

Book Review: “Interventions for Autism: Evidence for Educational and Clinical Practice”

Phil Reed, Professor of Psychology, Swansea University, 2016. Published by Wiley Blackwell (1-360pp).

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The treatment of ASD raises significant controversy in research and service provision at a time when awareness of ASD has reached a new peak. This comes with the establishment of a world-first Autism Cooperative Research Centre in Australia in 2013, and government funding for early intervention in 2008 which is currently transitioning to the National Disability Insurance Scheme. It is therefore timely for a comprehensive review.

Setting the scene

Reed (2016) had the view that it was changes in criteria and greater skills in identifying ASD that led to the massive increase of ASD diagnoses (from 5/10,000 to 100/10,000). He reported that there was evidence to suggest that the new DSM5 criteria has reduced the number of people with ASD by 30%, with other cases falling into alternative diagnoses. ASD has huge economic costs, possibly somewhere between one to 25 billion pounds in the UK per annum, with the lifetime cost for an individual between two and four million pounds. However, such costing depends highly on assumptions of lost earnings and care costs. De-institutionalisation has shifted the cost to the informal care of the family. Intensive early intervention Applied Behaviour Analysis (ABA) can cost up to one million US dollars. Others have suggested that ABA intensive treatment saves money spent on ‘treatment as usual’ of 11,000 UK pounds a year.

Prognosis has changed with this widening of diagnostic criteria. Older studies suggested that 50% of people with ASD were institutionalized 10 years after diagnosis. More recent data has suggested that those with good outcomes have increased from 10% to 20%. Of those with an IQ of 110 or more, 50% now achieve independence. The 50% ‘cure’ reported by Lovaas, the founder of ABA, has been disputed by subsequent researchers. Reed (2016) divided treatments into behavioural approaches, environmental systems approaches, and developmental approaches. The evidence did not support the notion of cure but improvement.

Strength of evidence has its criteria and the best studies are characterised by independent, blinded assessors of diagnosis and change, randomised



allocation design (i.e., RCT), a range of measures with blinded assessors, and assessment of the fidelity of intervention. Fifty four percent of acceptable studies were behavioural; 10% used facilitated communication. Part of the problem is that children with ASD are exposed to multiple interventions at one time, which range between 4.5 to 8.7 interventions for different levels of severity. Studies can be divided into randomised control trials (RCTs), control studies and observational studies with a trade-off between methodology and approaches to overcome potential selection bias. RCTs and control studies enable the comparison between two interventions, yet may select for a homogenous group with ASD. However, the real world also includes pre-existing interventions. Observational studies have the ability to include two or more interventions over a greater time span.

Is ASD a unitary disorder?

Reed (2016) raised a number of issues that related to this question, such as what are the core symptoms of ASD when DSM5 has reduced the essential criteria from a triad to a dyad of problems, putting communication together with socially impairing symptoms? Is Social Communication Disorder distinct from ASD? The DSM5 clusters five DSMIV disorders into one. Surely the clinical knowledge of Disintegrative Disorder of Childhood has a value, but it has now been clustered with ASD with the inclusion of late onset ASD.

Sensory responsiveness problems are now recognized as a core part of the disorder. Should level of IQ or intellectual disability be taken into account? Should co-morbidity be taken into account? Seventy percent of people diagnosed with ASD have one psychiatric co-morbidity and 40% have two psychiatric comorbidities. Disorders that occur more commonly in people with ASD than in the general population include: ADHD, Anxiety, Disruptive Behaviour Disorder, Depression, Intellectual Disability, Motor Coordination Disorder, Schizophrenia and sleep disorders. Does that mean these comorbidities are part of the ASD phenotype? How should the problems of assessing internalising disorders in lower functioning individuals be addressed? Reed reviewed the psychometric properties of different diagnostic instruments, and their limitations in assessing the whole phenotype.

Reed (2016) divided theories of ASD into *within-person* and *environmental*. A *within-person theory* included high-level and low-level theories (although perhaps it would be more descriptive to call it an

interpersonal model). High level theories include emotional recognition skills and deficits of theory of mind. However, these deficits are also found in other disorders such as schizophrenia. Baron Cohen, a leading figure in ASD research, added the male brain theory and the influence of testosterone on pattern recognition versus emotional recognition. Interventions challenging one or other deficit don't have strong evidence. However, some intervention approaches such as social stories have resulted from recognising these problems.

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Low-level theories look at cognitive processing and identifies problems at every point. This includes difficulties with eye gaze, attention, memory, executive control and retrieval problems, with notions such as weak central coherence and executive dysfunction (i.e., planning, impulse control, working memory, behavior inhibition, flexibility and action monitoring, and a weakness in 'delayed rule-shift' skills). However, these cognitive processing problems are also all found in schizophrenia and acquired brain injury. The diversity of findings in low level measures between individuals makes it difficult to consider a unitary concept with some researchers saying that there can be no unitary disorder.

The environmental or learning-social and behavioural theories derive from Soviet Psychology. They focus on the development of behaviours, with theories of conditioned stimulus and response, progressing onto unconditioned stimulus and response as an explanation for perseverative behaviours. Linked to this was the notion of abnormal attentional focus and abnormal attachment behavior like imprinting behavior in birds described by the Tinbergens. The strength of this theory has been in its evidence from using operant behavioural conditioning to change behavior and develop language. This contrasted with the within-person theories which lacked a unitary model, from which it was difficult to provide clear effectiveness.

Overview of Interventions

Reed finished his book with an overview of interventions, that is, *what is known about what works*. While ABA proponents suggested that ABA was the best, there were those who said that it was ineffective. The question is really this: *How does ABA fit in with a wider range of approaches?* Reed summarised the impact of: 1) Behavioural (e.g. ABA); 2) Environment – alterations/systems (e.g., TEACCH, the treatment and education of children with ASD and related communication disabilities); 3) Developmental (e.g., Early Start Denver Model, (ESDM)); 4) Sensorimotor (e.g., sensory integration and massage); and 5) Eclectic treatments. Lastly Reed looked at the educational evidence for mainstream schooling.

The treatments reviewed were chosen on the range of evidence available for them, and the extent to which they were well known. However, these treatments had many overlaps. For example, pivotal response training and functional analysis to determine individualised components of learning or behavior occur in many programs. Both behavioural and developmental approaches discuss developmental steps in ASD. The value of comparisons between approaches is to establish best practice, although each approach may not be as different from each other. It was determined that all comprehensive intervention strategies should have: An individualised approach, focus on assumed core deficits, use naturalistic teaching opportunities, and involve professionals and parents.

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Reed compared treatment across three main domains: 1) intellectual/cognitive; 2) linguistic/communicative; and 3) adaptive-social behaviours, using pre-post intervention effect sizes. ABA had the strongest effect on intelligence, even if that is not part of the core symptoms. However, there were

effects on all three domains for ABA and ESDM. However, the effects on Adaptive-Social were as large from massage and TEACCH, although data was not as extensive for these approaches. Conversely, the impact on ASD diagnosis was positive in 25% of those treated with ABA, ESDM and developmental treatments. Of concern is that ABA also had 18% of young people that got worse! It must be remembered that most studies were a year long, which is a short time to bring about diagnostic amelioration.

Some of the treatment effect differences may have been related to dose, that is, the number of hours per week of intervention, and the number of months' duration. ABA and TEACCH tend to be more intensive and longer. In general, the longer the duration of the intervention, the more the improvement. However, improvements also become less pronounced the longer the intervention, whilst effects apply more across all three domains. Only ABA and TEACCH had data for two to three years or more. When the intervention was limited to 15 weeks there was a small advantage to behavioural and ESDM programs. One comparative study that looked at treatment intensity in terms of hours per week found that 'Portage' (a home visiting early intervention development enhancing model), and 'special nursery school' (i.e., preschool) had a greater effect with greater hours. However, ABA had a lesser effect as hours increased, possibly because reinforcers, which are generally limited, became less effective. When programs (conducted for up to one year) were compared between those providing one to 19 hours versus those over 20 hours/week it was found that ABA did better on IQ but that there was no advantage on communication or adaptive/social behaviours.

When research participant characteristics were examined, all intervention types tended to work better with participants who had better language and adaptive social skills at the start of intervention. In terms of age, the younger the participants, the greater the gains. This was especially the case for IQ and adaptive-social gains in behavioural programs, but older individuals demonstrated greater adaptive social gains for both developmental and eclectic programs. Curiously, both less and more able individuals (measured by IQ) fared less well for behavioural and ESDM models in IQ and language gains. That is, young people with ASD and higher IQ may do better on programs other than behavioural programs. In two



to four year olds, behavioural programs had more impact on those with more severe ASD symptoms; milder ASD faired similarly well on all programs studied. Accordingly, behavioural intervention was better for severe ASD and/or those who were lower functioning. In the domain of adaptive-social skills, eclectic or school-based programs deliver outcomes that were as good as each other, and behavioural programs may be less optimal.

Delivery by parents or professionals, which was better? IQ outcomes were better with more professional implementation. This applied to outcomes of language for behavioural interventions but there was no difference between environmental interventions, TEACCH or ESDM. Adaptive-social outcomes were better with parent implementation in TEACCH and eclectic programs. Some studies showed less parental effect when they were highly stressed. These parents had greater difficulty engaging in programs, had less effective limit setting, and greater problems of attachment. Conversely, parental involvement may help with understanding their child and the attachment. Parents may benefit from interventions aimed at reducing stress.

Over time the debate should move from “what works” to “what works best for whom?” Overall,

within-person treatments made little impression compared with treatments that emphasised the ‘person’s interaction with the environment’. For individuals with severe ASD and those with significant linguistic problems, behavioural approaches were indicated or TEACCH (which has significant ABA embedded within it but delivered for less time per week). However, Reed suggested that there was a law of diminishing returns and that it would be wise to have an exit point from these approaches, and then think more about therapy to improve adaptive-social functioning. Similarly, behavioural treatment of more than 25 hours/week had a law of diminishing returns.

If the individual has less severe ASD or less intellectual impairment, or their needs are largely in the adaptive-social domain, then TEACCH might be the initial choice, or the option to follow on from ABA. In both situations it would be best to place the child in a social setting such as school, with appropriately trained staff and work closely with parents. For high functioning ASD with social anxiety problems, massage therapy could be considered along with other approaches. Reed suggested that it was necessary to be aware of the impact of parental stress, which can increase the need for behavioural interventions.

Summary of the main types of intervention

Some of the main types of interventions presented by Reed (2016) included:

Behavioural interventions:

The original research from *UCLA/ Lovaas'* behavioural intervention was a game changer, but it used a case selection process for the original 40 hour-a-week program. This behavioural approach has now been extended by the Verbal Behaviour Program, which is done at home, and includes using naturalistic situations and pivotal learning. The *Complete Application of Behaviour Analysis to Schools (CABAS)* applies behavioural intervention through the behavior of teachers. Students engaged in the program for two years have shown an increase in IQ from 75 to 100. However, when comparing CABAS to preschool training, it was suggested that ABA improves behavioural problems and hyperactivity, but not emotional problems.

Overall 85% of behavioural studies were effective in controlled studies, but only 25% in RCTs. Such intensive studies tend to have small numbers, and achieve better outcomes with younger children (i.e., under three years old) and children with better cognitive abilities. The best outcomes of behavioural interventions occur for children with normal IQ, although there is improvement for children with a mild ID but poorer outcomes for



children with more severe ID. Similar effects were found for those with better language skills and adaptive behaviour scores. The measures of language and adaptive behavior probably were also associated with severity of ASD. However, this did not mean that older children, or children lacking language skills did not respond to treatment, indeed some seemed to be more responsive to the intervention than others for unknown reasons.

Teaching Environment Modification Techniques (TEMT):

These are mainly represented by *TEACCH* (Schopler & Reichler, 1971), which is characterized by the following: A highly structured learning environment that is adapted to the limitations of the child with ASD and maximises opportunities to learn; highly structured instruction techniques; and provides clear social models.

TEMT approaches, also include *Leap* (Learning Experiences and Alternative Program for Preschoolers and their parents, from Pennsylvania) and *Daily Living Skills Therapy* (Higashi from Tokyo) share qualities in common. They are delivered by skilled professionals (teachers). Environmental input in the school setting is controlled through the physical structure of classroom, schedules and tasks. Interventions are individualised, involve multidisciplinary participation and include parents in treatment. Additionally, they use visual cues, incorporating inclusion and the influence of typically developing peers, and rely on special interests to motivate and promoting self-initiation of communication.

TEMT approaches may also include physical therapies such as music, dance and art therapies. *TEACCH* is generally effective on the skills it targets, especially in the adaptive-social domain. Again it is generally focused on preschoolers and can have effects across all three target domains of intellectual/cognitive ability, linguistic/communicative ability, and adaptive-social behaviours. However, there is little evidence that ASD children learn by imitation of normal peers.

Developmental and Parent Mediated Treatment Models:

This is exemplified by the *Early Start Denver Model* (Sally Rogers; UC Davis), which is intended for preschool settings for children aged 12 to 48 months. It is based on a Piagetian model or Vygotskian social-developmental framework of



development and therefore relates to in-person (or interpersonal) models of ASD. Developmental and Parent Mediated Treatment Models focus on enhancing skills in social communication and interactions (including joint attention and imitation), linguistic behaviours and challenging behaviours. These are related to interactions with parents and peers.

Developmental and parent mediated treatment models often address both social and functional communication such as *Social Communication, Emotional Regulation and Transactional Support* (SCERTS; Prizant, et al., 2003). Over time the emphasis on parent mediation of the intervention has become central, facilitated by professional contact. One principle of parent mediated intervention is that treatment goals depend on individual analysis, motivation from building on child's interests and strengths, using natural opportunities to teach, and a focus on all attempts to communicate.

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Other related programs include *Floortime* (Developmental, Individual-difference, Relationship-based Model (DIR), Greenspan & Weider; www.floortime.org), *Options-Son-Rise* (Kaufman, www.autismtreatmentcenter.org); *Relationship Development Intervention*, (Gutstein, www.rdiconnect.com); *Hanen More than Words* (Sussman, 1999; www.hanen.org); *Stepping Stones Triple P* (Sanders, www.triplep.net/glo-en/home).

While the whole framework of these interventions may have reasonable evidence individual components, like Pivotal Response Training, does not. Similarly, while there is evidence that parent training helps modify behavior with people with ASD, there is little evidence that it helps ASD per se. Furthermore, in moving from expert therapist intervention to parent intervention, there is a drop in the effect size. However, this difference highlights the problem of providing university-based interventions versus making interventions available to a wider population and geography.

SCERTS is an individualized, multidisciplinary approach that focuses on Social Communication and Emotional Regulation facilitated by Transactional Support. Transactional support refers to using a child's interest in learning, altering the environment to maximize learning, and using enhanced techniques such as picture communication. SCERTS is designed around pre-linguistic developmental skills and initially focuses on shared attention and promoting parental sensitivity to the child's needs and attempts to communicate. After an initial training workshop, parents video their child's play sessions and these are used by therapists to improve parents' skills. Parents implement strategies for 30 minutes each day, hoping to generalize across other daily routines. An RCT showed that individuals improved social interactions and communication, but there was less gain in adaptive-social skills. However, a replication in a 'local authority' observational study didn't have strong effects, with little gain in cognitive function or language.

In recent empirical studies of *Floortime*, one study showed no difference to Lovaas, while another longer study showing a large effect size and improvement in social interactions but less in social emotional functioning, depending on the mothers' responsiveness.

Hanen More than Words (MTW) doesn't rely on spoken language, but social behavior and interactions as forms of communication, which suits children with ASD with delayed language development. Like other interventions, MTW relies on early intervention by parents and carers using natural opportunities to teach. It depends on initial parent training of eight sessions to promote practical strategies. This focuses on enhancing parental responsiveness to child's attention and communication attempts, and the number and

quality of parent-child interactions in daily life. It looks at early two-way interaction, conventional communication, social communication and language comprehension. This involves responding to communication attempts, following the child's lead, joint action and play, using positive affect, predictability and structure. The approach uses visual supports and daily routines and activities for teaching. The studies have shown particular improvement in language.

Generally, studies of developmental interventions have been less rigorous and one cannot discriminate effectiveness between these studies. The strength of evidence supporting their benefits come from the validity of the principles of the approaches, the support and experience of teachers and parents and accordingly their ecological and social validity. However, none of the interventions should be dismissed lightly. Earlier evaluations of Developmental and Parent Mediated Treatment Models suggested that there was not much evidence for efficacy, but later reviews indicated effectiveness, especially in language and communication and in developing parenting skills. Pooling results from 42 studies indicated that there was a moderate effect size for improved cognitive function, a moderate to strong effect in communication abilities and adaptive-social behavior was moderate.

Sensory and Physical Stimulation Treatments :

These include sensory integration therapy and massage therapy and tend to focus on externalizing, challenging behaviours or internalizing anxiety. Up to 90% of people with ASD have abnormal sensory reactivity, that is hypo or hyper-sensitivity, and 70% receive some intervention.

Sensory Integration Therapy research suggested that it doesn't improve any area with consistency,

although it may have some benefits for social-emotional functioning. A range of Auditory Integration Therapy studies found outcomes at best have been equivocal for ASD. Visual therapies such as ocular-motor exercises, prism lenses and Irlen lenses have even less evidence of value, with best benefit for lenses that correct visual problems! Physical Stimulation Therapies such as holding or squeezing therapy is used in theory for attachment problems and is not specific to ASD. The self-applied 'squeeze machine' described by Temple Grandin, a renowned adult with ASD, applies pressure for five to 15 minutes, although rolling up in a blanket can be used. There was some evidence that the squeeze machine reduced anxiety although it may have reflected that the treatment group had higher levels at outset.

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There has been a range of massage treatments described, initially with case reports, although Silva and Cignolini have published RCTs using Qigong Massage from Chinese medicine which showed moderate effect sizes on ASD severity, social, behavioural and sensory outcomes, and greater effect with parent led approaches. The latter may lead to improved attachment and limit setting, associated with less hyperactivity, stereotypies and sleep disturbance and not necessarily neurological change. Nonetheless, even if sensory intervention can be helpful, it is not a comprehensive treatment.



Eclectic Interventions:

In reviewing *eclectic interventions*, Reed (2016) found that intervention effect was moderated by therapist motivation, the extent of training, and a coherent treatment philosophy or theory with clear targets of change, rather than a mixing up of approaches.

Inclusive or Special Education:

Inclusive or Special Education is the practice of mainstreaming children with special educational needs (SEN). It has been driven by a 'rights-based approach' with 'moral and social imperatives' to challenge stigma and exclusion, which is countered by the 'rights-base' that education should be based on individual needs not social imperatives. Reed focused on the evidence of educational attainment not the effect on stigma. Generally, special education was developed to provide education to those children who were excluded from mainstream! However, Howlin (1997) argued that after 50 years of educational intervention the prognosis of ASD was not improved. The Warnock Report (1978) rode on the back of 'normalisation' in education and aimed to combat discriminatory views, creating welcoming communities and improving cost efficiency. However, mainstreaming led to low levels of acceptance in schools and a lack of educational gains. Even Dame Warnock recanted. There is great variation in mainstreaming internationally: 25% in the USA, 60% in UK and 80% in Australia. This is slightly more for ASD spectrum and less for ASD with co-morbidity. On top of that Baron Cohen estimated that 40% of ASD were unrecognized and therefore received no support.

Although there is little evidence on the effect of mainstreaming, children with ASD are 20 times more likely to be excluded, and 20% are suspended. The measures of successful inclusion are academic progress, social progress and the child's happiness and compliance. Although some academic gain can be seen in those with mild disabilities, for those with behavioural difficulties progress was better in special schools. In one study where TEACCH was being provided in special schools and in mainstream schools outcomes were similar and better than in mainstream schools that weren't so structured. Similarly, those with greater disability generally fared better in special schools. Other factors that were identified as important were such things as noise in the classroom, teaching style in mainstream schools, and the pupil's level of disruptive behavior. However, in Strain's study (1983) for pupils with ASD in mainstream schools



there was evidence of more pro-social behaviours and play skills. However, this was not replicated in a range of other studies, indeed several studies found high levels of exclusion in mainstream schools.

These effects are worse for ASD than other SENs (e.g., dyslexia). High levels of bullying are especially pronounced in high functioning individuals. ASD children have difficulty imitating others without special training. They are also more likely to imitate peers with similar problems. Furthermore, the mainstream peers are just as likely to model antisocial behavior.

While most parents want mainstreaming, as they believe it avoids the stigma of special schooling, evidence suggested that children suffer more from mainstreaming which leads to greater psychiatric co-morbidity. This was especially so in high functioning ASD children who were also most likely to be mainstreamed! Furthermore, by the time ASD children reach school age, their challenging behaviours are most problematic, affecting any inclusion process.

Applying specialist ASD programs in a mainstream setting can reduce that level of psychiatric co-

morbidity. Accordingly, greater academic achievement may come with the cost of greater depression and reduced self-concept. Inclusion itself does not provide benefit.

Factors that improve mainstreaming include specialised educational methods, smaller class sizes, clear leadership with positive attitudes, teacher attitude and training, and the development of individualized teaching procedures including functional assessment. Indeed, Wishart and Manning (1996) found only 6% of teachers felt qualified to deal with a child with SEN! Mainstream teachers were significantly less knowledgeable than special school teachers about ASD (Segall & Campbell, 2012). Lack of training leads to teacher stress and burnout. Training enables more realistic expectations, especially if it reduces expectations, and therefore a sense of failure. Conversely teacher knowledge improves child-teacher relationships, which is more important in ASD because of impoverished peer relationships. Improved teacher-child relationship improved inclusion in the classroom and reduced behavior problems.

Child attributes effect outcomes. For example, Asperger Syndrome is more likely to be mainstreamed and more likely to show increased problems as a result of placement! Better social and communication abilities and self-regulation (e.g., impulse inhibition) predict mainstream success, indicating that earlier emotional and social regulation skills in pre-school are important for mainstream success even in the context of high IQ.

Sensory processing problems are associated with poor mainstream success. Sensory problems associated with poor social competence negatively impact on social participation and conduct problems. Indeed, sensory problems contribute 50% of the variance of in academic performance in ASD. Externalizing behaviors and IQ correlate in mainstream settings, suggesting an underlying 'setting' cause.

One cannot conclude whether mainstreaming is good or bad for individuals with ASD. It is a complex issue but clearly requires a specialization of support in a mainstream setting. It certainly can be harmful if poorly managed. A 'rights-approach' may be another form of group discrimination. An economic rationale is a fallacy as appropriate approaches is expensive. A special commitment to ASD is needed in mainstream education, along with an individualized approach.

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Conclusion

Reed (2016) provided a helpful, intelligent and authoritative overview of a complex subject with so much research from many international contributors. He clearly has considerable experience in ASD and its treatment, from an academic, clinical and educational perspective. One can get lost in the detail; however I found that the major recognised interventions have useful websites and examples of actual intervention on YouTube. It is really helpful to collect such a wide literature into a single resource which takes advantage of compiling the strength of evidence from multiple sources. What one realizes is how much research, replication, and funding is needed to be able to evaluate any novel treatment. Conversely there is considerable overlap in approach between the main interventions and in some ways the differences are important to evaluate. However, Reed provided a summary which most people interested in the best way to help a child with ASD will find essential reading.

Personal Views of the Book

I feel that one has to conclude that interventions do make an impact on ASD, but that change is slow, and requires an intensity in delivery and subsequently a pervasiveness of context. Most of the research evidence was about early intervention. The best results occurred the earlier the intervention began, especially prior to pre-school and with children whose IQ was over 50 who presumably had a greater capacity for intellectual recovery. Although professional therapy was more effective early, later parental skills were important to help parent-child attachment, and emotional and behavioural wellbeing. Yet the evidence suggested that specialist intervention needed to be maintained throughout school age, possibly

because school and peer relationships remain such a socially complex and challenging environment (less is known about adult needs).

I think that behavioral principles are important in early intervention and behavioral promotion of



basic recognition skills may enhance IQ, enabling language development and reducing externalising problems. There appears to be a point that pure behavioural approaches actually hinder social-emotional adaptive gains, which is because there is a stage that one needs to respect the emotional (and internal world) and attachment needs of the child.

Many would argue that the development of emotional recognition and theory of mind skills occurs in the context of an attachment relationship. This contradicts Reed's assertion that, although most treatments rely on a notion of developmental theories of the development of the mind, the within-person theories of both theory of mind and emotional recognition become important at a later age/stage of development. That is, as the mind develops, measures of higher executive functions start to have a meaning and a reality.

Further there is evidence that the quality of parental wellbeing, and parenting impacts on the emotional and behavioural wellbeing of the child with ASD, yet intervention seldom takes account of this factor. Indeed the most intensive interventions sub-select for an atypical group of determined and self-efficacious parents. There are clearly individual factors that contribute to potential for improvement, such as IQ and language, but there may be many others, such as temperament, family wellbeing/ motivation and genetic/other biological variance (such as hormones).

It is also evident that in most settings there is little awareness of psychiatric co-morbidity, which clearly is a whole additional complexity, for which one answer will not fit all. Clearly, sensory issues have an impact on prognosis, but there is too little research for us to have a coherent theory or approach(es) to intervention. The chapter on eclectic approaches illustrated a further problem, that is, that if you mix up treatment approaches, you are left with an omelet of inputs, and unless there is a further whole coherent approach to research of any particular mixture, you are left unsure what components are important in the omelet. This is a limitation of the competitive nature of academic research, in which success is the key to getting funding for the next research. Yet approaches in improving educational environments and intervention very appropriately investigate new contributions to promoting skills in ASD, but then embed them in the previously established specialist curriculum (Costley, Clarke, & Bruck, 2014). Thus this academic tome is essential to understand the scientific process of researching ASD, but we shall need different approaches to understand individual differences and how to individualise interventions.

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