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AUTISM SPECTRUM DISORDER (ASD) RESEARCH AND PRACTICE

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Learning objectives

This chapter will:

- Discuss the context and the key research areas on ASD
- Discuss and clarify the diagnostic criteria for ASD
- Discuss the importance of early diagnosis
- Provide a detailed analysis of the wide range of available treatments in practice

History and research

Incidence

Based on European studies from the 1970s and 1980s, it was estimated at that time that 1 in 2,500 children were diagnosed with autism. Recent studies suggest that the prevalence of autism in the UK may mean that 1.1%, or almost 700,000 of the population, could be on the Autism Spectrum (National Autistic Society, 2019). This assessment is compiled from studies of children and of adults. The first suggests almost 40 in every 10,000 could be autistic, with 116 per 10,000 for the entire autistic spectrum (Baird et al., 2006). The studies of adults sought to establish representative evaluations for the numbers of adults in whom autism was prevalent at all ages and abilities (Brugha et al., 2009; The NHS Information Centre, Community and Mental Health Team, 2012).

The latest US data, available from research conducted in 2014 by the United States Centers for Disease Control and Prevention (CDC), put the figure at 1 in 59 (CDC, 2018). This figure represents a significant increase on the incidence rate found in previous studies conducted in the United States of 1 in 150 in 2000–2002, when such records began, and the last study of 1 in 68 in 2010–2012. This change represents a doubling of prevalence in less than twenty years and a 15% increase between the 2012 and the 2018 figures.

Since 2000, the CDC surveys have assigned a diagnosis of ASD based on results from its Autism and Developmental Disabilities Monitoring (ADDMM) Network research of eight-year-olds in eleven communities throughout the United States. The latest report noted that there was a difference in the incidence of ASD by geographical location, sex and intellect of the child. For instance, boys were four times more likely to receive a diagnosis than girls were. This figure has remained more or less constant with almost 4.5 males to every one female with ASD recorded in 2012 (CDC, 2018).

It has also been noted, according to the CDC ADDMM data, that the percentage of children with ASD and a recorded intellectual disability – where intelligence quotient (IQ) scores are within the range of <70 – has slowly declined. Results from 2000–2002 showed that half of children diagnosed with ASD had an IQ in the disability range. By 2012, this number had decreased to one-third (CDC, 2018). This reduction was found to be more pronounced with girls than with boys.

Reasons for increase

There is some debate on whether this increase represents a true increase in the prevalence of autism or whether it reflects changes in the criteria used to diagnose autism, along with increased recognition of the disorder by professionals. Many questions, hypotheses and accompanying explanations have been put forward for this dramatic rise. These range from environmental factors to better and more accurate detection and neurobiological, chemical and emotional influences, or even misdiagnosis.

Whatever the cause of this increase, the changing nature of these statistics demonstrate that there is an ongoing requirement for further research into the myriad risk factors associated with ASD. There is also a need for teachers, parents and professionals to collaborate and work towards effective provision of services and lifelong intervention to support children and young adults who have ASD.

Kanner's Syndrome

The term Kanner's Syndrome was first assigned to autism following the work of Dr Leo Kanner of the Johns Hopkins Hospital in the USA in 1943. He studied a group of

11 children and introduced the label early infantile autism into the English language. At the same time a German scientist, Dr Hans Asperger, described a milder form of the disorder that became known as Asperger syndrome (Asperger, 1991 [1944]). This later group was characterised by Asperger by their social and communication deficits, and their obsessions and dependence on rituals and routines. Kanner's Syndrome was characterised by abnormal communication, abnormal social communication and ritualistic and stereotyped behaviour and resistance to change (Howlin, 2002).

ICD-11

The International Classification of Diseases for Mortality and Morbidity Statistics 2018 version (ICD-11 MMS) (WHO, 2018) defines autism as characterised by 'persistent deficits in the ability to initiate and to sustain reciprocal social interaction and social communication, and by a range of restricted, repetitive, and inflexible patterns of behaviour and interests' (WHO, 2018). In relation to ASD, ICD-11 MMS goes on to say that, 'Deficits are sufficiently severe to cause impairment in personal, family, social, educational, occupational or other important areas of functioning' (WHO, 2018). In relation to Asperger syndrome, however, ICD-11 MMS says that in addition to meeting all of the criteria for ASD, 'intellectual functioning and adaptive behaviour are found to be at least within the average range ... and there is only mild or no impairment in the individual's capacity to use functional language [to] ... express personal needs and desires' (WHO, 2018).

DSM-5

These two disorders are also described in the *Diagnostic and Statistical Manual of Mental Disorders-5* (DSM-5) (APA, 2013a). DSM-5 defines ASD to include 'the previous DSM-IV autistic disorder (autism), Asperger's disorder, childhood disintegrative disorder, and pervasive developmental disorder not otherwise specified' (APA, 2013a: 809). Autism Spectrum Disorder is used here as it 'reflects a scientific consensus that four previously separate disorders are actually a single condition with different levels of symptom severity' (APA, 2013b). All of these disorders are characterised by varying degrees of impairment in communication skills, social interactions and restricted, repetitive and stereotyped patterns of behaviour.

These symptoms are split into two core domains: 'Persistent deficits in social communication and social interaction across multiple contexts' (APA, 2013a: 50) and 'restricted, repetitive patterns of behavior, interests or activities' (APA, 2013a: 50). As a consequence of these definitions, a series of severity levels are also published in DSM-5.

These range from ‘Level 1 “Requiring support”’, ‘Level 2 “Requiring substantial support”’ to ‘Level 3 “Requiring very substantial support”’ (APA, 2013a: 52). This then provides for a clear categorisation of conditions and levels of support. However, in practical terms, it means that many children are now receiving an autism spectrum disorder Level 1 diagnosis, who previously would have been diagnosed as PDD–NOS. The implication of this is that this can affect the child in situations such as school admission where a label of autism may be prohibitive but one of PDD–NOS would not have been. This suggests there is an ongoing need to educate those who need to understand what these labels represent.

Autism and Asperger syndrome

In 2002, Howlin had argued that there were a number of factors that differentiated between autism and Asperger syndrome. She suggested that the prevalence rates may have been higher for Asperger than for autism. She also suggested that the research indicated that there was often a significant difference in ages when children from the two groups were first diagnosed. In the autism group, she stated that the average age of diagnosis was 5.5 years, while in the Asperger group it was 11.3 years, and almost all (88%) of the children in the study with autism had been diagnosed before 10 years of age compared to only 45% of the Asperger group. Mandell et al. (2005) said that, ‘The average age of diagnosis was 3.1 years for children with autistic disorder ... and 7.2 years for Asperger’s disorder’. Interestingly, their research also aims to identify reasons for late diagnosis. They provide some insightful data; they suggest that children in rural areas and those classed as ‘near poor’ received diagnoses later than those in urban areas or with higher incomes did. They also found that children with a single paediatrician received an earlier diagnosis (through referral to a specialist) than those with four or more doctors, and that most did not receive a diagnosis until of school age. This, they claim, may be because ‘many physicians have limited knowledge of the presentation, prognosis, and treatment of ASD’ (Mandell et al., 2005).

In support of DSM-5, it can be argued that the obvious similarities between the two syndromes lie in the same continuum or spectrum and that Asperger syndrome has often been considered to be a type of ‘high-functioning’ autism. However, although DSM-5 (APA, 2013a) claims a ‘scientific consensus’ that they are the same condition, there is still some clinical controversy about whether it is a milder form of autistic disorder or a distinct disorder. Additionally, the term ‘high-functioning’ can be misleading as it does not necessarily translate to lower needs. This can have considerable implications for intervention and the allocation of resources.

Early diagnosis

As we shall see in the next section, early diagnoses are key to effective interventions. Research has begun to show that some ‘symptoms’ of ASD are visible at an early age and, therefore, treatment can be started sooner. Roberts (2010) suggests an age of nine months for early detection. As we have seen, in practice, many children do not receive a diagnosis until they start school and their ability to cope with complex social situations becomes outweighed by the increasingly complex nature of those interactions.

In addition to late diagnosis, accurate diagnosis of ASD can be fraught with difficulties where other disorders are also prevalent. It is recognised that disorders do not usually exist in isolation and co-morbidity is the norm (Kaplan et al., 2001; Ronald et al., 2010; Sturm et al., 2004). Russell and Pavelka (2013) found that children with autism are also more likely to have conditions such as dyslexia, dyscalculia, dyspraxia and ADHD (Gillberg, 2010; Reiersen and Todd, 2008; Simonoff et al., 2008). This can only add to the difficulty of a precise diagnosis, especially considering the prevalence for practitioners to specialise in one or two areas (Gillberg, 2010). This means that a holistic diagnosis that takes into account all symptoms to arrive accurately at a precise diagnosis may necessitate the form of a multi-disciplinary or multi-agency approach.

Practice

0-25 Special Educational Needs and Disability Code of Practice

In support of the transformations introduced by the UK Children and Families Act 2014, the 0-25 Special Educational Needs and Disability (SEND) Code of Practice sets out expectations for increased co-operation between education, social care and health, as well as an increased focus on outcomes of support to be provided.

Relating to young children, the Code places an emphasis and ‘clear expectations’ on early years settings (DfE and DoH, 2015). The Code of Practice recognises that early diagnosis and intervention are key to providing timely and graduated support to those children who require it.

The Code also mandates that all OFSTED-registered providers must have arrangements available to be able to identify children with special educational needs or disabilities (SEND). Additionally, such providers are required to enable equal opportunities for all children in their care. The Early Years Outcome guidance document can be used as a tool to gauge a child’s development against a series of recognised behaviours. Several of these, such as ‘communication and language [and] personal, social and emotional development’ (DfE and DoH, 2015) provide an obvious overlap with the criteria

used to diagnose ASD. Additionally, when a child is two years old and at the end of the Reception year, a written assessment should be made available to parents and professionals. In turn, this has the potential to increase the likelihood of early notification of any developmental delay, in order to enable an effective diagnosis to be made. However, if difficulties are not indicated when the child is two, by the second assessment at the end of the Reception year, the child could already be five years old and missing out on the benefits of early intervention.

At the other end of the age range covered by the Code are mandatory responsibilities placed on local authorities and educational colleges. These include: a reciprocal duty for a college to cooperate with the local authority; the ability for a specific college to be named in an Education, Health and Care Plan (EHC) and for that college to admit and support that student; involving a college in the transition of a student with SEN from school, to ensure a successful move; and colleges to 'use their best endeavours to secure the special educational provision that the young person needs' (DfE and DoH, 2015). Additionally, colleges are required to have 'appropriate expertise within their workforce' (DfE and DoH, 2015) as well as access to external assistance as may be required for a student. SEND funding is allocated to colleges to assist with the delivery of these services.

In this way, the SEND provision can be continued for students in colleges. It is intended to provide comparable opportunities so that children with SEND are able to access higher education curricula in the same way as their peers. This is an important step to ensuring that all children have a level playing field to be able to achieve their maximum potential.

Available treatments in practice

In practice today, there are myriad therapies available which claim to be able to treat autism. Some of these are supported by wide-scale scientifically conducted research; however, with others, there is often little or no empirical evidence to support suggestions made in support of them. Each therapy should be objectively assessed and evaluated critically. This section will focus on educational, psychological and therapeutic interventions in practice.

Applied Behaviour Analysis (ABA)

Perhaps one of the best-known therapies is Applied Behaviour Analysis (ABA). Its practitioners aim to improve behaviour that is socially important by using interventions that are based on principles of learning theory and that have been evaluated through experimentation using replicable and independent measurement. Generally, when we

talk of ABA we are talking of the science in its applied sense: that is to say, the way that we apply the ‘pure’ principles.

The United States Surgeon General concluded in 1999 that ‘Thirty years of research demonstrated the efficacy of applied behavioral methods in reducing inappropriate behavior and in increasing communication, learning and appropriate social behavior’.

The original Lovaas method involved breaking down desired behaviours and skills into manageable steps or tasks (intermittent trials). The target behaviour would first be taught alone before ‘distracters’ were introduced. Then another behaviour would be taught in this fashion before the two target behaviours would be randomly rotated. Each of these trials utilised a series of verbal or physical prompts to shape the child’s correct response which in turn could increase their attention capability. A correct response would be reinforced verbally, with an edible or another desired item. Today, the use of aversives does not form any part of the programme and this aspect of the original model has been condemned for being overly punishing, outdated, immoral and often illegal. Only positive reinforcement is used to provide acceptable alternatives to self-stimulatory (‘stimming’) behaviour. Today, the system appears to be successful for some children and not others, and despite the scale of Lovaas’s work, it should not be seen as a panacea.

The effectiveness of ABA interventions generally is well known and well documented. In 1972, Hingtgen and Bryson reviewed research articles from the previous decade and found that interventions that were based on behaviour illustrated more consistent results than interventions that were not. In 1981, DeMyer et al. found ‘evidence strongly suggests that the treatment of choice for maximal expansion of the autistic child’s behavioral repertoire is a systematic behavioral education program, involving as many child contact hours as possible’. Since Lovaas’s 1987 article, further research has been produced to support the efficacy of a behavioural approach to treating autism. In 1996, Baglio et al. reviewed research from the previous fifteen years and commented that the type of research itself was evolving to be more refined and incorporating more broad applications of ABA. Research continues to support ABA and, unlike with other ‘treatments’, studies have not been able to show that behavioural intervention is not effective.

ABA can be thought of as the application of behaviourist principles in order to effect positive changes in a person’s behaviours. ABA explains behaviour in relation to external events that can be influenced, and not internal concepts that cannot. Where people refer to different types of ABA therapy, this simply refers to different styles of application of the behavioural science and not distinct sciences. In 1968, Baer et al. identified what they saw as seven fundamental attributes of ABA:

Applied – has practical value

Behavioural – behaviour itself is targeted

- Analytical – functional relationship can be established
- Technological – methods are well-documented and replicable
- Conceptually systematic – based on sound theoretical principles
- Effective – produces socially meaningful results
- Generalised – applicable across different settings (Baer et al., 1968)

Empirical findings have shown that ABA can be effective in helping children with ASD to improve their academic abilities, communication skills, general socialisation and simultaneously reduce inappropriate behaviours. ABA can be utilised holistically in a range of situations from the classroom to the home and broader community environments.

ABA: treatment – five steps

ABA works through a process of systematic instructions to teach broken-down steps of a desired skill. One of the procedures for this that is used in early and intensive treatments is known as Discrete Trial Training (DTT). There are generally five accepted parts to DTT:

- 1 Antecedent
- 2 Prompt
- 3 Response
- 4 Consequence for a correct and for an incorrect response
- 5 Inter-trial interval (Malott and Trojan-Suarez, 2006; Smith, 2001)

With DTT, a therapist will provide different learning opportunities in order to establish a child's repertoire for correctly responding to directions to obtain positive reinforcement (a reward). Initially, rewards may take the form of primary reinforcement such as food edibles, and as the child progresses these may move towards secondary reinforcement such as tangibles and social praise. By utilising a strategy of appropriate teaching and rewards, the child will be able to quickly learn new skills and behaviours. Smith (2001) claims that 'Discrete Trial Training is one of the most important instructional methods for children with autism'.

Verbal Behaviour Therapy (VB/AVB)

Verbal Behaviour Therapy (VB/AVB) utilises DTT but places an additional emphasis on communication skills. This is done in accordance with Skinner's analysis of language

and its functions which he described (creating the new terms ‘echoics’, ‘intraverbals’, ‘mands’ and ‘tacts’) in his 1957 book *Verbal Behavior*. As Skinner merely described these, it fell to others such as Carbone, Michael, Partington and Sundberg to apply his analysis of VB within ABA. VB suggests that a child’s language facilitates their desire to obtain something from someone else and so it teaches the child to make demands (‘mand’). This is different from other forms of ABA in that it is teaching the child that by communicating they can receive an instant positive reinforcement and so it can be considered less rigid than other types of ABA. VB encourages the child to take on a more active role within a session and can increase their motivation to complete trials.

Natural Environment Teaching (NET)

In order for a child to be capable of generalising what they learn to all environments, the opportunity for generalisation should be included in the teaching from the outset. Natural Environment Teaching (NET) sets out to achieve this without learning behaviours and skills in one setting (usually the structured classroom) and then having to adapt and learn to generalise these to other scenarios. With NET, the therapist or teacher must be clear about what they want to achieve and how they can achieve it in a varied, moveable setting. In order to establish instructional control with NET the teacher must first effectively associate themselves with positive reinforcement. This is done through ‘pairing’. This will begin with non-contingent reinforcement where reinforcement is offered without any demands having been placed on the child (other than their acceptance of the reinforcement and an absence of undesirable behaviour). Where this happens constantly, the teacher can begin to slowly introduce demands of the child. In this way, the required response before reinforcement can also be increased. More opportunities of varying degrees of difficulty can then be attempted without lowering the value of the reinforcer. The teacher must be able to pair herself with robust reinforcers so that she actually becomes a reinforcer herself. From this point on, the teacher becomes a conduit and everything about her – *ergo* learning – will become reinforcing. The key to NET is being inventive with teaching the desired skills and behaviours in a way that remains motivational and fun for the child.

Pivotal Response Training (PRT)

Pivotal Response Training (PRT) was developed by Koegel and Schreibman in the 1970s. Its goals include ‘the development of communication, language and positive social behaviors and relief from disruptive self-stimulatory behaviors’ (Autism Speaks, 2019). It can be used to develop generalisation of stimulus and response, reduce dependency

on prompts and increase spontaneity and motivation. It is a naturalistic intervention whose motivation strategies promote natural reinforcement (Schreibman, 2000) where the reward is directly related. For example, a child demanding a toy is rewarded by being given the toy and not a more abstract reward. PRT is centred on child-instigated play. Such interventions are said to have a positive effect on the child and parents who implement PRT.

Rather than target specific behaviours, PRT targets pivotal components that affect a wide range of a child's behaviours in the areas of academic study, communication and socialisation. When pivotal behaviours are encouraged, they are thought to produce improvements in other behaviours that have not been specifically targeted. These pivotal behaviours are initiating social interaction, motivation, response to multiple cues and self-management. Koegel et al. (1999) report that an enhancement of pivotal behaviours can induce an improvement in autonomy, child learning and generalising new skills. Humphries (2003) claims that PRT is: 'an efficacious evidence-based intervention for children with ASD'.

Augmentative Communication (AAC)

Other therapies that may be considered to offer most benefit include Augmentative Communication (AAC), neurofeedback and video modelling.

AAC relies on alternate methods of communication that replace or enhance conventional spoken language in order to express needs, wants and feelings. These may take the form of gestures, sign language, picture exchange (including the Picture Exchange Communication System), pointing and electronic aids. Research indicates that AAC may improve communication skills with children who have limited or no verbal communication when ABA methods are used to teach it. Hourcade et al. (2004) caution however that 'children with good verbal imitation skills demonstrate better speech production than those with poor verbal imitation skills, with or without AAC'. They further caution:

simple signs may be a support for children learning to speak or an additional mode of communication for children who have no speech or limited speech ... it is very rare to find a child with autism who learns to sign fluently (in sentences) and flexibly.

Video modelling

Video modelling is a form of observational learning that is used to develop and strengthen communication skills, academic performance, and social and self-help skills. This is achieved by watching a video of targeted desirable behaviours to be learnt and

then memorising, imitating and generalising the behaviours. Video modelling has been found to lead to quicker acquisition rates and increases in generalisation when compared to live modelling (Charlop-Christy and Daneshvar, 2003). A form of video modelling that is based on Discrete Trial Training (DTT) was devised and recorded as a way to teach those who do not respond well to other therapies. Video modelling can be successful in teaching 'theory of mind' or the capability to empathise and 'see things from another person's point of view' (Happé et al., 1996). It is also more efficient in terms of time and cost to train and implement (Graetz et al., 2006).

Neurofeedback (NFB)

Neurofeedback (NFB) measures brain waves or flow of blood to the brain in order to produce a signal to be used as brain activity feedback. This enables self-regulation of brain function to be taught. Feedback with this therapy is often in the form of audio or visual signals (video display). Positive feedback is given for desirable brain activity and negative feedback is given for undesirable brain activity. Research has claimed that NFB is helpful in the treatment of ADHD, although it should be noted that the UK National Institute for Health and Care Excellence (NICE) clinical guideline no.72 (NICE, 2009) says 'Biofeedback has been employed as a non-invasive treatment for children with ADHD since the 1970s but it is probably not used as a significant intervention in UK clinical practice'.

Other educational, psychological and therapeutic interventions

Other educational, psychological and therapeutic interventions that have been shown to have some or mixed support from scientific research include: Auditory Integration Training (AIT), music therapy, the Picture Exchange Communication System, the TEACCH® autism programme (Treatment and Education of Autistic and related Communication-handicapped Children), recreational sport and exercise, Sensory Integrative Therapy (SI or SIT) and socialisation-related classes.

Auditory Integration Training (AIT)

AIT is used as an intervention to identify sounds to which a person is believed to be either hyper- or hypo-sensitive. There are three main types of AIT which are the Tomatis, Clark and Berard methods. Dr Guy Berard, a French otolaryngologist, put forward the theory that such auditory alterations may cause behavioural disturbances

including autism (Berard, 1993). Berard's method uses audiograms to discern such 'abnormalities' before AIT treats such distortions by exercising the muscles of the middle ear in the same way as physiotherapy (Berard, 1993). Some small-scale studies have illustrated benefits and others have provided mixed results. However, the American Speech-Language-Hearing Association (2004) report:

this method has not met scientific standards for efficacy and safety ... The American Academy of Audiology (1993), ASHA (1994), the American Academy of Pediatrics (1998), and the Educational Audiology Association (1997) all concur that AIT should be considered an experimental procedure.

Music therapy

Music therapy uses music in a therapeutic manner to address behavioural, communication, physical, psychological, sensory-motor, social and cognitive functioning. A client will be involved in listening to music, playing instruments and singing, as well as creative activities. The therapist will conduct activities in an arranged and systematic manner to effect change with target behaviours and responses. Some research indicates that music therapy may enhance functioning (Kaplan and Steele, 2005; Whipple, 2004) but further research is required with robust experimental designs to evaluate these findings.

The Picture Exchange Communication System (PECS)

The Picture Exchange Communication System (PECS) was developed in 1984 by Lori Frost and Andrew Bondy. PECS is a six-phase system of augmentative communication which allows children who have little or no communication capabilities, a means of communicating non-verbally. A student will use pictures and symbols to communicate by learning to exchange a picture or symbol card of an item for the actual item itself. In doing this, the child is able to initiate communication. Studies have suggested that PECS may be effective in teaching communication of single words or short phrases, but further studies are required to understand whether the claim that PECS can stimulate acquisition of more complex and flexible language by building sentence structures is supported. Research published in the *American Journal of Speech Language Pathology* (Flippin et al., 2010) suggests that:

PECS is a promising but not yet established evidence-based intervention for facilitating communication in children with ASD ages 1–11 years. Small to moderate gains in communication were demonstrated following training. Gains in speech were small to negative.

It has also been proposed that PECS may help with the development of verbal language and reduce tantrums.

The TEACCH® autism programme

The TEACCH® autism programme was developed by Eric Schopler and Robert Reichler at the University of North Carolina during the 1960s. The programme promotes ‘an array of teaching or treatment principles and strategies based on the learning characteristics of individuals with ASD, including strengths in visual information processing’ (UNC, 2014). Visual skills are emphasised as they may be more advanced than verbal skills in children with autism. For this reason, instructions may be presented as pictures rather than words, and tasks may utilise visual prompts to achieve them. TEACCH claims that its services are ‘grounded in empirical research, enriched by extensive clinical expertise, and notable for flexible and individualized support of individuals’ (UNC, 2019). The National Research Council (2001) also found that TEACCH could be effective as a plausible intervention. Ozonoff and Cathcart (1998) found that TEACCH parent training may accelerate development of both cognitive and self-help skills in children.

Sport and exercise

Recreational sports and exercise such as gymnastics, swimming or martial arts provide opportunities for a child to develop physical abilities, participate within a group environment and interact with other children. There is strong empirical evidence that putting children with autism in settings with typically developing peers – and no other intervention – may increase their social interactions (Lord and Hopkins, 1986). Where these typical peers act as role models, this can effectively increase social interaction further (McConnell, 2002). Such activities may also reduce aggressive and repetitive behaviour in some cases (Celiberti et al., 1997; Rosenthal-Malek and Mitchell, 1997).

Sensory integration

Ayres’ theory of sensory integration describes sensory integration as the normal developmental process of the body’s central nervous system to organise sensations from the external environment as well as within the body in order to make adaptive responses necessary for emotional and behavioural regulation, learning and participation in daily life (Ayres, 2005). Those who suffer from sensory integration dysfunction may experience difficulties with integrating such input through touch, smell, hearing, taste, sight, coordination and sensing where one’s body is in a given

space. Sensory Integration Therapy (SIT/SI) is an intervention where the participant receives sensory stimulation with the objective of improving attention and cognitive functioning and decreasing disruptive and repetitive behaviours. This can include compressing elbows and knees, swinging, spinning and brushing the body. Some children with autism may enjoy a sense of firmly applied pressure that would otherwise be considered claustrophobic, such as being squashed between mattresses. Recent studies (Fazlioglu and Baran, 2008; Pfeiffer et al., 2011; Schaaf, 2014) have suggested that children with autism who have received SIT, have shown substantial gains in social engagement and performance.

Socialisation

Socialisation-related classes include attending pre-school and provide an opportunity for a child to interact with other children by participating in group activities. Such classes allow enjoyable recreation and opportunities to generalise the skills that have been learnt in more formal therapy settings. As with recreational sports and exercise, there is evidence of the benefits of interaction with typically developing peers.

Future directions

There are other therapies that may offer some benefit but around which more research is required. This category could include animal therapy, art therapy, Developmentally-based Individual-difference Relationship-based intervention (DIR), oral-motor training, Son-Rise and vision therapy. Beyond these, there are other therapies which the current weight of academic and empirical evidence suggests are ineffective in the treatment of autism.

Further reading

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- Gilliam, J.E. (2006) *Gilliam Autism Rating Scale* (2nd edn) (GARS-2). Upper Saddle River, NJ: Pearson Education. GARS-2 assists teachers, parents and clinicians in identifying and diagnosing autism in individuals aged 3-22. It also helps estimate the severity of the child's disorder. The items on the GARS-2 are based on the definitions of autism adopted by the Autism Society of America and DSM IV TR. See <http://www.autism-world.com/index.php/2007/03/27/child-hood-autism-rating-scalecars/> for a list of rating scales used in different countries.
- Jordan, R. (1999) *Autistic Spectrum Disorders: An Introductory Guide for Practitioners*. London: David Fulton. This book has been reprinted a number of times and is an excellent resource. It is written for practitioners working in the field of autism and related disorders (including

Asperger's syndrome) and it offers an overview of understandings of these disorders from a behavioural, biological and psychological perspective.

- Le Couteur, A. (2003) *Autism Diagnostic Interview-Revised (ADI-R)*. San Francisco, CA: Western Psychological Services. The Autism Diagnostic Interview-Revised, better known as the ADI-R, is a set of interview questions that are administered to the parents of young children with possible symptoms of autism or an ASD (<http://autism.about.com/od/diagnosingautism/f/ADI-R.htm>).
- Sara, S. *et al.* (2005) *Vineland Adaptive Behavior Scales* (2nd edn) (Vineland-II; Pearson's assessment). Forms: birth-90-years-old: Survey Interview Form, Expanded Interview Form and Parent/Caregiver Rating Form; 3:0-21:11: Teacher Rating Form (<http://education.pearsonassessments.com/>).

Useful websites

- Autism Society, USA <http://www.autism-society.org/site/>
<https://autismcanada.org>
- Checklist for Autism in Toddlers (CHAT) http://www.autismresearchcentre.com/tests/chat_test.asp
- National Autism Association, USA <http://www.nationalautismassociation.org/>
- National Autistic Society, UK <https://www.autism.org.uk>
- National Institute of Mental Health, USA <http://www.nimh.nih.gov/health/publications/autism/complete-index.shtml>
- Scottish Society for Autism <http://www.autism-in-scotland.org.uk/>
- TEACCH <http://www.teacch.com/>

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