism, causality remains inconclusive and is a topic of much current research.

Recommended Approaches to Supporting Children

In the absence of information about causality, the focus of intervention is on what maintains particular behaviours and how students can be supported to positively progress their learning and to develop a sense of well-being. Support may involve lessening the intensity and effects of challenges associated with autism. It may include supporting families as they work to increase the quality of life for their child and other family members and promoting functional independence. Interventions frequently involve enhancing cognitive, communication, and social skills while minimising unhelpful behaviours. Intensive, sustained personalised education programs and behaviour therapy early in life can help children acquire self-care and social skills. Approaches have included functional behaviour analysis, developmental models, structured teaching, speech and language therapy, social skills therapy, and occupational therapy (Myers & Johnson, 2007). No single intervention is considered best, and intervention is typically tailored to the child's needs.

School and Classroom Support

As with all children, learning is different in each case. The following strategies are commonly applied for children with differing abilities (Department of Education and Early Childhood Development, 2013):

- A structured and predictable learning environment that supports consistency and clarity, so children know where things belong, what is expected of them in a specific situation, and how to anticipate what comes next.
- Provision of a visual daily schedule.
- Incorporation of physical activity and exercise throughout the day.
- Awareness of tasks and activities that create frustration and may result in sensory overload or frustration. Accompanying calming sensory experiences for children when completing potentially frustrating tasks, to promote successful participation.
- Provision of relaxation opportunities and a calm, quiet, designated area for this. This may involve engaging in repetitive behaviours that have a calming effect (e.g. rocking movements). Other relaxation techniques to help students may include counting to 10, taking deep breaths, and tensing and relaxing muscles.
- Provision of situation-specific expectations for behaviour and opportunities for meaningful contact with peers who have appropriate social behaviour. Such opportunities may include: involving children in shared learning arrangements, pairing children with buddies during games and other unstructured time, (varying buddies across time and activities to prevent dependence on one child), involving peers in providing individualised instruction, arranging cross-age support by assigning an older child to assist the student with ASD, pairing children while

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attending special school events such as assemblies and clubs, and facilitating involvement in after-school or extracurricular activities.

- Careful preparation for change and transitions, as children with ASD find changes in activity, setting, or planned routine stressful. Consideration of the impact of sensory factors (e.g. fans, loudspeakers, alarms, light distractions etc.) can help minimise any negative effects these may have on children with ASD.
- Inclusion of multi-sensory activities to improve tactile and vestibular development, with input from an audiologist and/or occupational therapist.

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Dyscalculia

Definition

Dyscalculia has been defined as specific and persistent challenges in numerical understanding that may lead to a diverse range of difficulties with mathematics, occurring across all ages, abilities, and levels of education/experience (Jarret, 2019). In broad terms, dyscalculia is a difficulty in learning or comprehending arithmetic, such as understanding numbers, learning how to manipulate numbers, performing mathematical calculations and learning facts in mathematics. It often occurs in conjunction with difficulties with time, measurement and spatial reasoning, and is estimated to be prevalent in 3% to 6% of the population (Butterworth & Laurillard, 2010). At least 10% of children experience dyscalculia and/or dyslexia, even though they may display at least average intelligence and be in an adequate learning environment (Butterworth, 2010). Links between Dyscalculia and Dyslexia has been suggested, some researchers viewing the two as parts of one condition.

Characteristics

The first signs of dyscalculia may be evident in early schooling, in the form of delays learning to count and efficiently use arithmetic strategies. These are followed by persistent difficulty in the recall of arithmetical facts (Geary, 2011). Generally speaking, children with dyscalculia may display some of the following symptoms: (See The British Dyslexia Association; Posner, 2008)

- Difficulty counting backwards.
- Poor sense of numerical estimation.
- Difficulty remembering 'basic' facts or times tables, despite many hours of practice/rote learning.
- Absence of strategies to compensate for lack of recall, other than using counting.
- Difficulty understanding place value and the role of zero.
- Difficulty stating which of two numbers is larger.
- Difficulty sequencing numbers.
- Inconsistency in results when adding, subtracting, multiplying and dividing.
- Little sense of estimating whether answers given are correct/nearly correct.
- Lack of speed when performing calculations.
- Lack of recall of mathematical procedures, especially as they become more complex, e.g. 'long' division.
- High levels of mathematics anxiety.
- Difficulty differentiating between left and right.
- Ability to grasp maths on a conceptual level, but an inability to put such concepts into practice.

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Some children with dyscalculia may display all of the difficulties above, while others may exhibit some but not others (Muter & Likierman, 2008).

Diagnosis

The diagnosis of dyscalculia varies but generally calls for information from multiple sources. For example, Haberstroh and Schulte-Körne (2019) suggest that the diagnosis requires a standardized test score of at least a standard deviation below that expected at the age or year level as well clinical information that includes a psychosocial assessment. In sum, Dyscalculia is diagnosed using standardized test scores in conjunction with contextual information. The specific nature of testing and the particular criteria for diagnosis vary (The British Dyslexia Association). Assessors may use domain-specific tests rather than tests of overall mathematics achievement (i.e. working memory, executive functioning, inhibition, intelligence, spatial reasoning etc.) to supplement teacher evaluations.

Origins

Compared with dyslexia, dyscalculia is relatively under-researched. It is possible that it is related to certain brain functions or structure, in areas of the brain involved in mathematics. Number processing and arithmetic are associated with frontoparietal network activity and Magnetic Resonance Imaging (MRI) has indicated that children who experience difficulty with mathematics have structural differences in this network (De Smedt, Peters, & Ghesquière, 2019). De Smedt et al., point out that this does not mean this relationship is a cause or a consequence.

Recommended Approaches to Supporting Children

Some well-known teaching practices have proved effective for working with children with Dyscalculia (Butterworth, Varma, & Laurillard, 2011). Below are some general principles for supporting students with Dyscalculia. Specific strategies that are particular to individual students would emerge from detailed assessments (see Haberstroh & Schulte-Körne, 2019).

- Using multisensory instructions (a teaching approach using sight, touch, hearing and movement) to give children different ways to learn skills and understand concepts, as well as what numbers and symbols represent. Concepts are often taught in a logical way in which one skill builds on the next.
- Using objects to show quantities and how they change to provide concrete examples of mathematical concepts at work, enabling children to develop a sense of numbers and a stronger connection to what they represent, e.g. eight blocks representing the numeral 8.
- Repetition and practice of interventions focusing on improving basic numerical skills, as this may be a contributing factor in reported performance gains (Räsänen, Salminen, Wilson, Aunio, & Dehaene, 2009).

School and Classroom Management Techniques

For children with dyscalculia, mathematics lessons and tests/exams often present seemingly insurmountable obstacles that can lower self-esteem and affect academic success. Relating abstract mathematical information to the physical world can help, as in the following strategies:

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- Talking through a problem or writing it down in sentence form can assist children visualise relationships between elements. Restating word problems in new ways and/or identifying key components using highlighters helps to organise information, make connections and perceive solutions.
- Drawing a problem can also help visualise relationships and understand concepts. Children can be asked to 'draw through' a problem with images that reflect their understanding of it and show ways to solve it.
- As with other challenging learning conditions, dyscalculia affects children's success both in and out of the classroom. Strategies using visual or verbal cues and physical props can make the abstract world of mathematics more concrete, and help dyscalculic children overcome obstacles towards making sense of mathematics.
- Exposing children to successful learning experiences is key to their motivation and level of confidence. Giving them ownership of their work, such as marking it using a calculator and/or ticking it following a marking scheme can be empowering for children and enhance their level of motivation as well as success.

Assessment Accommodations

- Allowance of additional time in standard-lengths mathematics tests to prevent rushing.
- Providing supervised breaks during tests/exams or dividing long tests into multiple sittings of shorter duration across a few days.
- Having access to visual support is likely to be helpful.
- Providing frequent checks during classwork to prevent errors and levels of frustration.
- Outlining stages for multi-step problems and algorithms can be helpful; clearly numbered step-by-step instructions can be posted on the board, or placed on the child's desk.

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Dyslexia

Definition

Dyslexia is a learning difficulty that primarily affects the skills involved in accurate and fluent word reading and spelling (The British Dyslexia Association, 2019). It is characterised by difficulties in phonological awareness, verbal memory and verbal processing speed, despite normal intelligence (National Institute of Neurological Disorders and Strokes, 2018; Siegel, 2006). Dyslexia is the most commonly diagnosed learning disability, occurring in all areas of the world. It is estimated to affect 3–7% of the population, though up to 20% of people may have some degree of the symptoms (Peterson & Pennington, 2012; National Institutes of Health, 2015).

Characteristics

Dyslexia affects people to varying degrees. Difficulties may include a child's ability to:

- Spell words correctly.
- Read quickly and effortlessly.
- Put thoughts to paper and 'sound words out in the head'.
- Pronounce words when reading aloud
- Comprehend text (National Institutes of Health, 2016).
- Identify/generate rhyming, or count the number of syllables in words, both of which depend on phonological awareness, an individual's awareness of the phonological or sound structure of words, which is a reliable predictor of later reading ability (Alabama Dyslexia Association, 2003).
- Segment words into individual sounds or blend sounds when producing words, indicating reduced phonemic awareness, the basis for learning phonics. Phenomic awareness supports children's word reading and reading comprehension and helps them learn to spell (National Reading Panel, NZ, 2008).
- Word retrieval or naming things (Shaywitz & Shaywitz, 2013). People with dyslexia commonly experience spelling difficulties, a feature sometimes termed dysorthographia or dysgraphia, which depends on orthographic coding (Handler & Fierson, 2011).

Diagnosis

Dyslexia is diagnosed through a series of tests including cognitive assessment and educational assessments focusing on memory, visual processing, spelling, vision and reading skills (National Institutes of Health, 2015).

The manual of psychiatric diagnosis used in the United States (DSM-V) does not specifically define dyslexia, including it instead in a category termed specific learning disorders (American Psychiatric Publishing, 2015).

Origins

Dyslexia relates to two neural networks, one relating to language processing and another to visual processing. The condition is now commonly understood to reflect diverse forms of cognition rather than indicating lowered intelligence. Emotional problems often

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consequently arise when a child's specific needs for learning are not aligned with regular teaching and learning environments (Campell, 2009). Dyslexia may be due to genetic factors, environmental factors or an interaction between the two. It may also relate to brain mechanisms concerned with the way language is processed (Peterson & Pennington, 2012).

A diagnosis of dyslexia is often accompanied by other learning disabilities, including dysgraphia, dyscalculia, Attention Deficit Hyperactivity Disorder (ADHD), auditory processing disorder (APD) and developmental coordination disorder/dyspraxia) although it is unclear whether or not they share underlying neurological causes (Nicolson & Fawcett, 2011).

Recommended Approaches to Supporting Children

As for all learning conditions, the presence of dyslexia involves adjusting teaching methods to suit the child's best modes of learning (National Institute of Neurological Disorders and Strokes, 2018). Through the use of compensation strategies, therapy and educational support, dyslexic individuals can learn to read and write (Bogon, Finke, & Stenneken, 2014).

School and Classroom Support

Children who have been diagnosed with dyslexia often display difficulties in the areas of Working Memory and/or Visual Processing Speed. The following techniques may be helpful to minimise memory-related underachievement in classroom-based learning tasks (Weiss, Saklofske, Holdnack, & Prifitera, 2016):

- Instructions are best kept simple and clear and repeated frequently.
- Children can be asked to repeat instructions back to the teacher and encouraged to ask for forgotten information.
- For tasks taking place over an extended period of time, it is best to remind children of crucial information rather than repeat sets of instructions.
- Training children in the use of memory aids (e.g. mnemonic or verbal rehearsal 'big elephants can always understand small elephants' etc).
- Provision of support for the correct spelling of frequently occurring words to help prevent children losing their place in written tasks.
- Allowing longer response times for dyslexic children when responding orally to questions in class, when making decisions about a choice of activities, and when completing assignments in class.
- Reducing quantity of work in favour of quality in production.
- Providing copies or notes rather than requiring the child to copy from a screen or whiteboard within a time limit.

Changes to the Physical Environment

- Reduction of environmental distractions to improve performance.
- Provision of physical reminders and other memory supports for multi-step tasks.
- Designating a quiet area in the classroom to help minimise distractions.
- Good organisation of whiteboard for daily information.
- Seating children close to the teacher or within the teacher's peripheral vision, next to high achieving peers/non talkative children, to enhance focus.

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Assessment Accommodations:

- Use of open-ended questions with more than one correct answer.
- Use of electronic assistance when completing class work or tests.
- Use of oral testing for formal assessments, and extended time if appropriate.
- Providing supervised breaks during tests/exams or dividing long tests into multiple sittings of shorter duration across a few days.
- Provision of reader/writer in exams.

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Dyspraxia

Definition

Dyspraxia affects planning of movements and co-ordination as a result of brain messages not being accurately transmitted to the body. This results in difficulties in skilled motor movements which interfere with daily activities (Kotsopoulos, 2013). Children with dyspraxia do not necessarily have an identifiable medical or neurological condition explaining their coordination problems.

Dyspraxia is estimated to affect 5-6% of school-aged children, tending to occur more frequently in boys, and progresses towards adulthood, making it a lifelong condition (CanChild, 2016). Dyspraxia can exist on its own or it may be present in children with other learning disabilities, such as dyslexia and/or speech/language impairments. It is classified in the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) as a motor disorder, in the category of neurodevelopmental disorders (APA, 2013).

Characteristics

Symptoms are usually noticed first by those closest to the child (parents, classroom teacher) due to motor difficulties interfering with successful participation at home, in school, or on the playground. It is commonly identified and diagnosed after age 5, when minor motor problems become more noticeable due to the structured demands of a school environment (CanChild).

Symptoms can vary, depending on age. In general, a child may display the following physical characteristics:

- Difficulty controlling posture and lack of awareness of objects or his/her body space.
- Awkwardness in movements and bumping into, spilling, or knocking things over.
- Difficulty with gross motor skills (whole body) and/or fine motor skills (using hands), and planning movements (e.g. sitting down on a chair).
- Delayed development of certain motor skills such as tricycle or bike riding, ball catching, handling a knife and fork, and doing up buttons.
- Discrepancies between his/her abilities in motor skills and in other areas (e.g. intellectual or language skills may be quite strong while motor skills are delayed).
- Difficulty in activities that require constant changes in body position or adaptation to changes in the environment (e.g. tennis or jumping rope).
- Difficulty performing activities that require the coordinated use of both sides of the body (e.g. cutting with scissors, handling a hockey stick).
- Poor balance.
- Difficulty with handwriting.

A child may display the following emotional/behavioural characteristics:

- Frustration, decreased self-esteem, and lack of motivation due to problems coping with activities required in daily life.

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- Avoidance in socialising with peers, particularly on the playground. Some children will seek out younger children to play with, while others may go off on their own, usually due to decreased self-confidence or avoidance of physical activities.
- Dissatisfaction with his/her school performance (e.g. erasing written work, complaining of performance in motor activities, frustration with work produced).
- Resistance to changes in routine or environment.

Diagnosis

The following criteria are necessary for a positive diagnosis of dyspraxia:

- Learning and execution of coordinated motor skills below expected level for age, despite opportunities for skill learning and normal level of intelligence.
- Motor skill difficulties interfering significantly with daily life activities and impacting on academic/school productivity, vocational activities, leisure and play.
- Onset in the early developmental period.
- Motor skill difficulties not better explained by intellectual delay, visual impairment or other neurological conditions that affect movement (American Psychiatric Association, 2013).

Origins

Although there are many theories about the causes of dyspraxia, they are still unknown (Dyspraxia Foundation, UK). Recent research indicates involvement of the cerebellum, the part of the brain responsible for human movement, co-ordination, motor control and sensory perception. The cerebellum is critical for developing automatic movement control and ongoing monitoring of movements, both of which are affected in dyspraxia (Dyspraxia Foundation, UK).

Recommended Approaches to Supporting Children

Dyspraxia can be managed through occupational therapy (co-ordination of fine and gross motor skills) and physiotherapy (muscle strength) as well as psychological therapy (emotional and learning support) for those experiencing the condition.

School and Classroom Support

Teaching strategies for children with dyspraxia include the following (see Patrick, 2015):

- Ideally, children are seated near the front of the classroom and away from doors/windows or other distractions.
- Instructions are best presented verbally as well as visually (e.g. written on whiteboard) as are key phrases or information.
- Paper for reading and/or writing is best placed in the direction the individual's eyes usually look when thinking.
- Slanted desks or boards can lead to improved concentration and less pressure on a child's eyes when working. Good posture is important for encouraging blood flow to the brain; stretching also increases oxygen flow to the brain.
- Children can, where appropriate, be prompted to write bullet points during a lesson rather than complete sentences.
- Provision of wide-lined/large-squared paper for children who write large letters/numbers.

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- Provision of pencils and pencil grips and/or triangular shaped pencils.
- Children can be encouraged to dictate to someone or use a laptop/computer to type a story/paragraph (Morin, 2014).
- Provision of checklists, step-by-step instructions and visuals for longer tasks, and memory aids.
- Allocation of extra time to move between classes.
- Positive reinforcement and recognition to enhance motivation and self-esteem.
- Changes in routine are best to be sensitively implemented to lower anxiety.

Assessment Accommodations

- Allowing additional time in standard-length tests.
- Having access to visual support.
- Use of open-ended questions with more than one correct answer.
- Use of electronic assistance when completing class work or tests.
- Use of oral testing for formal assessments, and extended time if appropriate.
- Providing supervised breaks during tests/exams or dividing long tests into
- Multiple sittings of shorter duration across a few days.
- Provision of reader/writer in exams.

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