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**A Review of the Research to
Identify the Most Effective
Models of Practice in Early
Intervention for Children with
Autism Spectrum Disorders**

Jacqueline M. A. Roberts
The University of Sydney

Margot Prior
The University of Melbourne

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AUTISM TREATMENT REVIEW

This review was prepared by Dr Jacqueline Roberts and Professor Margot Prior with assistance from David Trembath for the Australian Government Department of Health and Ageing

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Glossary of Terms

AAC	Alternative and Augmentative Communication
ASPECT	Autism Spectrum Australia
ABA	Applied Behavioural Analysis
AIT	Auditory Integration Training
ASD	Autism Spectrum Disorders
CDDS	Centre for Developmental Disability Studies
DADHC	Department of Ageing, Disability and Home Care (NSW)
DET	Department of Education and Training (NSW)
DIR	Developmental Individual-Difference, Relationship Intervention
DLT	Daily Life Therapy
DoHA	Department of Health and Ageing
DSM-IV	Diagnostic and Statistical Manual – Fourth Edition
DSP	Developmental Social-Pragmatic model
DTT	Discrete Trial Training
DT-TB	Discrete Trial Traditional Behavioural
EIBI	Early Intensive Behavioural Interventions
FC	Facilitated Communication
FCT	Functional Communication Training
HFA	High Functioning Autism
IBI	Intensive Behavioural Intervention
ICD-10	International Classification of Diseases
IO	Support Class for students with moderate intellectual disability (NSW)
IQ	Intelligence Quotient
LEAP	Learning Experiences: an Alternative Program for Preschoolers and their Parents
MADSEC	Maine Administrators of Services for Children with Disabilities
MRC	Medical Research Council
MTW	More than Words
NAS	National Autistic Society
NLP	Natural Language Paradigm
PBS	Positive Behaviour Support
PCDI	Princeton Child Development Institute Program
PDD	Pervasive Developmental Disorders
PECS	Picture Exchange Communication System
PRT	Pivotal Response Training
RCT	Randomised Control Trial
SCERTS	Social-Communication, Emotional Regulation, and Transactional Support
SI	Sensory Integration
SPELL	Structure Positive Empathetic Low arousal Links
TEACCH	Treatment and Education of Autistic and related Communications Handicapped Children

EXECUTIVE SUMMARY

Introduction

The purpose of this review of research literature relating to the management and treatment of young children with autism is to identify the most effective models of best practice. The review was commissioned by the Australian Government Department of Health and Ageing, (DoHA) and completed by Jacqueline Roberts of The University of Sydney and Margot Prior of The University of Melbourne with assistance from David Trembath.

Defining Autism Spectrum Disorders

Autism is a life long neurological disability of unknown aetiology. The criteria for a diagnosis of autism are based on a triad of impairments in social interaction, communication and a lack of flexibility in thinking and behaviour. There is a spectrum of autistic disorders which includes Autistic Disorder, Aspergers Syndrome, Retts Syndrome, Childhood Disintegrative Disorder, and Pervasive Developmental Disorders Not Otherwise Specified (PDD-NOS) which is also known as Atypical Autism. Some people with Autistic Disorder with IQ in the typical range may also be described as having High Functioning Autism, (HFA).

The diagnosis of autism spectrum disorders, referred to throughout this review as autism, is made on the basis of developmental history, formal assessments, and observed behaviour. Consequently, there is some variability across professionals in the assessment and diagnosis of autism. There are also differences in the reported incidence and prevalence of the disorder which range from less than 4 per 10,000 to more than 100 per 10,000. There are several factors which are likely to contribute to this variation including the strict versus loose definitions of autism, and variability in diagnostic practice amongst professionals. Nevertheless, there has been an increase in the ascertainment rate (numbers of children correctly diagnosed) and a steadily increasing demand for services reported by agencies in Australia which is disproportionate to the general growth in population.

Summary of Treatments for Children with Autism Spectrum Disorders

A large number of treatments are currently used with children with autism. For the majority of interventions, further research is required to: (a) examine which children are most likely to benefit, (b) identify the most effective strategies for supporting their introduction and use, and (c) ascertain the extent to which a child's experience of a treatment fosters his or her general adaptive functioning. The following is a summary of the research evidence for treatments identified in this review.

Biologically Based Interventions

Medication

There is currently no medical treatment for the core features of autism, although attempts have been made to use medications to treat symptoms and co-morbid disorders of autism such as anxiety and ADHD, as well as to increase the likelihood that children will benefit from concurrent interventions. The following medications have been demonstrated to be somewhat effective for individuals with autism, although careful monitoring is required to measure effects and side effects: Neuroleptics/Antipsychotics, Risperidone, Selective Serotonin Reuptake Inhibitors (SSRIs), Antidepressants, Stimulants, Anticonvulsants. The following medications have been demonstrated to be ineffective and/or harmful for children and adolescents with autism: Naltrexone, Secretin, and Adrenocorticotrophin Hormone (ACTH).

Complimentary and alternative interventions

These include exclusion diets (casein and gluten-free diet), anti-yeast therapies, chelation. Secretin, withholding the MMR vaccine and vitamin/dietary supplements including vitamin B6. There is minimal evidence demonstrating the effectiveness of these interventions and considerable evidence demonstrating no effect for some such as Secretin and withholding the MMR vaccine. Potential risks associated with some of these treatments may be significant.

Psychodynamic Interventions

Psychodynamic therapies are based on the assumption that autism is the result of emotional damage to the child, usually because of failure to develop a close bond (attachment) to parents, especially mothers. Psychodynamic therapies are seldom used today, as there is strong evidence to support the perspective that autism is a developmental and cognitive disorder, rather than emotional disorder, and there is little empirical evidence demonstrating the effectiveness of psychodynamic interventions.

Educational Interventions

Behavioural Interventions

Behavioural interventions are those in which operant learning techniques based on learning theory constitute the predominant feature of the intervention approach (Francis, 2005). *Applied behaviour analysis (ABA)* is an approach in which operant learning techniques are applied in a systematic and measurable manner to increase, reduce, maintain, and/or generalize target behaviours. *Discrete Trial Training (DDT)* is one of the instructional methodologies frequently used in ABA-based programs, and involves breaking down specific skills into small discrete components or steps which are then taught in a graduated fashion.

The Lovaas program

The generic terms *intensive behavioural intervention (IBI)* and *early intensive behavioural intervention (EIBI)* refer to behavioural interventions that are intensive and comprehensive. The intensity of a program relates to the number of hours of treatment the child receives per week as well as the intensity of training, curriculum, evaluation, planning, and coordination. The Lovaas program, also known as the Young Autism Project, is a well known and widely imitated pioneer example of the intensive behavioural programs. The program is characterised by focus on intensive and extensive use of discrete trial training in the early stages of the program.

Contemporary Applied Behaviour Analysis

Behavioural interventions which have evolved over time are often referred to as contemporary ABA programs. For example, many now incorporate information about typical child development, in particular social-communication development and take account of the characteristics of autism such as strong visual spatial skills which can be developed to compensate for other characteristics such as poor auditory comprehension. There are several contemporary ABA programs including *Pivotal Response Training (PRT)*, *Natural Language Paradigm (NLP)*, and *Incidental Teaching*.

There is universal agreement that behavioural interventions have produced positive outcomes for children with autism that are well supported by research. Few other treatment programs have been subjected to the level of research scrutiny that has been applied to behavioural interventions. However, there continues to be controversy about particular behavioural interventions and programs, concerns about methodological issues, and differences in the interpretation of research findings. This controversy revolves around (a) claims that behavioural programs can lead to ‘recovery’ of children with autism, (b) recommendations by some service providers that ABA and DTT approaches should be used to the exclusion of all other methods, (c) and concerns that the intensity of treatment may not be appropriate for all children and families.

Developmental Interventions

Developmental or relationship based interventions focus on the child’s ability to form positive, meaningful relationships with other people. Generally, the aims of these programs are to promote attention, relating to and interacting with others, experience of a range of feelings, and organised logical thought. Developmental interventions are also known as normalised interventions. To date, there is little research evidence to support the effectiveness of developmental interventions for children with autism. Studies have been pre-experimental, have lacked independence, or have been limited by methodological flaws. Further research is required to determine the effectiveness of these interventions. Studies have been done on discrete components of many of the programs such as social, communication, cognitive, and parenting outcomes, which show positive results.

The *Developmental Social-Pragmatic Model* emphasises the importance of initiation and spontaneity in communication, following the child’s focus of attention and motivations, building on the child’s current communicative repertoire, even if this is unconventional,

and using natural activities and events as contexts to support the development of the child's communicative abilities. The DSP Model differs from the contemporary ABA approach in its emphasis on sequences of language development and reduced emphasis on eliciting and measuring discrete trial behavioural responses. DSP focuses on successful participation in extended interactions as the measure of success, with greater emphasis on enhancing communication abilities within meaningful events and routines.

Floor Time (DIR)

Floor Time, or the *Developmental Individual-Difference Relationship-Based Model (DIR)*, is a developmental approach for early intervention with infants and children with a disability, including autism. The program includes interactive experiences, which are child directed, in a low stimulus environment. Proponents contend that interactive play, in which the adult follows the child's lead, will encourage the child to 'want' to relate to the outside world.

Responsive Teaching (RT)

Responsive Teaching (RT) is a parent-mediated program, grounded in contemporary child development theory, which aims to help parents to interact more responsively with their children

Relationship Development Intervention (RDI)

Relationship Development Intervention (RDI) is a series of techniques and strategies built upon the typical developmental processes of social competence. The goal of RDI is to increase motivation and interest in social relating in individuals with autism and provide activities and coaching to assist them to enjoy and become competent in social relationships.

Therapy Based Interventions

Communication Focused Interventions

A number of communication focused interventions are commonly used with children with autism. These may be used in isolation or integrated into a more comprehensive program. Some research has examined the effectiveness of communication focused interventions with mixed results. Although positive outcomes have been reported for some communication based interventions, there is a lack of large, comprehensive, and well controlled studies.

Visual Strategies and Visually Cued Instruction

Visual strategies and visually cued instruction are commonly used to facilitate children's expressive and receptive communication and to support their learning, information processing, and ability to navigate both the physical and social environment.

Manual Signing

Manual signing has long been used to support the comprehension and expression of children with autism. However, further research is required to evaluate the functional outcomes for children who are taught to use manual signing as well as to identify which

children are most likely to benefit from the use of manual signing. Apart from a few case studies manual signing has not been shown to reliably lead to verbal language development.

The Picture Exchange Communication System (PECS)

The Picture exchange Communication System (PECS) is a program that teaches children to interact with others by exchanging pictures, symbols, photographs or real objects for desired items. The goals of PECS include the identification of objects that may serve as stimuli for each child's actions and the learning of responses to simple questions with multi-picture systems. It is a highly structured program that uses behavioural principles of stimulus, response, and reward to achieve functional communication.

Social Stories

Social stories were originally developed by Carol Gray (Gray & Garand, 1993) in order to explain social situations to children with autism and to help them to actively learn appropriate responses to social cues.

Speech Generating Devices

Speech generating devices (SGDs) have been used to support both the expressive and receptive communication of children with autism in particular to support comprehension, promote symbol learning, increase interactions with adults and peers, and support the expression of wants and needs.

Facilitated Communication (FC)

Proponents of FC claim that autism is primarily a motor disorder involving difficulty producing voluntary movement (apraxia) which precludes the production of speech. The intervention involves teaching communication by physically prompting to form a pointing finger, supporting the hand as a point is made, and assisting withdrawal from the point. To date there is no evidence that FC results in consistent, useful, or spontaneous communication for children with autism.

Functional Communication Training (FCT)

FCT is a behavioural strategy for teaching people with autism to use Augmentative and Alternative Communication (AAC) as substitutes for the 'messages' underlying their challenging behaviour. FCT interventions teach the individual to communicate one or more functional messages, while providing a positive alternative to challenging behaviour(s). FCT is currently considered to be a 'treatment of choice' in the management of challenging behaviours in children with autism.

Sensory-Motor Interventions

There is growing awareness of the sensory issues characteristic of autism and interest in interventions designed to manage the environmental to lessen the impact of sensory issues. Research is needed to investigate the type and extent of the sensory characteristics of autism and interventions designed to manage these.

Auditory Integration Training (AIT)

Auditory integration training aims to address the hypothesised hearing distortions, hyperacute hearing, and sensory processing anomalies, which may cause discomfort and confusion in people with autism. At present, auditory based therapies should be considered experimental in nature, as there is little supporting research evidence.

Sensory Integration

Sensory Integration Therapy aims to improve the sensory processing capabilities of the brain through the provision of vestibular, tactile, and/or proprioceptive stimulation. Current research does not support SI as an effective treatment for children with autism, developmental delays, or mental retardation; nor has the limited research to date been able to identify SI as a specific variable responsible for positive change in a child's behaviours or skills.

Combined Interventions

The SCERTS Model

The SCERTS model focuses on *Social Communication, Emotional Regulation, and Transactional Support* as the principal dimensions for intervention planning. The goal of the program is to directly address the core deficits observed in children with autism, based on a highly individualised approach which addresses the primary deficits affecting each child. The SCERTS is a model of service provision rather than a program and has not been independently validated.

Treatment and Education of Autistic and related Communication Handicapped Children (TEACCH)

TEACCH is a 'whole life' approach aimed at supporting children, adolescents, and adults with autism through the provision of visual information, structure, and predictability. The results of a small number of studies have indicated positive outcomes for children who access the TEACCH program. However, there is a need for larger, systematic and controlled studies to be conducted by independent researchers in order to evaluate the immediate and long term outcomes of the program.

Learning Experiences-An Alternative Program for Preschoolers and Parents (LEAP)

LEAP is a comprehensive preschool service, designed for both children with autism and typically developing children. LEAP has the components of an integrated preschool program and a behaviour skills training program for parents. The program contains aspects of behavioural analysis, but it is primarily a developmentally based approach. Long term outcomes are currently being evaluated however independent evaluation is required to determine effectiveness.

Other Interventions

Other interventions include; *Higashi/Daily Life Therapy*, *The Option Method*, *Music Intervention Therapy*, *Spell*, *Campbell*, *Miller Method*. There is little, if any, research evidence evaluating outcomes for these programs.

Family Based Interventions

A number of programs have been developed to provide support to the families of children with autism. Support may include helping parents to understand the nature of autism and their child's learning style, providing parents with teaching and strategies to help support their child's learning, helping family members to establish their own support networks, and providing information about other services and support programs that are available. In family support programs, therapists and professionals work with the parents, siblings, and significant others, rather than directly with the child with autism. A small number of studies involving family support programs have yielded positive outcomes for both children with autism and their families. However, there is a need for further research involving large controlled studies to replicate and extend these findings. Family support and education programs include *The Help! Program* and *The EarlyBird Program* which were both developed and are currently operated by the National Autistic Society in the UK.

Family-Centred Positive Behaviour Support (PBS) Programs

Family-centred PBS programs involve parents and professionals working together, in a systematic and collaborative fashion, to address a child's challenging behaviour. Family-centred PBS plans include (a) strategies for teaching and increasing skills that are intended to replace the problem behaviours, (b) strategies for preventing the problems before they occur, (c) strategies for dealing with the problems if or when they do occur, and (d) strategies for monitoring progress.

The Hanen Program (More than Words)

'More than Words' is an intensive training program for parents of pre-school children with autism. The program derives its theoretical framework from a social-pragmatic developmental perspective and emphasises the blending of aspects of both behavioural and naturalistic child-centred programs; the breaking down of activities into structured, small steps found in an ABA program, and the provision of opportunities to use language for functional purposes built into more naturalistic approaches. A preliminary evaluation of treatment outcomes has indicated that the program has some positive outcomes for children and families. Further research is required in order to evaluate this program more comprehensively.

Characteristics of Effective Programs

A review of the research literature indicates that effective programs tend to contain the same key components, regardless of their different philosophical orientations. Effective programs:

- Provide an autism specific curriculum content focusing on attention, compliance, imitation, language, and social skills.
- Address children's need for highly supportive teaching environments.
- Include specific strategies to promote generalisation of new skills.
- Address children's need for predictability and routine.
- Adopt a functional communication approach in addressing challenging behaviours.
- Support children in their transition from the preschool classroom.
- Ensure that family members are supported and engaged in a collaborative partnership with professionals involved in the delivery of treatments.

A consistent finding in research studies is that different children with autism respond in different ways to any given treatment or intervention program. Therefore, it is important to note that there is no single program that will suit all children with autism and their families. There is however evidence to suggest that there are substantial short and long term benefits from early, intensive, family-based treatment programs, whatever their theoretical basis, so long as these are appropriately adapted to the child's pattern of strengths and weaknesses and take account of family circumstances.

Costs-Benefits of Interventions

To date, no studies have reported on the cost benefits associated with treatment programs in terms of funding, treatment times, short-term outcomes and benefits over time. Rather, reviewers in this field have provided a description of the aims of the intervention or treatment program available, the target population, treatment times, associated costs, and how the treatment was being funded. Information about costs provided by service providers in Australia is included in Table Six.

CONTEXT OF THE REVIEW

Introduction

This report presents the results and recommendations arising from a review of early intervention services for children with autism. The impetus for the review came from a National Autism Forum held at Parliament House Canberra on June 16th 2005. The forum was convened by the Australian Government Department of Health and Ageing with the aim of identifying and discussing the needs and challenges for children with autism and their carers. The forum brought together representatives of groups concerned with Autism Spectrum Disorders (ASD) from around Australia as well as government representatives, and culminated in agreed steps in promoting improved practice related to autism at a national level.

Following the forum, the Hon Christopher Pyne, Parliamentary Secretary for the Minister of Health and Ageing, committed \$50,000 to be used principally to fund a research project to identify best practice benchmarks for early intervention services for children with autism. Dr Jacqueline Roberts and Professor Margot Prior were contracted to carry out this research and to prepare a national compendium with appropriate guidelines for parents, professionals, and government agencies which would assist with the evaluation of and provide access to evidence based best practice programs for children with autism. Evidence based treatment guidelines are particularly important in the field of autism where there has been considerable controversy surrounding the effectiveness of various treatments, including those which are well promoted but lack scientific evidence for their effectiveness. Parents and professionals need information to help them evaluate claims of successful treatments, particularly those treatments in which practitioners have claimed to have ‘cured’ children with autism, or promise to do so. Although these interventions might be helpful to children, they might also be ineffective or even harmful. Research evidence is needed to address these claims. There is limited research evidence to support the effectiveness of a small number of treatment programs. However, most treatments have not been the evaluated adequately and some have not been evaluated at all. Consequently, parents and professionals must carefully appraise the evidence for the effectiveness of each treatment when making decisions about interventions for their children with autism. Several international reviews of the research evidence for treatments for children with autism have been conducted, in addition to this one. A list of these reviews is provided in Appendix B.

Note that there is no reliable evidence that ‘recovery’ or ‘cure’ occurs as a result of treatments or interventions for autism. However it is clear and well supported by the evidence base, that with appropriate intervention children with autism continue to develop and learn behaviours that will equip them for life.

About the authors

Jacqueline M.A. Roberts BA(Hons), Dip.Teach, BaAppSc(Sp.Path), PhD

Jacqueline is a Research Associate at the University of Sydney and a consultant specialising in autism spectrum disorders. Jacqueline worked for the Autism Association of NSW (now Autism Spectrum Australia, Aspect) for 20 years as a teacher, speech pathologist, school principal, and Director of Services with overall responsibility for the provision of all professional services delivered by the Association. As a lecturer and educator, Jacqueline has worked extensively in Australia and overseas delivering both specialised programs in autism, and general training in Special Education and Speech Pathology. Jacqueline has a Doctorate in Linguistics, Macquarie University (Sydney, Australia). Jacqueline is a researcher and postgraduate supervisor in the Centre for Early Interventions, Faculty of Education and Social Work, University of Sydney and teaches the autism unit in the postgraduate program in Developmental Disability Studies at the Faculty of Health Sciences, University of Sydney. She holds honorary positions at Macquarie University in the Faculty of English and Linguistics and MUSEC (Special Education Centre).

Professor Margot Prior AO, BA, PhD, FASSA

Margot is Professor of Psychology at the University of Melbourne. She has been a lecturer, clinician, and researcher in the field of family and child development, at Monash, LaTrobe, and Melbourne Universities with particular focus on understanding and helping children with autism, learning difficulties and behavioural and emotional problems. Between 1994 and 2002 she was Professor/ Director of Psychology at the Royal Children's Hospital, Melbourne. She has written or edited seven books including: Pathways from Infancy to Adolescence; Understanding Specific Learning Difficulties; Hyperactivity: Diagnosis and Management; and Learning and Behavior Problems in Asperger Syndrome, and published over 200 scientific papers. Margot has an international reputation as an expert in Autism Spectrum Disorders. She has been a Chief Investigator in the 20 year, longitudinal study of Australian children titled 'The Australian Temperament Project'. Margot was a Founder of the Victorian Parenting Centre, and the Learning Difficulties Centre at the Royal Children's Hospital. She is the Social Science representative on the Australian National Commission for UNESCO. Margot was recently awarded the Australian Psychological Society prize for distinguished contributions to Psychology.

Research Assistant: David Trembath MaAppSc, BaAppSc(Sp.Path)

David is a lecturer in communication and lifelong disability and research officer at The University of Sydney. He has worked as a Speech Pathologist at the Department of Ageing Disability and Home Care, Autism Spectrum Australia (ASPECT), and the Communication Disorders Treatment and Research Clinic at the University of Sydney. In 2005, David completed his Masters by research in which he examined the effectiveness of peer mediated naturalistic teaching and speech generating devices for preschool aged children with autism. He has ongoing research interests in the field of autism, augmentative and alternative communication, and other lifelong disabilities.

Origin of the Review

In recent years it has been suggested that there is an ‘epidemic’ of autism spectrum disorders, since the prevalence of the disorder appears to have increased markedly, with many more children being diagnosed at younger ages, and an increase in the number of children diagnosed with Aspergers Syndrome. This increasingly large group of children has very specific support needs, especially early intervention which is beneficial in building skills that will enable more effective integration within the community and increased independence throughout life. Areas of particular importance for children with autism include the development of social and communication skills, the prevention and treatment of challenging behaviours, and the development of adaptive functioning skills which enable participation in the everyday world.

There is also concern for the support needs of families where there is a family member with autism. There is a need to identify strategies that will help families through the experience of diagnosis and assessment, and to find the most effective way to provide information about available treatments. Comprehensive service provision requires family centred practices that acknowledge the specific needs of individuals within families, and include strategies to promote family participation in their community.

This review of key international articles and research projects sets out to present:

- The definition of autism spectrum disorders
- Comparative evidence supporting a range of treatment and intervention models, for example intensive behavioural interventions, naturalistic strategies, combined therapy support, parent education programs, across the range of autism spectrum disorders emphasising **early** intervention.
- Costs and benefits of interventions in terms of intensity, length, short-term outcomes and benefits over time.
- Evidence to support best practice models in assisting families at the time of diagnosis and assessment (including the provision of information).
- An overview of the nature of comprehensive supports that help reduce stresses that may be experienced by families of a child/young person with autism spectrum disorder and promote inclusion in community activities.
- Educational placement of students with autism.
- The results of a survey of autism programs available in the states and territories of Australia at the time of writing

Defining Autism Spectrum Disorders

Autism is a life long neurodevelopmental disorder of unknown aetiology (Volkmar, 1998). In terms of pathophysiology, it is generally accepted that, autism involves some level of brain dysfunction at both cortical and sub-cortical levels. The originating site or sites of brain maldevelopment have not been identified to date (Bristol et al., 1996), however evidence of genetic involvement has increased over the past decade. The diagnosis of autism has been relatively consistent and stable over the past several decades since its identification by Leo Kanner in the 1940’s (Kanner, 1943). Rutter (1996)

suggested that there is "...a high degree of consensus on the diagnostic criteria for autism and consistency in the evidence on the validation of autism as a diagnostic category" (p257).

Currently there are two major diagnostic systems in use which have common criteria for a diagnosis of autism based on a triad of impairments in social interaction, communication, and a lack of flexibility in thinking and behaviour. These are the Diagnostic and Statistical Manual (4th Ed) of the American Psychological Association (1994) and the International Classification of Diseases (10th Ed) of the World Health Organisation (1992). The term 'autism' is used synonymously with the term 'autistic spectrum disorders' (ASD) (Wing, 1996) and is part of DSM IV 'Pervasive Developmental Disorders' (PDD). The autistic spectrum covers a number of conditions with different diagnostic criteria, but which share the common developmental difficulties within the triad of impairments. Autistic Spectrum Disorders or Pervasive Developmental Disorders as defined in DSM-IV (1994), include:

- Autistic Disorder (also referred to as Classic or Kanner's autism. Some people with Autistic Disorder with intelligence and language in the typical range may also be described as having High Functioning Autism (HFA).
- Aspergers Syndrome (also known as Aspergers Disorder) There has been considerable debate about the validity of the distinction between Aspergers Syndrome (AS) and HFA. Current research evidence suggests that they cannot be reliably discriminated on the basis of any significant features. Wing (1996) maintained that HFA and Aspergers syndrome are more alike than different and that educational distinctions between the groups may not be valid or helpful.
- Retts Syndrome.
- Childhood Disintegrative Disorder.
- Pervasive Developmental Disorders Not Otherwise Specified (PDD-NOS), also known as Atypical Autism.

The diagnosis of an autistic spectrum disorder is based on the observation of behaviour in the three areas of the triad:

- Social behaviour
- Communicative behaviour
- Repetitive or ritualistic behaviour and resistance to change.

There is no definitive physiologically based test to reliably indicate the presence of autism and no one particular behaviour is a definitive indicator of autism. The diagnosis is predicated on the developmental history indicating early signs of autism, along with observation of behaviours in each of the clusters of characteristics described by the triad.

Incidence and Prevalence: *How common is autism?*

The prevalence and incidence of autism continues to be an area of contention amongst researchers and service providers. Prevalence rate refers to the number of people with autism in a particular age range, living in a defined area. Birth Prevalence refers to the number of babies born with a particular condition in a prescribed area. It is difficult to establish birth prevalence for autism in the same way that it is possible to establish birth prevalence for Down's Syndrome (Williams, 2003) since there is, to date, no clear biological marker for the

disorder. Incidence refers to the number of **new** cases in a specified time in a specified population (Wing, 1996). The incidence rate is also difficult to study in autism because of the variable criteria for autism used by different researchers, for example studies which include Aspergers Syndrome may have a higher incidence rate than those looking only at Autistic Disorder.

The range of estimated prevalence of autism reported in the research literature is considerable. A comprehensive review conducted by the Medical Research Council (MRC) of the United Kingdom (2001) found that autism spectrum disorders affect approximately 60 per 10,000 children under 8 years of age. These rates found by the MRC were confirmed by Chakrabarti and Fombonne (2005). Recent international research suggests an average prevalence of 1 in every 175 children (Insel, 2006). The authors of the MRC review suggested that differences in rates reported in the literature and in the media are likely to be the result of a number of factors including methodological differences between studies, changes in diagnostic practice, and increasing professional and public awareness of autism. What is not clear is whether there has been an actual increase in the prevalence of the disorder and, if there has, whether the factors outlined previously are sufficient to account for the increase (see Prior, 2003). According to Fombonne (2003), approximately 70% of people with autism have an intellectual disability and autism is over represented amongst males (with a male/female ratio of 4.3:1).

Currently there is no single known cause for autism or autism spectrum disorders. Most experts would contend that autistic symptoms are the result of a variety of aetiologies affecting the developing brain (Gillberg & Peeters, 1999). It is well established that there is a genetic component to autism (Medical Research Council, 2001), however the mechanism is not yet understood. Neither is it known how genetic susceptibility interacts with environmental factors.

Considerations in Reviewing Interventions for Children with Autism

Cultural Perceptions

The impact of cultural perceptions of autism needs to be taken into account in any discussion of intervention outcomes. Every disorder is perceived differently by society and different cultures may define and relate to a given disorder in different ways. The social definition of a particular disorder or aspects of that disorder may influence specific interventions and reflect different societal beliefs and values. Within Australian society, for example, the amount and 'type' of eye contact displayed by an individual is often reflective of his or her cultural background. A lack of eye contact and/or unusual quality of eye contact, as displayed by many children with autism, may be seen as culturally appropriate in one family, but culturally inappropriate in another. One view of autism considers it to be a feature of normal biological variation which may have evolutionary advantages as well as disadvantages (Jordan, 2001). Many adults with autism question the validity of imposing non-autistic or what they may call 'neurotypical' standards, beliefs, attitudes and judgements on their way of being in society.

The Need for a Multi-Dimensional Framework

Autism is a condition that straddles the domains of many different professions in terms of its definition, diagnosis, education, and care. Hence, it is best approached in a multidisciplinary way (Jordan, 2001). When considering assessment and intervention for children with autism, it is essential that our understanding of autism is based on an ecological concept of the disorder. Professionals need to adopt a multi-dimensional framework involving people working in different disciplines, and intervention strategies must include parents, teachers, peers, the person with autism and other professionals.

All attempts at planning intervention and treatments should involve a close working relationship between the professional and the family, always keeping in mind the need to bridge the gap between science, beliefs, culture, and the individual needs of children and their families (Schulman, Zimin, & Mishori, 2001, p233).

Individual Differences

The range of the autism spectrum and individual variation in manifestations of autism are key issues. Jordan (2001) comments that while autism has a pervasive effect on the way a person thinks, feels, understands, and acts; the effects are not uniform. Given that the autism spectrum encompasses a wide range of age and ability, and reflects the often considerable, individual differences among children with autism, it is **unlikely that one kind of intervention will fit all children and families.**

Claims of ‘Cure’ and ‘Recovery’

Although autism is a life long pervasive developmental disorder, treatment programs exist that claim to provide a cure for autism. Howlin (1998) identified a number of such programs including Holding Therapy, the Options or ‘Sonrise’ program, Auditory Integration Therapy, and Facilitated Communication (FC). Despite being the subjects of a range of published testimonials, internet articles, anecdotal accounts and research studies, none of these therapies and the associated claims have been shown to be supported by **adequate** research (Howlin, 1998). It is clear that there is insufficient empirically sound research evaluating outcomes of programs for children with autism, despite the range of treatments available to parents and the claims made by the exponents of some of these programs.

The cost to families

Currently there is a plethora of interventions for autism available, especially for young children with autism, some of which may be associated with unsubstantiated claims of cure and recovery. Interventions are often available at very high cost in terms of money and time. In addition parents often feel tremendous pressure to provide intensive intervention as early as possible in their child’s life which may then be associated with guilt if they believe they have not provided enough of the ‘right’ early intervention treatment. Families report high levels of confusion, problems with misinformation and desperation arising from this situation.

Challenges Inherent in Measuring Outcomes

This gap between program claims and empirically validated outcomes arises in part because the criteria for good science are based on rigorous experimental methods such as random assignment to treated and untreated groups and tight control of any variables which may affect outcomes other than the specific intervention being assessed. In order to provide compelling evidence for the effectiveness of a particular intervention, a range of scientific criteria must be met. However, intervention programs cannot always meet such criteria. Random assignment of participants to a treated, or an untreated comparison group, for example, may not be feasible or even legal, and complex variables such as the nature of the relationship between the person delivering the treatment (e.g. teacher) and the child cannot be easily controlled for. However without research to evaluate interventions, claims of successful results cannot be substantiated. It is possible, if difficult, to design scientifically rigorous research studies in order to evaluate outcomes of intervention. The extent to which sound research criteria are met, in particular the replication of the research findings by different researchers, is an indication of the confidence one can have in the findings. Unfortunately in the field of autism there is a tendency for research containing major errors in the selection and interpretation of the evidence to be used to substantiate claims for a particular intervention, or in some cases claims are made in a "flagrant perversion or disregard for evidence" (Schopler, Yirmiya, Shulman, & Marcus, 2001, p13).

Historically, the treatment picture was clouded with decades of psychotherapy for families and children with autism occurring without any empirical evidence to support its efficacy. Today families are spending significant resources in terms of time and money on a range of interventions that have not been evaluated, and which may even pose risks of harm to their children with autism. Research into facilitated communication, for example, has indicated that the presence of the facilitator made the child more passive and less likely to initiate communication. Moreover, in a number of schools and educational districts in the USA, there was a major transfer of resources into Facilitated Communication to the detriment of the wider curriculum, and children were transferred into mainstream classes on the basis of remarkable 'facilitated' typescripts resulting in unrealistic expectation of students and subsequent stress for all concerned (Howlin, 1997). There is also a range of biomedical and 'naturopathic' treatments which are not recommended due to minimal evidence and potential risk (Perry & Condillac, 2003). These include the administration of high doses of vitamin B6 and magnesium. In a review of treatment outcomes, Pfeiffer, Norton and Shott (1995) reported that 5% of participants demonstrated side effects such as sensory neuropathy, headache, depression, vomiting, and photosensitivity.

Significant issues for any researcher looking at intervention outcomes include the variability or lack of precision in terms of the description of the nature of the autism spectrum disorder of participants, and variability in the outcome measures which make comparison of studies of different treatment evaluations difficult. The challenges addressed in this review are to summarise the available research evidence, to consider the extent to which evidence is sound, and where possible to suggest how the evidence might relate to the programs available in Australia for children with autism and their families.

The focus of this review is **early intervention** for young children with autism and their families in order to promote understanding of what has been done in terms of research into treatment and management of autism in young children, and to highlight the need for more empirically sound research to inform families and professionals.

Classification of Interventions

The range of interventions available for autism is extensive and classified in several different ways by different authors. Mesibov, Adams & Klinger (1997), classify intervention approaches into three main groups:

- Biological;
- psychodynamic and
- educational

This review will deal briefly with biological and psychodynamic treatments and focus on educational interventions. Although educational interventions are our primary brief, reviews of the research into psychodynamic and biological approaches are included because it is likely that families will pursue more than one approach, often simultaneously. Many children in Australia, for example, are enrolled in educational programs and are also receiving one or more biological intervention such as medication, modified diet, or treatment for 'heavy metal poisoning'. It is important to keep in mind the dilemma for families faced with many, often expensive and sometimes invasive, treatment options for their children, especially when scientific evidence of the efficacy of these interventions cannot be found.

Educational interventions are interventions which focus on skill development and relationship development. They can be described as primarily behavioural focusing on skill development, primarily developmental focusing on relationship development, primarily therapy based focusing on specific domains such as communication or sensory motor (these programs are usually conducted in combination with other programs), primarily family based focusing on enabling parents to promote skill and or relationship development in their children, or combined, that is programs which combine one or more of the above.'

BIOLOGICALLY BASED INTERVENTIONS

MEDICATION

Although the mainstay of intervention in individuals with autism remains individualised education, incorporating communication and behavioural strategies, pharmacotherapy can have a role in the management of some of the behaviours seen in autism including co-morbid problems such as anxiety, depression, and hyperactivity. There are two major approaches with biological interventions (Gringas, 2000): The 'one size fits all' approach when there is a belief that there is one underlying biological cause for autism and claims are made for treatments that impact on the core social impairments of autism. New 'miracle cure' claims are made from time to time, but to date have not been substantiated when scientifically investigated. A recent example is secretin (a hormonal compound) (Ian Dempsey & Foreman, 2001). Treatment regimes using secretin emerged as families sought to secure the medication for their children, often at significant emotional and financial cost. However several randomised control trials (Williams, Wray, & Wheeler, 2005) have been unable to demonstrate any benefit over placebo.

The second major approach is an individualised 'tailor-made' approach. This involves a comprehensive assessment of the individual's medical, developmental/intervention and psycho-social needs. Symptoms that may be impairing the response to intervention or progress are identified and the potential role of medication is then considered. This approach stresses that the agents used do not impact on the primary social characteristics of autism. The goal of medication and treatment is the reduction (and not necessarily the extinction) of interfering behaviours so that the individual can be more amenable to education and other psychosocial interventions. In broad terms, these targeted symptoms include the ADHD-like symptoms of inattention and over-activity ; anxiety, ritualistic/obsessive compulsive behaviour, self-injurious behaviour and sleep disorders (Gringas, 2000).

Basic principles that are adhered to when prescribing medication include;

- baseline assessments and identification of targeted symptoms,
- close monitoring and review before, during, and after medication trial,
- initial prescription of the lowest possible dose which may be increased gradually if needed (start low, go slow),
- adequate informed consent,
- checking the method (and ease) of administering the particular medication with carers.

It is unfortunately the case that families report that the basic principles outlined above for the prescription of medication for children with autism are frequently not adhered to. Failure to consider alternatives to medication, complementary non-medical interventions and lack of ongoing supervision are common concerns. This is particularly the case for families outside of the major metropolitan areas in Australia.

At the present time, there is no drug that is licensed for specific use with children or individuals with autism (Silove, 2003).

Research Units on Paediatric Psychopharmacology Network (RUPP)

In 1997, the National Institute of Mental Health in the US funded 5 university affiliated medical centres with expertise in the treatment of autism to constitute the RUPP Autism Network (King & Bostic, 2006). This group was to investigate the safety and efficacy of drugs that are being used widely in the treatment of autism or that may hold particular promise. To date the network has chosen to study Risperidone and Methylphenidate. The behavioural targets identified for the initial Risperidone trial included impaired social behaviour, interfering repetitive phenomena, and aggressive, self-injurious and destructive behaviour. The results of the RUPP Risperidone trial were published in 2002 and may ultimately contribute to Risperidone being indicated for the treatment of behavioural disturbance in autism. McCracken, McGough, and Shah (2002) found that behavioural symptoms including aggression, hyperactivity and irritability all improved significantly on Risperidone. Side effects, however, included weight gain, increase in heart rate and blood pressure, fatigue, drowsiness, dizziness and drooling. Extrapyramidal symptom scores (e.g. tremor) were not different between groups, but it is suggested that one should decrease the dose slowly when discontinuing medication as a precaution to minimise the possibility of extra pyramidal side effects.

The RUPP network has recently completed a second large randomised controlled trial of Methylphenidate in children who have both PDD and ADHD. Preliminary results indicate that Methylphenidate may be helpful for some children but that the percentage of responders is less than reported for children with ADHD alone (King & Bostic, 2006).

Additional studies that are in progress in the RUPP network, include the first large study of combined drug and behavioural treatment in this population.

Studies to Advance Autism Research and Treatment (STAART) network

After the Children's Health Act of 2000, the US Congress enacted legislation that mandated the creation of a new autism research network. Five institutes implemented the Studies to Advance Autism Research and Treatment (STAART) network program. The initial pharmacologic targets identified in several STAART sites were repetitive behaviour, affective and anxiety disturbance in children who have autism. Two multi centre studies are currently in progress, exploring the use of Citalopram and Fluoxetine respectively (King & Bostic, 2006).

MEDICATION CLASSES

Stimulants e.g. Methylphenidate (Ritalin TM)

Stimulants remain the most effective agents in the treatment of inattention and hyperactivity and have been used increasingly for people who have an autism spectrum

disorder (ASD). The response to stimulants however, can be idiosyncratic with up to 1/3 experiencing *increased* hyperactivity, stereotypies, dysphoria or motor tics (Di Martine, Melis, & Cianchetti, 2004).

Typical Anti-psychotics.

These were developed to treat schizophrenia. This class includes drugs such as haloperidol, fluphenazine, and thioridazine. Empirically sound studies conclude that these drugs may be useful in modestly improving the overall functioning of children with autism however there are significant side effects on the extrapyramidal motor system associated with these medications including stiffness (dystonia), restlessness (akathisia) and involuntary movements (dyskinesias). Long-term use is not recommended because of the possibility of developing permanent tardive dyskinesia. If the medications are to be stopped they should be gradually withdrawn to avoid withdrawal dyskinesias (Sikich, 2001).

Atypical Anti-psychotics.

These have been developed in the last 20 years to minimise the effects on the extrapyramidal system of the typical antipsychotics outlined above. This class of drugs includes: clozapine, risperidone, olanzapine, ziprasidone, quetiapine. These drugs have fewer extrapyramidal side effects than the typical antipsychotics. Clinical trials of Risperidone in children are outlined above in the RUPP trials. Clinical trials with adults with autism show some reduction in repetitive behaviours, aggression, irritability and anxiety. No changes in language or social behaviours were observed. Similar findings, using open label trials have been found for olanzapine, quetiapine and ziprasodone (King & Bostic, 2006). A recent study reporting the effects of Aripiprazole in 5 children with had PDD noted that all of the subjects responded well and that Aripiprazole may be less likely to cause substantial weight gain (Stigler, Posey, & McDougle, 2004).

Specific Serotonin Reuptake Inhibitors

This class of drugs was developed as antidepressants and has proved useful in the management of obsessive-compulsive disorder and anxiety disorders. Serotonin reuptake inhibitors include the tricyclic antidepressant clomipramine, the mixed antidepressant venlafaxine and all selective serotonin reuptake inhibitors, fluoxetine, sertraline, paroxetine, fluvoxamine, and citalopram. The effect of serotonin reuptake inhibitors in reducing the severity of the characteristics of autism is likely to be linked to serotonergic abnormalities in many people with autism, and altered patterns of brain serotonin synthesis. Mesibov et al. (1997) suggest that clomipramine should be used with caution because of an association with lowering of seizure thresholds.

A controlled trial in children and adolescents supports the effectiveness of Fluoxetine in reducing repetitive behaviours in children with Pervasive Developmental Disorders (PDD) (Hollander, Phillips, & Chaplin, 2005). However, a controlled trial of Fluvoxamine in children who had a PDD revealed a much less robust response and the notable side effect of behavioural activation was noted (Martin, Koenig, & Anderson, 2003). Several investigators have reported symptoms of behavioural activation in their clinical experience and there are also concerns about the potential induction of mania.

Open label trials including Sertraline, Citalopram, Escitalopram and Mirtazapine have reported benefits for anxiety, aggression, stereotypy and pre-occupation symptoms for children who have PDD. Although rare, extrapyramidal side effects have also been noted in people with ASD treated with SSRI's (McDougle, Kresch, & Posey, 2000).

GABA-ergic agents

It is well known that Benzodiazepines may exacerbate behavioural disturbance in people with autism (Marrosu, Marrosu, & Rachel, 1987). A retrospective assessment of Topiramate in children and adolescence with PDD noted significant improvements with regards to hyperactivity, inattention and conduct symptoms. There were concerns regarding cognitive dulling observed in two participants, and controlled trials were recommended to clarify this risk (Hardan, Jou, & Handen, 2004).

Glutamatergic Agents

Lamotrigine, modulates glutamate release and was examined in a controlled trial (Belsito, Law, Kirk, Landa, & Zimmerman, 2001) but no significant improvements were noted compared to placebo. A pilot study of D-cycloserine observed a dose related, significant improvement in symptoms of social withdrawal and responsiveness in a single blind design involving 10 children treated with the drug for 8 weeks (Posey, Kem, & Swiezy, 2004). A controlled trial of Amantadine showed limited efficacy (King, Wright, & Handen, 2001).

Nor Adrenergic Agents

There are as yet no published studies regarding Atomoxetine in people who have ASD. Two double blind controlled placebo studies in ASD have noted benefits with Clonidine hydrochloride, including improvements in hyperactivity, aggression and irritability. Adverse drug reactions with Clonidine include drowsiness, development of tolerance and risk of hypertensive crisis on withdrawal (Fankhauser, Karamanchi, & German, 1992).

Cholinergic Agents

Open label trial with Rivastigmine (32 subjects, 3 to 12 years of age with Autism) showed improvement in both expressive speech and overall autistic behaviour over a 12 week treatment period (King & Bostic, 2006). Other case reports included Donepezil (a cholinesterase inhibitor) which was noted in a retrospective study to improve irritability and hyperactivity, but no benefits were noted for speech repetitive behaviour or lethargy (Hardan & Handen, 2002).

Beta Blockers

The use of beta-blockers to reduce anxiety and aggression in autism has not been well researched, however atenolol and propranolol are used to reduce anxiety in some people with autism (Mesibov, 1998).

Opioidergic Agents

Naltrexone

Naltrexone is an opiate antagonist that has been hypothesised to be helpful in reducing the symptoms of autism by blocking endogenous opioids that may be released during self-injurious repetitive behaviours. Sikich (2001) suggests that there is fairly consistent evidence that Naltrexone is possibly efficacious in reducing hyperactivity and impulsivity to a limited degree in children with autism, however there have been problems reliably replicating study findings and results for adults have been mixed and negative at times. Perry and Condillac (2003) suggest that Naltrexone has not been demonstrated to be effective.

Anti-Convulsant Medications

It is estimated that up to 30% of people with autism have seizures, which often develop during adolescence (Mesibov, 1997). For those who do suffer from seizures anticonvulsant medication is indicated in the same way as for any person affected with seizures.

The mood stabiliser Valproate is currently being studied in a trial sponsored by the National Institute of Mental Health. Another mood stabiliser, carbamazepine (Tegretol), is sometimes used to modify aggression in highly aggressive people with autism who do not show signs of seizures (Mesibov, 1998).

Summary

It should be noted that for the majority of the medications discussed thus far the research evidence to date is not sufficient to assess long term effectiveness and potential side effects. Numbers of participants in trials have generally been insufficient to allow for confidence in generalising findings. There is an urgent need for more replications of this research with larger numbers of participants.

Medication can sometimes have a role in the treatment of targeted symptoms impairing the quality of life and progress of an individual with autism. Symptoms most responsive to medication include hyperactivity, impulsivity, aggression, anxiety, self-injurious and obsessive/compulsive behaviours. No biological treatment has yet been demonstrated to change the core characteristics of autism. The typical and atypical anti-psychotics seem to be the most effective proven agents in impacting on many of the deficits seen in autism. However, their potential side-effects are still extremely worrying and militate against long-term prescribing.

COMPLEMENTARY AND ALTERNATIVE MEDICINE (CAM)

CAM has been defined as “*a broad domain of healing resources that encompasses all health systems, modalities and practices and their accompanying theories and beliefs, other than those intrinsic to the politically dominant health system*” (Panel of definition and description, 1995) and “*strategies that have not met the standards of clinical effectiveness, either through randomised controlled clinical trials or through the consensus of the biomedical community*” (American Academy of Paediatrics, 2001).

“In no area of developmental paediatric practice is there more controversy regarding the choice of treatment than related to children with Autism Spectrum Disorders (ASD). Complementary and Alternative Medical Therapies (CAM) are often selected because they are perceived as treating the cause of the symptoms rather than the symptoms themselves. The lack of identification of a specific biomedical cause accepted by the scientific and medical establishment allows for proliferation of multiple hypotheses that may not be compatible with current scientific understanding of neuroscience” (Levy & Hyman, 2005).

In their reviews of the safety and effectiveness of non-traditional approaches to the treatment of autism, Levy and Hyman (2002) divide treatment approaches into four categories:

1. unproven benign biological treatments that are commonly used but have no basis in theory,
2. unproven benign biological treatments that have some basis in theory.
3. unproven, potentially harmful biological treatments and
4. non-biological treatments.

The first category includes vitamin supplements such as B6 and Magnesium, gastrointestinal medications, and antifungal agents. The second includes gluten and casein free diets, Vitamin C, and secretin. The third includes chelation, immunoglobulins, large doses of Vitamin A, antibiotics, antiviral agents, alkaline salts, and withholding immunisations. The fourth category includes auditory integration training (see page 62 for review), interactive metronome, craniosacral manipulation, and facilitated communication (see page 61 for review).

Conventional interventions typically focus on the symptoms and behaviours characteristic of autism and are based on skill building rather than promising “miracle cures”. It is often very difficult for parents to critically evaluate the flood of proposed cures and interventions freely advertised. Parents report that the internet is the primary source of information about treatments, followed by attendance at seminars, books and discussion with other parents. Parents report that these avenues provide a variety of often unsubstantiated evidence which they then must attempt to evaluate. This highlights the need for reliable objective information; more evidence based evaluation and better informed healthcare providers. Levy and Hyman (2005) note that it is essential for

evidence to be the primary source of information for families and clinicians, rather than the market place, when they decide on treatment for a child with autism.

Addressing all the possible CAM interventions is beyond the scope of this review, but the more common interventions are briefly discussed below.

Diet

The most popular of CAM approaches are diets that eliminate foods containing either gluten or casein, or both. Four overlapping biological theories contribute most to the support for the diet; opioid excess, reduced peptidase activity, immune dysfunction or autoimmunity and, gastrointestinal abnormalities. Both gluten and casein are broken down in the gut into compounds with opiate agonist properties (Teschmacher, Koch, & Brantl, 1997). It has been hypothesised that children with autism have abnormal leakage from the gut and these metabolites then pass into the central nervous system (CNS) to produce intensified brain opioid activity and disruption of brain function. Clinical trials with opiate antagonists have not been as successful as initially claimed, but there may be some benefit in a few select individuals regarding hyperactivity and self injurious behaviour (Kolmen, Feldman, & Handen, 1995; Willemsen-Swinkels, Buitelaar, & Van Engel, 1996). The “leaky gut theory” however remains controversial with no rigorous scientific study or substantiated evidence. The most recent review of the scientific evidence available on the role of elimination diets in Autism Spectrum Disorder was published by Christianson & Ivany, (2006). They noted that significant design flaws in all the current studies weaken the confidence that can be placed in their findings, and they suggested that the future/current double blind placebo controlled studies should evaluate diets eliminating both gluten and casein (rather than either alone) and that outcome measures should include assessments of non-verbal cognition. While no major side effects of the diet were noted, some concerns were raised regarding the cost of an unnecessary diet and further restricting dietary intake in individuals who already have rigidity around food intake.

Chelation: (DMSA, lipoic acid, clay baths and natural chelating agents.)

There are no published peer review publications regarding the efficacy of chelation agents for the treatment of autism. It is known that up to a third of children with autism may present with apparent regression in milestones in their second year of life, and from this arose the proposed theory of immunisation as a cause for the regression and autism. One of the reasons immunisation was blamed was due to the Thimerosal, which is an ethyl mercury derivative used to stabilise killed virus vaccination packaged in multi-dosed vials. It is important to note that the live virus vaccines like the trivalent measles, mumps, rubella vaccine do not contain Thimerosal. Thimerosal is no longer present in childhood vaccines except in the DT influenza vaccine. In Australia, even when thiomersal-containing vaccines were being used in the past, the maximum possible number of doses of thiomersal-containing vaccines was six (two doses of triple antigen, two doses of hepatitis B, two doses of lyophilised pedvax Hib), giving a maximum mercury dose below the WHO limit of 3.3 µg/kg per week (MacIntyre & Leask, 2003).

Thimerosal was removed from childhood vaccines in Denmark in 1992. This allowed (Madsen, Lauritsen, & Pederson, 2003) to examine the rate of reported autism before and after this change in practice. The rate of reported autism began increasing before Thimerosal was removed from the childhood vaccines and this trend continued on the same upward trajectory after the removal of Thimerosal. No associations were identified and causality could not be implied. In the case of documented lead poisoning with neurological complications, chelation of the lead has not been shown to improve neurological function. Renal and hepatic toxicity must be monitored with DSMA chelation. Due to the lack of evidence and the potential significant harm and toxicity, this intervention should be viewed with extreme caution.

Yeast overgrowth: (probiotics, anti-fungal agents, “yeast free diet”).

No clinical trials to date have been published in peer reviewed literature examining these interventions for autism although they still remain popular. Chronic use of antifungal agents such as Fluconazole requires monitoring for liver toxicity and exfoliative dermatitis. Nystatin is not systemically absorbed and may result in diarrhoea. It is important to note that yeast is a normal commensal in the bowel and stool, and candidal overgrowth in the intestine has not been documented by endoscopy (Wakefield, Murch, & Anthony, 1998).

Digestive enzymes.

No rigorous scientific studies have shown the administration of digestive enzymes to be of benefit. However in open label clinical trials the authors report close to 15% of subjects experienced significant side-effects (Brudnak, Rimland, & Kerry, 2002).

Secretin

Secretin is a peptide hormone secreted by the small intestine, which increases pancreatic secretions. It is used clinically to assess the gastrointestinal function in some children with autism. Reports of dramatic reductions in autistic symptomatology subsequent to treatment with secretin evoked extensive interest in secretin as a potential treatment for autism. However, several RCT clinical trials have failed to demonstrate its efficacy (Williams et al., 2005). Perry and Condillac (2003), state that Secretin, Fenfluramine, Naltrexone and Adrenocorticotrophin (ACTH) have been demonstrated to be ineffective and/or harmful for children and adolescents with autism.

With-holding of MMR Vaccine

In 1993, a group of researchers led by Dr Wakefield at the Royal Free Hospital, London, suggested an association between both wild and vaccine measles viruses and inflammatory bowel disease (IBD), based on a small case series of children with Crohn's disease (Wakefield, Pittilo, & Sim, 1993). In 1998, the same researchers reported another series of 12 children, and described an apparently new syndrome of an unusual type of IBD associated with developmental disorders such as (but not limited to) autism (Wakefield et al., 1998). They suggested that measles-mumps-rubella (MMR) vaccine may cause IBD, which then results in decreased intestinal absorption of essential vitamins and nutrients, which may then lead to developmental disorders such as autism. Expert groups around the world have found the suggested associations weak and the studies

significantly flawed. The studies had no controls, were un-blinded, potentially biased and not designed to test aetiology or harm. The association between vaccination and autism was primarily based on parental recall, and subject to recall bias (MacIntyre & Leask, 2003). Numerous large epidemiological studies have suggested no causal relationship between the MMR vaccine (or any other vaccine) and autism (Dales, Hammer, & Smith, 2001; Demicheli, Jefferson, Rivetti, & Price, 2005; MacIntyre & Leask, 2003; Madsen et al., 2003; Patja et al., 2000).

Vitamin B6 and magnesium.

Interest in mega doses of vitamins to treat autism arose from a 1960's theory that some psychiatric disorders might be the result of relative deficiencies in certain vitamins and minerals. There has been particular interest in Vitamin B6 because it is involved in the synthesis of several neurotransmitters. Magnesium is administered with mega doses of Vitamin B6 to reduce toxic side effects. The Cochrane review of the research into the effect of this therapy did not find any studies that met the standard for clinical control trials (Nye & Brice, 2003). Sikich (2001) suggested that an overview of the limited research evidence indicates that vitamin B6 and magnesium are possibly efficacious in some autistic individuals. There are potential difficulties in administering the agents (bitterness) and the effect appears to be relatively small, even in individuals who do respond (Sikich, 2001). Howlin (1997) suggested that there are reported side effects such as sensory neuropathy, headache, depression, vomiting, and photosensitivity and urges caution in the use of large doses of vitamins.

Cranial osteopathy

This involves very gentle manipulation particularly of the head. Treatment may last several months and effects are said to range from minor reductions in hyperactivity to major improvements in communication. However there are no adequate evaluative studies of this approach (Howlin, 1997).

PSYCHODYNAMIC INTERVENTIONS

Introduction

When Kanner (1943) first described autism he initially speculated about potential biological/genetic aetiology. However he also commented on the lack of warmth shown by the parents of the children he studied and their tendency towards mechanical human interaction. Probably as a result of the prevailing psychoanalytic climate of the time, Kanner and other influential theorists, assumed that autism was an emotional disorder caused by emotionally 'cold' parents, especially mothers, who subconsciously rejected their offspring. This developed into the theory of 'refrigerator parents' or 'refrigerator mothers' despite the lack of empirical evidence to support the theory (Jordan, 1999). These theories and the treatments that sprang from them were popularized by Bettelheim (1967) who was a concentration camp survivor. He had observed first hand the extreme symptoms of social withdrawal, anxiety, depression and stereotyped behaviour resulting from trauma to the concentration camp inmates. When he observed similar behaviours in children with autism in America he assumed that these children had suffered a similar extreme trauma which could only have happened at home at the hands of the people the child spent most of his or her time with, their parents. Because parents were assumed to be the primary source of the child's disorder, removal from the home and placement in residential institutions ('parentectomy') was often recommended as treatment (Bettelheim, 1967).

There is some evidence that severely traumatised children demonstrate behaviours that are initially compatible with a diagnosis of autism. This was observed in children who had suffered severe abuse and deprivation in Eastern Europe before they were adopted into British families (Rutter, 1999), however, the response of these children to treatment showed a very different pattern to the treatment outcomes for children with autism.

Severing all ties with their 'toxic' parents and psycho-dynamically oriented play therapy were key components in the psychodynamic therapeutic process (Mesibov et al., 1997). Although the psychoanalysts claimed dramatic cures and recoveries as a result of this intervention there is virtually no evidence to support the efficacy of either removal from the parents or traditional play therapy (Jordan, 1999; Mesibov, 1997).

There continues to be some support for a psychoanalytic approach to autism today from researchers such as Hobson, (1990) who suggests it may be useful because of its emphasis on object relations and affective contact. Howlin (1997) points out that for older more able individuals with autism individual psychotherapy or counseling may help them deal with anxiety and depression arising from recognition of their difficulties and differences.

Examples of Psychodynamic Interventions

Holding Therapy

This intervention is based on the work of Tinbergen & Tinbergen (1983), who claim that autism is caused by an ‘anxiety dominated emotional imbalance’, which leads to social withdrawal and a failure to learn from social interaction. This imbalance was said to result from a lack of binding between mother and infant, which could be ameliorated by Holding Therapy. Howlin describes Holding Therapy as a “process [which] involves holding the child tightly, to ensure eye contact, with the aim of deliberately provoking distress, until he or she needs and accepts comfort.” (Howlin, 1997 p. 58). No adequate research evidence evaluating this approach was found.

Pheraplay

This approach was developed by DesLauriers (1978), who essentially proposed that autism was a failure of emotional attachment compounded by sensory impairments. Pheraplay was advanced as the best way to provide stimulating experiences intense enough to overcome the sensory impairments of children with autism. The intervention focused on providing highly stimulating interpersonal interactions rather than learning specific play skills (Mesibov, et al 1997). No adequate research evidence evaluating this approach was found.

Summary

Today, clinicians in the field of autism in Australia infrequently use psycho-dynamically oriented approaches. The evidence that autism is a developmental rather than an emotional disorder is strong and there is now empirical evidence demonstrating the ineffectiveness of these interventions (Mesibov et al., 1997).

EDUCATIONAL INTERVENTIONS

Overview

Educational interventions can be described as primarily behavioural, primarily developmental, primarily therapy based, combined, or family based. Examples are set out below.

Educational Interventions

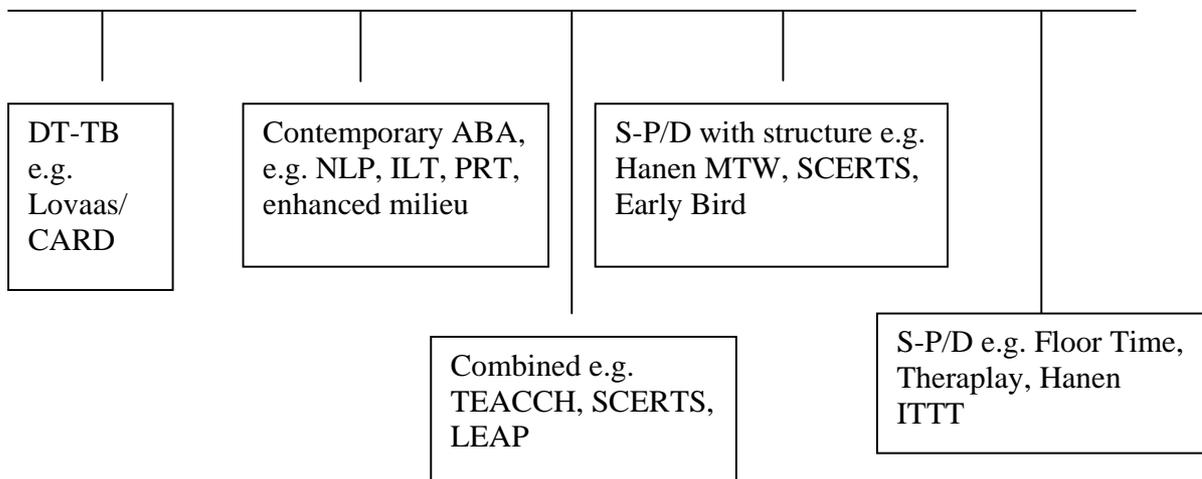
Behavioural Interventions	Applied Behaviour Analysis (ABA) (Early) Intensive Behavioural Interventions (EIBI/IBI) Contemporary ABA e.g. NLP
Developmental Interventions	Developmental Social-Pragmatic Model (DSP) Floor time Relationship Development Intervention
Therapy based Interventions	Communication Focused Interventions Visual Supports/Alternative and Augmentative Communication (AAC) Picture Exchange Communication System (PECS) Social Stories Facilitated Communication (FC) Functional Communication Training (FCT) Sensory/Motor Interventions Sensory Integration Auditory Integration Training Doman-Delacato method
Combined Interventions	SCERTS (Social-Communication, Emotional Regulation and Transactional Support) TEACCH (Treatment and education of autistic and related communication handicapped children) LEAP (Learning Experiences – An Alternative Program for Preschoolers and Parents)
Other Interventions	Higashi/Daily Life Therapy The Option Method Music Intervention Therapy Spell The Camphill Movement Miller Method
Family Based Interventions	The Hanen Program The Early Bird Program

Prizant and Wetherby (1998) suggested that educational interventions can be viewed in terms of their position on a continuum of rigorous traditional behavioural approaches (e.g. IBI/Lovaas) to the social pragmatic developmental approaches (e.g., Floor time). They noted that programs vary in terms of:

- the degree of prescription versus flexibility of teaching,
- focus on adult versus child centred procedures,
- emphasis on child initiation/response,
- response to child's behaviour,
- naturalness of learning context,
- relevance of information on child development,
- social context of intervention,
- generalisation to other environments,
- intensity, extent and frequency of direct teaching,
- utilisation of child strengths,
- type of reinforcement,
- treatment of challenging behaviour,
- type and intensity of data collection,
- recognition and utilisation of individual differences in learning,
- role of typical peers. (Wetherby & Prizant, 1998)

The continuum of educational interventions is illustrated below.

The Continuum of Discrete-Trial Traditional Behavioural to Social-Pragmatic Developmental Interventions



It is useful to examine the nature and significance of these potential differences between interventions, given the controversy and debate about the efficacy of one intervention compared to another. At the end of this section comparative research on different interventions is discussed.

BEHAVIOURAL INTERVENTIONS

Introduction

Behavioural interventions are among the most commonly used treatments for children with autism and the subject of a considerable body of research (Ian Dempsey & Foreman, 2001). This section contains (a) definitions of key terms, (b) descriptions of commonly used intervention programs, (c) a critique of the research evidence for behavioural interventions, and (d) an outline of emerging trends in behavioural programs. The information presented has been drawn from the research literature and several comprehensive reviews of autism treatments commissioned by government agencies in recent years.

Definitions

Behavioural interventions are those in which instrumental learning techniques constitute the predominant feature of the intervention approach (Francis, 2005). Grounded heavily in learning theory, behavioural interventions are built on the premise that most human behaviour is learned through the interaction between an individual and his or her environment. It is theorized therefore that human behaviour is both learned and governed by its antecedents and its consequences. Simply put, children are more likely to learn and retain behaviours for which they receive positive reinforcement (reward) and are less likely to learn or maintain behaviours for which they receive no reward (including punishment). Behavioural interventions aim to teach and increase targeted positive behaviours and reduce or eliminate inappropriate or non-adaptive behaviours through careful manipulation of the environment and the provision of contingencies.

According to McGahan (2001, p.9), "...behavioural strategies can be divided into three periodic categories:

1. *Antecedent* interventions that are implemented before a target behaviour is likely to occur.
2. *Consequence* interventions that are implemented following the occurrence of a target behaviour.
3. *Skill development* interventions or *behavioural techniques* that are designed to teach new skills and alternative, adaptive behaviours to reduce the frequency and severity of maladaptive behaviours (Cohen & Volkmar, 1997).

Current behavioural interventions tend to be comprehensive and complex, characterized by a range of intervention techniques and the provision of high levels of structure and reinforcement provided at high intensity using precise teaching techniques. Functional assessments are used to identify the most powerful reinforcement for each child. Interventions are designed to achieve long term, generalised behaviour change in target and related skill areas (McGahan, 2001). Although the approaches used in behavioural interventions are evolving, Applied Behaviour Analysis (ABA) and Discrete Trial Training (DTT) continue to constitute the core features of most behavioural intervention programs, Francis (2005).

Applied Behaviour Analysis

Applied behaviour analysis (ABA) is an intervention in which the principles of learning theory are applied in a systematic and measurable manner to increase, reduce, maintain, and/or generalize target behaviours (Sulzer-Azaroff & Mayer, 1991; Sulzer-Azaroff & Mayer, 1977). The goal of ABA is to improve *socially significant* behaviours to a meaningful degree (Sulzer-Azaroff & Mayer, 1991). These behaviours include reading and other academic skills, social skills, communication, and adaptive living skills. Adaptive living skills include gross and fine motor skills, eating and food preparation, toileting, dressing, personal self-care, domestic skills, time and punctuality, money and value, home and community orientation, and work skills (Francis, 2005). According to Sulzer-Azaroff and Mayer (1991), assessment of outcomes of the intervention are dependent upon the ongoing objective measurement of changes in observable behaviour (i.e., before and after intervention) which then informs the goal selection and decision making process for ongoing treatment and progress.

For children with autism, ABA methods are used to

- *Increase* behaviours (e.g., reinforcement procedures increase on-task behaviour, or social interactions);
- *Teach new skills* (e.g., systematic instruction, shaping, modelling and reinforcement procedures to teach functional life skills, communication skills, or social skills);
- *Maintain behaviours* (e.g., teaching self control and self-monitoring procedures to maintain and generalise task related social skills);
- *Generalise* or transfer behaviour from one situation or response to another (e.g., from completing assignments in the resource room to performing as well in the mainstream classroom);
- *Restrict* or narrow conditions under which interfering behaviours occur (e.g., modifying the learning environment);
- *Reduce* interfering behaviours (e.g., self-injury or stereotypy) (MADSEC, 2000).

Applied behaviour analysis programs are characterized by the following elements:

- The selection of interfering behaviour or behavioural skill deficit.
- The identification of goals and objectives such as learning of new skills.
- Establishment of a method of measuring target behaviours.
- Evaluation of the current levels of performance (baseline).
- Design and implementation of the interventions that teach new skills and/or reduce interfering behaviours.
- Continuous measurement of target behaviours to determine the effectiveness of the intervention.
- Ongoing evaluation of the effectiveness of the intervention, with modifications made as necessary to maintain and/or increase both the effectiveness and the efficiency of the intervention (MADSEC, 2000).

Discrete Trial Training

Discrete trial training involves breaking down specific skills into small discrete components or steps which are then taught in a graduated fashion. Often training takes place during a one-to-one interaction between a child and his or her parent or educator, and reinforcers are used to reward success at each step (Francis, 2005). Training involves the presentation of series of *trials*, each of which comprises the following four components:

- (1) The teacher or therapist presents a brief, distinctive instruction or question (stimulus) e.g. pick up your spoon
- (2) The instruction is followed by a predetermined prompt (e.g. pointing), if the child needs one, to elicit the correct response
- (3) The child responds correctly or incorrectly (response)
- (4) The teacher or therapist provides an appropriate consequence.

DTT is highly structured with the choice of stimuli, the criteria for the target response, and the type of reinforcement which is to be provided all clearly defined before each trial commences. Only the child's correct responses are reinforced whereas incorrect or off-task behaviours are ignored (Schreibman, Kaneko, & Koegel, 1991). Wetherby and Prizant (2000) noted that the initial focus is on adult control and child compliance. Despite the frequent use of verbal prompts, teaching is usually conducted with minimal contextual supports in an effort to encourage the child to develop comprehension of the adult's spoken language (Wetherby & Prizant, 2000).

Proponents of discrete trial training state that DTT and ABA are not synonymous; rather DTT represents one of several teaching strategies in the ABA tool box. Other methods used in ABA programs include chaining, shaping, and graduated guidance (Francis, 2005; MADSEC, 2000). In addition, behaviourally based interventions are also evolving to include other technologies and approaches such as the use of augmentative and alternative communication strategies e.g. the Picture Exchange Communication System (PECS). Nevertheless, the most frequently cited and recommended intensive behavioural programs (Lovaas, 1981; Maurice, Green, & Luce, 1996) continue to focus on DTT as the primary and predominant strategy for teaching children with autism.

Intensive Behavioural Intervention (IBI) or Early Intensive Behavioural Intervention (EIBI)

Intensive behavioural intervention (IBI) and early intensive behavioural intervention (EIBI) are generic terms that refer to behavioural interventions that are intensive and comprehensive. Severe behaviour disorders may be treated with intensive behavioural intervention. Proponents point out that children with autism typically do not learn from their environment spontaneously, and therefore need to be taught virtually everything they are expected to learn (Green, 1995).

Intensive interventions refer to more than the number of hours of treatment the child receives per week. Training, curriculum, evaluation, planning, and coordination are also intensive in nature. Intensive means one-to-one treatment in which carefully planned learning opportunities are provided and reinforced at a high rate by trained therapists and

teachers for at least 30 (preferably 40) hours per week, 7 days a week, for at least two years. Because true generalization of therapy effects means that newly acquired behaviours need expression in a variety of settings, with a variety of people, behavioural interventions require the expansion of the role of therapy provider to include parents, teachers, siblings, and peers. The provision of consistent therapy during interactions with parents, siblings, and peers at home and at school is central to the creation of a complete therapeutic environment which supports generalisation. (McGahan, 2000)

Examples of Behavioural Interventions

(Including extracts from McGahan, 2001, pages 11-13)

Lovaas Program

Based on principles of ABA, the Lovaas program, developed by the University of California Los Angeles Young Autism Project under the direction of Ivaar Lovaas, uses time-intensive (40 or greater hours per week) behavioural intervention techniques to treat children of two to three years of age, over a two to three year period. First stages of the program focus on teaching self-help and receptive language skills, nonverbal and verbal imitation, and the foundations of appropriate play through one-to-one DTT 40 hours per week. Parents are trained to apply the intervention during most of the child's waking hours (Dawson & Osterling, 1997). The second stage of the intervention emphasizes the teaching of expressive language and interactive play with peers. Advanced stages, taught at home and school, involve the learning of early academic tasks; socialization skills; cause-effect relationships; and learning by observation. Aggressive and self-stimulatory behaviours are managed by ignoring, time-out, shaping and the delivery of a loud "no" or slap on the thigh (Dawson & Osterling, 1997). The treatment strategy requires the presence of a therapist trained at the Lovaas Institute; thus dependence on the treatment provider may limit the generalization of treatment effects across community settings (Health Technology Assessment Information Service, 1999).

Douglas Developmental Disabilities Centre Program

Established at Rutgers University, this program is based on principles of ABA and behaviour intervention approaches (Dawson & Osterling, 1997). Children progress through three preschool classrooms, from a segregated class to a highly structured group, to an integrated preschool classroom. The segregated class provides intensive one-to-one DTT, largely based on Lovaas's model. The highly structured group maintains a two educator teaching session per child and focuses on skills needed to function in an integrated classroom. The integrated class is partially based on the Learning Experiences-An Alternative Program for Preschoolers and Parents (LEAP). The program serves both children with autism and typically developing peers. Families are visited by a staff member twice a month and are offered parent and sibling support groups (Dawson & Osterling, 1997).

May Institute

The May Institute offers a developmentally sequenced program based on the principles of ABA and behavioural intervention approaches. Intensive in-home training (15 hours per week) is provided to young children and their families for a period of six months. The in-

home therapist and parents provide one-to-one intervention focusing on basic skills such as self care, language, and the reduction of problem behaviours. Following completion of home-based treatment, the children attend one of the Institute's two preschool programs, "Step 1" class or the integrated classroom. Children attending the Step 1 class, comprised only of children with autism, learn basic skills to follow instructions, develop imitation, and work in highly structured small groups for the duration of a year. The integrated class, in contrast, includes typically developing children as well as those with developmental disabilities. The curriculum focuses on teaching skills that children need in general kindergarten. A service coordinator visits families every month, during which time the child's progress and the parent's concerns are discussed. The program offers group support and respite care for families as well as outside referral information (Dawson & Osterling, 1997).

Autism Preschool Program

The Autism Preschool Program, based at the University of Manitoba, uses a variety of behavioural and language development methods similar to the Rutgers Autism Program. It is a collaborative program staffed by a multidisciplinary team and involves the university hospital, the provincial government, and local community resources. The intervention is directed by parents and day-care staff who are taught how to perform a functional analysis of behaviour and to plan and evaluate strategies for changing behaviour (Health Technology Assessment Information Service, 1999).

Princeton Child Development Institute Program (PCDI)

The program for children with autism at the Princeton Child Development Institute is based on principles of ABA and behaviour intervention approaches. Children are first evaluated, to guide the design of individualised behaviour programs that target basic skills. Children in the day education and treatment program attend school 5.5 hours per day, five days per week, for 11 months of the year. Children participate in 30-minute classes with changes in activity and a change of classroom and teacher. Children are taught to use picture schedules to assist them with transitions throughout the day (Dawson & Osterling, 1997). It has been suggested that this arrangement of the school day assists in generalization (Health Technology Assessment Information Service, 1999). Picture schedules also help children to learn to initiate activities, make choices and encourage independence. Progress is periodically assessed and specific goals are revised. A home programmer may visit the family twice a month to help families implement behaviour programs that have been successfully achieved at school to maximize generalisation of these skills at home (Dawson & Osterling, 1997).

The IBI program in Ontario

In 1999 the Ontario provincial government in Canada began to provide support for early intensive behavioural intervention (IBI) which is the predominant form of early intervention in this province. A recent report on effectiveness of this large program using adaptive behaviour, cognitive, and symptom measures found that children had doubled the rate of their previous learning and that symptoms had significantly decreased. Outcomes were especially significant for children who began the intervention when they were less than 4 years of age and who were moderate or above in their level of development, with a significant proportion of these reaching average cognitive and

diagnostic profiles. Other subgroups within the sample showed variable outcomes, but overall this evaluation of IBI demonstrated that the intervention can be effective in a community context (Freeman & Perry, 2006).

Additional ABA programs include the Eden Programs, The Childhood Learning Centre, Yale Child Development, Bancroft, Horizon, the ABA program in Prince Edward Island, the ABA pilot program in Newfoundland, the ABA pilot program in Nova Scotia, the pilot programs in Saskatchewan and the ABA programs in Alberta. Another ABA approach is the Comparative Applied Behavioural Analysis to Schooling Program (CABAS). There are a variety of ABA curriculum instructional and training materials available for use by families and health care professionals. Social Stories and social skill development are also behavioural interventions that are used to treat children with autism (Heflin & Simpson, 1998).

Research Evidence for Behavioural Interventions

Early Intensive Behavioural Interventions

The Lovaas Method: Original Study

Lovaas (1987) conducted an evaluation of a behavioural treatment program for young children with autism, developed at the University of California, Los Angeles (UCLA). The participants were 38 children with autism under 4 years of age. The children were assigned to two groups: an experimental group of 19 children and a control group of 19 children. The experimental group received one-to-one behavioural treatment using methods of applied behaviour analysis for 40 hours per week over 2-3 years. Treatment occurred in the home and school setting. The control group received 10 or less hours of therapy a week over the same period of time. A second control group of 21 children with autism also received 10 or less hours of therapy per week through a nearby agency but no treatment input from the researchers.

Each child was assessed prior to treatment. Measures included chronological age; mental age or IQ; and observational and parent report based assessments of a range of behaviours including self-stimulatory behaviour, production of recognizable words, and emotional attachment. The children were re-evaluated post-treatment by independent assessors who were blind as to whether the child had been in the treatment group or the control group. Each child was administered an IQ test and the level of educational support they were receiving was recorded (e.g., mainstream, support class).

The following treatment outcomes were reported:

- In the treatment group, 47% passed “normal” first grade and scored average or above on IQ tests. Of the control groups, only one child had a "normal" first grade placement and average IQ.
- Eight of the remaining children in the treatment group were successful in a classroom for children with language disorders and scored a mean IQ of 70

(range = 56-95). Of the control groups, 18 students were in a class for children with language disorders (mean IQ = 70).

- Following the treatment, two students in the treatment group were in a class for children with autism or intellectual disability and scored in the profound intellectual disability range. By comparison, 21 of the control students were in a class for children with autism and intellectual disability with a mean IQ of 40.
- In contrast to the treatment group, which showed significant gains in tested IQ, the control groups' mean IQ did not improve. The mean post-treatment IQ was 83.3 for the treatment group, 53.3 for the control groups.

The outcomes reported by Lovaas (1987) were unprecedented in the study of treatments for children with autism, and have since become the subject of considerable controversy. A number of authors have raised concerns about the results, in particular the claims of 'recovery,' in light of methodological weaknesses inherent in the study. In the late 1990s, Jordan, Jones, and Murray (1998) summarised the concerns relating to the study as follows:

- The control group was, on average, six months older than the experimental group,
- the outcome measures (IQ and educational placement) may not have reflected improvements in the key areas of difficulty experienced by children with autism,
- the IQ scores were assessed using different tests and some children were administered different tests before and after the treatment making the comparison of results unreliable,
- long term follow up data was collected at different times for each group, making comparison unreliable,
- experimental and control groups were not matched for variables such as gender,
- the allocation of children to different groups was less than random assignment,
- a significant number of the referred children were excluded on the basis of their prorated mental age (PMA), thus making it difficult to draw comparisons between the experimental group and the wider population of children with autism,
- there are no indications of the variables contributing to the less favourable outcome in half of the children in the experimental group.

It is noted that many of these issues raised by Jordan et al. (1998) and other researchers, have been disputed by Lovaas and other researchers in the literature (e.g., Lovaas, Smith, & McEachin, 1989; McEachin, Smith, & Lovaas, 1993; Sallows & Graupner, 2005).

The Lovaas Method: Follow up

McEachin, Smith and Lovaas (1993) conducted follow up assessments of the children who participated in the study by Lovaas (1987) at a mean age of 11.5 years. The researchers recorded student educational placement and administered three standardized tests to each child: an intelligence test, the Vineland Adaptive Behaviour Scales (Sparrow, Balla, & Cicchetti, 1984), and the Personality Inventory for Children (Wirt, Lachar, Klinedinst, & Seat, 1977). Particularly stringent assessment measures were employed in relation to the nine children who had achieved the greatest outcomes in the original study in an attempt to rule out experimenter bias. According to McEachin et al.

(1993), eight of the nine children who achieved the best outcomes in the original study by Lovaas (1987) were indistinguishable from typically developing peers on measures of intelligence and adaptive behaviour.

The Lovaas Method: Examples of Partial Replications

Anderson et al. (1987) conducted a partial replication of the study by Lovaas (1987). The participants, 14 children with autism, received 15 hours of treatment per week from trained professionals and 5 hours a week from parents over a period of one to two years. The program was the same as that used by Lovaas (1987), with the exception of aversive methods (punishment) which were not used. The researchers reported that following treatment, 4 of the 14 participants achieved an IQ score over 80 and were educated in regular classrooms.

Birnbrauer and Leach (1993) also conducted a partial replication of the study by Lovaas (1987). The participants were 11 children, aged from 24 to 48 months at the start of the study. The researchers intended to provide an intensive program of 30 hours per week to each participant, however this proved difficult to achieve and the range of hours actually provided was 8.7 to 24.6 with a mean of 18.7 hours per week. The researchers reported that 4 of the 9 children in the experimental group, and 1 child from the control group, made substantial improvements within 24 months, achieving IQ scores over 80. However, the children continued to display poor play skills and self-stimulatory behaviours which the researchers attributed to the failure of the program to target these skills specifically.

Smith et al. (2000) compared the outcomes of an intensive behavioural program with those of a parent training program for children with autism. The participants were 15 children with autism, 13 of whom had no functional speech. The children were randomly assigned to either the behavioural treatment or parent training group. Children in the behavioural group received an average of 25 hours per week over 12 months. The hours of treatment subsequently reduced over a period of 1-2 years. The parent training group received 3-9 months of parent training. At follow-up, the intensive treatment group scored significantly higher than the parent training group on measures of intelligence, visual-spatial skills, language, and academics. There were no significant differences for adaptive functioning or behaviour problems. Participants with less severe forms of autism (PDD-NOS) appeared to have gained more. While outcomes for the treatment group were favourable, the differences between the groups were not as large as those reported in earlier studies such as that by McEachin et al. (1993).

Eikeseth et al. (2002) compared the outcomes of an intensive behavioural intervention with those of an intensive eclectic intervention for 25 children with autism. The children, aged 4 to 7 years, were divided into two groups based on the availability of professionals to supervise treatment. Children in the behavioural group received a minimum of 20 hours of intervention per week at their local school. Parents and teachers were taught to deliver the intervention which was based on the techniques outlined in Lovaas' instructional manual (Lovaas, 1981). Children in the eclectic group also received a minimum of 20 hours treatment per week at their local schools. An individualised

program was developed for each child in the eclectic group, including elements from a variety of interventions including TEACCH, sensory-motor therapists, and applied behaviour analysis (Eikeseth et al., 2002). Therapists implemented the eclectic programs in one-to-one sessions in rooms which were separate to the children's regular classrooms.

Pre- and post-assessments were conducted for each child by experienced psychologists blind to the group assignment. Standardised tests were used to assess intelligence, visual-spatial skills, language, adaptive functioning (Eikeseth et al., 2002). The group who received intensive behavioural intervention made significantly larger gains than the group who received intensive eclectic treatment. In addition, more children in the intensive behavioural intervention group achieved standardised test scores in the average range, compared with the children in the intensive eclectic treatment group Eikeseth et al. (2002). The outcomes are limited however by;

- the small sample size (n=25),
- the lack of random assignment of children to treatment groups,
- the focus on cognitive rather than social measures of learning outcomes,
- the fact that eclectic treatment sessions were conducted in separate rooms rather than the children's regular classrooms, and
- the fact that children with an IQ below 50 were excluded from the study.

In addition, Eikeseth et al. (2002) noted that although the treatments were described as intensive, they still fell well below the recommended 40 hours per week, thus making comparisons with other studies (e.g., Lovaas, 1987) difficult.

Sallows and Graupner (2005) compared the outcomes of an intensive clinic-directed behavioural intervention with those of a less intensive parent-directed behavioural intervention for 23 young children with autism. The children, aged between 24 and 42 months, were randomly assigned to the two groups. The intensive group comprised 13 children in order to replicate the parameters of the original study by Lovaas (1987). Both groups of children received treatment based on the UCLA model. The researchers intended the children in the clinic-directed group receive 40 hours of treatment per week. The average was 39 hours in the first year, 37 hours during the second year, and gradually reducing hours thereafter as children entered school. The parent-directed group received an average of 32 hours in the first year and 31 hours in the second. A battery of tests was administered to each child prior to treatment in order to measure intelligence, communication skills, and adaptive behaviour. Assessments were repeated annually and at post-treatment. The Autism Diagnostic Interview-Revised was administered pre- and post-treatment.

The results indicated that treatment outcomes across cognitive, language, adaptive behaviour, social, and academic measures were similar for both groups of children. The researchers identified 11 children (48% of participants) from both groups as rapid learners, who achieved average post-treatment scores on standardised measures and were succeeding in regular classrooms at age 7. Nevertheless, approximately one third of these children were still seen to have mild delays in social skills post-treatment. IQ scores for the other children, described as moderate learners, did not show a significant increase

following treatment. However, some changes in language and adaptive behaviour were noted. Positive post-treatment outcomes were correlated with greater pre-treatment social, language, and cognitive skills (including imitation).

The outcomes of the study by Sallows and Graupner (2005) are broadly consistent with those of Lovaas (1987). Design strengths including diagnostic rigor associated with the use of the Autism Diagnostic Interview-Revised; random group assignment; and the use of procedures supported by research such as engaging the child, using powerful motivators, and augmentative and alternative communication strategies add weight to these findings. However, consideration must be given to the relatively small sample size, the lack of a control group not receiving the treatment (both groups in the study received IBI, either clinic based or parent directed), the potential bias associated with the involvement of the authors in administering assessments (lack of 'blind' assessors), and the fact that children with IQ scores below 35 were excluded from the study. The results suggest that early intensive behavioural intervention is an effective form of treatment for children with autism. The type of program (clinic-directed or parent-directed) did not appear to influence outcomes, nor did small variations in intensity of treatment between the two groups. The lack of a non-treatment control group or a comparison group receiving a different type of intervention means conclusions cannot be drawn in relation to outcomes compared to no treatment or different treatment programs.

Behavioural Interventions in Classroom Settings

Sallows and Graupner (2005) noted that four groups of researchers have investigated the use of behavioural interventions in classroom settings. Fenske, Zalenski, Kranz and McClannahan (1985) conducted a study in which they compared treatment outcomes for two groups of children who attended the Princeton Child Development Institute's day school and treatment program over a period of up to two years. One group of children entered the program prior to turning 60 months of age; the other group entered the program after 60 months of age. The children attended the program for 5.5 hours a day, 5 days per week, and 11 months of the year. Following the program, six of the nine children in the younger group were placed in regular public school classrooms. Only one child in the older group attended a regular public school classroom at the end of the program. Although some children appeared to benefit from the program, pre- and post-test scores were not provided, there was no indication of the level of support required by the children who attended regular public school classrooms, and the lack of a control group makes it impossible to attribute positive outcomes to the intervention.

Harris, Handleman, Gordon, Kristoff, and Fuentes (1991) assessed changes in language and IQ scores after one year for a group of children with autism and their typically developing peers attending the Douglass Developmental Disabilities Centre. Nine children with autism were assessed before and after the intervention using the Stanford-Binet IV and 16 children were assessed using the Preschool Language Scale. No explanation was provided in relation to selection of children for each assessment. The authors reported that, on average, the children with autism made a 19 point increase in IQ and an 8 point increase in the language quotient following the program (Harris et al., 1991). However, no explanation of sampling methods was provided, the children with

autism were higher functioning with a mean pre-intervention IQ of almost 70, very little description of the intervention goals and program was provided, the assessors were not blind to the status of the participants and no control group was employed. Consequently, caution must be exercised when interpreting these results.

In more recent studies, reviewed by (Sallows & Graupner, 2005); Meyer, Taylor, Levin, and Fisher (2001) provided 30 hours of intervention during class time to 26 children with autism over a two year period. The researchers reported that 7 of the 26 children were attending regular classrooms, three and a half years on, but five of these required support services, Romanczyk, Lockshin, and Matey (2001) provided 30 hours of intervention per week to a group of children during class time over a period of 3.3 years, 15% of whom were discharged to regular classrooms. However, these studies contained methodological weaknesses, particularly in relation to the absence of pre- and post-test scores and information about the ongoing support needs of the students in their regular classrooms. Therefore, although positive results have been reported from classroom based behavioural intervention programs, at present there is no conclusive evidence to support the efficacy of this approach. The methodological rigor applied in more recent studies of behavioural interventions in other settings (e.g., Sallows & Graupner, 2005) is not evident in studies of classroom based programs.

Parent Managed Home Based Behavioural Interventions

Following the positive outcomes reported by Lovaas (1987), many families have sought intensive behavioural interventions. However, a lack of appropriately trained professionals has forced many families to take responsibility for running their own programs, often with the intermittent support of a consultant (Johnson & Hastings, 2002). A number of professionals have questioned the extent to which the findings of Lovaas (1987) and other clinic based programs might be replicated in parent managed home based behavioural interventions (Mudford, Martin, Eikeseth, & Bibby, 2001). In an attempt to address this question, Mudford et al. (2001) conducted a review of program data for 75 young children with autism receiving parent managed home based intensive behavioural interventions through 25 behavioural consultants in the UK. The researchers reported that the majority of children started treatment later than those in the Lovaas (1987) study and 16% failed the minimum IQ criterion. The children experienced fewer hours of treatment (mean 32 hours per week compared to 40 hours) in their programs and were relatively infrequently supervised. Only 21% of the programs received supervision from staff accredited to provide the Lovaas program.

Mudford et al. (2001) concluded that none of the intensive behavioural programs in their sample followed the UCLA program employed in the original study by Lovaas (1987). Consequently, there was no basis on which to assume that the outcomes of the original study, including claims of 'normal functioning' for some children, would be replicated in the parent managed home based interventions. The review illustrated the difficulty inherent in producing a faithful replication of the Lovaas program outside a university setting. This has significant implications for the potential outcomes of parent managed home-based IBI programs and suggests that parents who initiate and manage these programs may require more assistance from intensive behavioural intervention service

providers to bring their children's programs closer to the empirically supported UCLA protocols. Sallows and Grauper (2005) reported that parent managed programs were as effective as the clinic based program in their study. It would be important to determine the amount of support parents had from the researchers and how this parent managed program compared with other parent based IBI programs.

In a second study, Bibby, Eikeseth, Martin, Mudford and Reeves (2002) examined treatment outcomes for 66 children whose intervention programs featured in the review by Mudford et al. (2001). Outcomes for the children were assessed after a mean of 31.6 months of parent managed home based intensive early intervention. The assessment tools were the same used in the study by Lovaas (1987) in order to facilitate comparison of outcomes in the two studies. The researchers reported no change in IQ scores for the children. However, scores of adaptive functioning, as measured using the Vineland, had increased significantly, as had scores of mental age (Merrill Palmer). They suggested that although the interventions appeared to result in changes in language skills, adaptive skills, and intellectual functioning for some children, the results did not replicate those of Lovaas (1987). The authors suggested that differences in the context of intervention, the children's skills, and the nature and intensity of the programs may have all contributed to the discrepancy in outcomes.

Johnson and Hastings (2002) examined facilitating factors and barriers to the implementation of home based IBI programs. The researchers found that recruiting experienced, trained staff, funding, and personal/family resource constraints were the most frequently cited barriers. On the other hand, having a supportive committed team, financial resources, and the support of family and friends were the most frequently cited facilitators. The quality of the program team was both the most frequently cited barrier and facilitator. In particular the paucity of supervisory and consultant level staff with ABA expertise was found to be a problem.

Considerations and Limitations noted in Behavioural Research

Staff Expertise

Smith (1993) emphasised the importance of prolonged and expert training for therapists. This may not be generally available. There are issues about the expertise, training, and close supervision required to maintain treatment integrity. Smith (2000) suggested that staff shortages, scheduling conflicts and illness make the logistics of arranging for intensive treatment "...formidable...and may pose more of an obstacle to replication than ...previously acknowledged" (p283). The difficulties in finding adequately trained and experienced staff is also highlighted in a review of parent managed intensive behavioural intervention programs in the UK (Mudford et al., 2001).

The Use of Aversive Consequences

There has been considerable debate about whether the original outcomes reported by Lovaas could be replicated without the use of aversives. Lovaas himself noted that it is "...unlikely that treatment effects could be replicated without this component" (Lovaas,

1987, p8). Similarly, McEachin et al. (1993) specifically identified the use of contingent aversives as one of the distinguishing factors that can account for the success of this program over others. However, current statements about Lovaas style intensive behavioural programs emphasise that aversives are no longer used, and findings by Sallows and Graupner (2005) indicate that such programs without aversives are effective for some children with autism.

Intensity of IBI Programs

There is no conclusive evidence for the optimal intensity of early behavioural programs. A number of researchers (e.g., Anderson et al., 1987; Sheinkopf & Siegal, 1998; Smith et al., 2000) have suggested that the smaller gains made by the participants in their studies compared to the original group in the Lovaas study (1987) were a result of fewer hours of treatment per week. Children in the studies by Birnbrauer and Leach (1993) and Sheinkopf and Siegal (1998), for example, failed to achieve 'a normal development stage' by the end of therapy. In both studies the children received about half (20 hours per week) the intervention intensity described in Lovaas' (1987) original study. The authors attributed this reduced effect to the reduced intensity of the program, however there are other potential contributing variables in addition to the issues related to the claims of 'recovery' and the achievement of 'normal functioning.'

Sallows and Graupner (2005) found little difference between a group of children who received a more intensive clinic-directed behavioural intervention and a group of children who received slightly less intensive parent-directed therapy. The children were similar across measures of cognitive, language, adaptive, social, and academic skills. Further research is needed in order to ascertain the extent to which treatment intensity determines intervention outcomes for children with autism as well as the optimum level of this intensity.

Claims of 'Recovery'

Claims for 'recovery' or 'cure' have led to the most controversy. There seems little contention that IBI programs produce positive outcomes for children with autism. Mesibov (1993) stated that it is not surprising that such intensive intervention should result in positive and lasting results, particularly as behavioural approaches have been used effectively with children with autism for many years. However, the extent of the positive outcomes reported in studies of some intensive behavioural intervention programs, particularly those that claim to produce 'normal' functioning, is questionable.

The authors of a report by the British Columbia Health Technology Assessment (BCOHTA, 2000) have suggested that Lovaas and his research colleagues have not limited their effectiveness claims to achieving developmental gains. Instead, that they have permitted, and even fostered, the premise that appears throughout the published literature associating their therapy with a notion of achieving 'normal functioning' for as many as half a given population of children with autism. Mesibov (1993) also queried the magnitude of the changes reported by Lovaas (1987) and McEachin et al. (1993), and what they mean in real terms.

Smith, co-author in the study by McEachin and Lovaas (1993), provided a somewhat more cautious interpretation of the research evidence in terms of achieving normal functioning: “It is encouraging that debates over how much and what kind of early intervention children with autism should receive have largely replaced debates over whether such intervention merits particular attention at all.” (p. 45). He also stated in relation to the study in which he was involved, that while results have been impressive there are limitations in the studies done to date. Replications were required utilising improved research methodologies (McEachin et al., 1993). Howlin (1997), in a review of long term treatment outcomes, indicated that most children require ongoing support in school and in later life, regardless of treatment program.

Definition of ‘Normal Functioning’

Mundy (1993), argued that the term normal functioning might be inappropriate, given the research of Dykens, Volkmar and Glick (1991) and Szatmari, Bartolucci, Bremner, Bond and Rich (1989) which shows that high-functioning people with autism may display relatively good adaptive skills and social outcome, yet still have a significant disability related to unusual thought processes and obsessive thoughts and concerns. Howlin (1997) concluded that the Lovaas program confirms the importance of behavioural interventions but cautions that more research evaluating these programs is required to establish the outcomes in different areas of functioning and cost effectiveness in terms of money and resources.

Behavioural Interventions Targeting Specific Skills

This review focuses on comprehensive behavioural interventions which aim to address a broad range of skill and developmental areas. However, it is important to acknowledge the vast body of research that has examined the use of behavioural interventions for targeting specific skill development in children with autism. Behavioural interventions have been used to treat undesirable behaviours (e.g. self injury, aggression); language development (e.g. receptive and expressive skills, augmentative communication), daily living skills (e.g. self-care, domestic skills); community living skills (e.g. vocational, public transportation and shopping skills); academic skills (e.g. reading, maths, spelling, written language); and social skills (e.g. reciprocal social interactions, age-appropriate social skills) (MADSEC, 2000). Research into the use of behavioural interventions to address specific skills in children with autism began in the 1960s, with comprehensive evaluations beginning in the early 1970s.

DeMeyer, Hingtgen, and Jackson (1981) reviewed over 1,100 studies published during the 1970s. The researchers examined studies that included behaviourally based interventions as well as interventions based upon a wide range of other theoretical foundations. Following a comprehensive review of these studies, the authors concluded that “...the overwhelming evidence strongly suggests that the treatment of choice for maximal expansion of the autistic child’s behavioural repertoire is a systematic behavioural education program” (p.435). Mesibov (1998) came to similar conclusions, commenting that of all the interventions used with children, research evidence suggests that behavioural interventions had been the most effective. These interventions included

the early behavioural programs which emphasised operant conditioning, as well as more recently developed cognitive behavioural approaches for higher functioning individuals which focus on observable behaviours and apply learning theory. Most contemporary educational programs for children with autism incorporate at least some behavioural strategies.

Summary of Research Evidence for Behavioural Interventions

There is universal agreement well supported by evaluation research, that behavioural interventions have produced positive outcomes for children with autism. However, there continues to be a great deal of controversy about particular behavioural interventions and programs and differences in the interpretation of research findings. Early intensive behavioural intervention programs, exemplified by the Lovaas program which uses ABA and DTT, are among the most controversial intervention strategies for children with autism (Heflin & Simpson, 1998; Lovaas et al., 1989). This controversy revolves around outcome claims, exclusivity, extensive use, and personnel.

The authors of the BCOHTA (2000) systematic review draw the following conclusions in relation to intensive behavioural intervention programs:

- The Lovaas (1987) and McEachin et al. (1993) studies, while methodologically stronger than published reports of alternate comprehensive therapies, are inadequate to establish the degree to which this form of therapy results in children achieving 'normal' functioning, however defined.
- There is insufficient evidence of effectiveness to establish a relationship between the amount (per day and total duration) of any form of early comprehensive treatment program and overall outcome.
- Randomised trials of alternative early intensive treatment programs are ethical and feasible to advance research knowledge.
- There is insufficient evidence of effectiveness to conduct a cost-benefit analysis of early, intensive treatment programs in terms of 'normalisation' of children diagnosed with autism. It remains the case that without a soundly based determination of the extent to which the intervention may result in benefit, and the degree of any such benefit, cost-benefit analyses have no basis on which to proceed.

However, it is essential to specify the nature of the behavioural intervention being discussed. Behavioural interventions may range from use of a social story program to a discrete trial training program but all behavioural interventions have in common the underlying assumption that the symptoms associated with autism can be reduced by manipulation of the observable interaction between the individual and his/her environment, and in particular through the objective measurement of change in observable behaviour. Blanket statements about the effectiveness of behavioural interventions may be misleading, given the variation in children, families, therapists, contexts, and methods that is almost invariably seen amongst programs. Howlin (1997) concluded that the benefits of behavioural interventions are particularly striking when parents are involved in therapy.

Recent Developments in Behavioural Interventions

In recent times behavioural interventions have been expanded to include understanding of the importance of the physical and social contexts in which communication occurs, resulting in interventions that blend operant conditioning with contextual awareness (Diehl, 2003). Programs may take account of what is motivating for the child and what they are most likely to want to communicate about (e.g. communicative temptations). This has given rise to a number of new and hybrid interventions. These interventions are often described as **Contemporary ABA**. There is a varied and at times limited amount of research into the programs and approaches discussed in this section, reflecting a need for more comprehensive, well designed evaluation studies.

Positive Behavioural Support

(PBS) is a process whereby individuals are assisted in acquiring adaptive, socially meaningful behaviours and encouraged to overcome maladaptive behaviours. The primary goal of positive behavioural supports is to teach functional skills as a replacement for problem behaviour. Positive behavioural support plans typically involve changing existing environments in a manner that makes problem behaviours irrelevant, ineffective and inefficient (Horner, O'Neill, & Flannery, 1993). Applied behaviour analysis methods of instruction are emphasized within positive behavioural support interventions to increase pro-social behaviour, while concurrently decreasing maladaptive behaviours.

Functional Assessment

Functional Assessment is the process of gathering information that can be used to maximize the effectiveness and efficiency of behavioural support interventions. Primary outcomes of functional analysis include (a) a description of the problem behaviour; (b) identification of events, times and situations predictive of problem behaviour; (c) identification of consequences that maintain behaviour; (d) identification of the motivating function of behaviour; and (d) collection of direct observational data (O'Neill et al., 1997).

Several studies have demonstrated that interventions based on the results of comprehensive assessments and analysis of the function of the particular behaviour have a much higher probability of being effective than those interventions based upon traditional forms of assessment (e.g., norm-referenced, intellectual/achievement/behavioral, projective personality, anecdotal observations and unstructured interviews) (O'Neill et al., 1997; Repp, Felce, & Banton, 1988).

Functional Communication Training

The goal of functional communication training is to teach an individual to use appropriate communication to obtain a desired item instead of engaging in problem behaviour. "Errorless" teaching is used in some programs to teach new or challenging information or skills. Applied behaviour analysis is used to maximize learning by ensuring that the individual experiences success and is somewhat dependent upon the skill and expertise of both the program developer and the therapist (see section on communication therapies).

Naturalistic Teaching

In response to the failure of many traditional discrete-trial interventions to result in generalized learning, behavioural researchers have developed and introduced a range of *naturalistic teaching* approaches. Incidental teaching (Hart & Risley, 1975), the Natural Language Teaching Paradigm (R. L. Koegel, O'Dell, & Koegel, 1987), and Pivotal Response Training (L. K. Koegel, Koegel, & Carter, 1998) have all been developed with the intention of achieving a more naturalistic approach to enhancing language and communication development for children with autism. These approaches are based, in part, on principles and interactive processes drawn from the developmental literature on caregiver-child interaction and developmental pragmatics, as well as ABA (Wetherby & Prizant, 2000).

The most striking differences between traditional discrete trial approaches (TB-DT) and contemporary ABA approaches are as follows:

- The control of the interaction is either shared or shifted from the trainer to the child. Child preferred and child selected activities provide the primary contexts and topics for communication exchange.
- Choices are offered rather than trainer imposed selections.
- Play and group therapy incorporating Pivotal Response Training (Schreibman & Pierce, 1993) focuses on increasing motivation to learn in children with autism, by allowing them choices, reinforcing attempts at correct responding, using adequate modelling, and providing natural consequences (Ian Dempsey & Foreman, 2001).

Pivotal Response Training has also been used to assist participants to develop an understanding of social roles and social events by teaching the child to be responsive to many learning opportunities and social interactions that occur in the natural environment (Simpson et al., 2005). Positive changes have been reported in play, language, and social skills. This is encouraging, given the observation of Sigman (1998) that “representational play skills as a predictor of gains in language over time has strong theoretical and empirical support” (p. 822). However, generalisation of these skills to other interactions and settings has been limited (Thorp, Stahmer, & Schreibman, 1995).

DEVELOPMENTAL INTERVENTIONS

Developmental or relationship based interventions focus on the child's ability to form positive, meaningful relationships with other people. Generally, the aims of these programs are to help children to "...attend, relate, interact, experience a range of feelings, and, ultimately, think and relate in an organized and logical manner" (Atchison et al., 1997, p.50). Developmental Interventions are also known as normalized interventions.

Developmental Social-Pragmatic Model (DSP)

The DSP approaches take a step further than the contemporary ABA models in the emphasis on the importance of initiation and spontaneity in communication, following the child's focus of attention and motivations; building on the child's current communicative repertoire, even if this is unconventional; and using more natural activities and events as contexts to support the development of the child's communicative abilities (Wetherby & Prizant, 2000). The DSP approach is characterised by the following features:

- The focus of intervention is on enhancing the child's spontaneous social communication within a flexible structure and with varied and motivating activities.
- There is an emphasis on helping the child to develop multimodal communicative repertoires (e.g. speech, song, gestures) in order to provide the child with a range of strategies to express intentions (see section on communication programs, page 57).
- The extent to which interactions are characterized by shared control, turn taking, and reciprocity.
- Intervention is provided in learning contexts involving meaningful activities or events, chosen for interest and motivation.
- The relevance of the child's communicative behaviour is considered with reference to the ongoing context and activities, including acknowledgment of unconventional means or behaviours as legitimate attempts to communicate.
- A variety of social groupings are incorporated into the program because the child's life experiences will involve increasingly complex social experiences.
- Information about sequences and processes of child development is used to frame the sequence of goals and to measure progress in a broader developmental context.
- Contextual supports (e.g. visual and gesture cues) are seen as essential to help the child make sense of activities and interactions rather than to 'strip down' learning contexts into discrete components or skills.
- There is a focus on helping the child acquire a socially acceptable means for social control (e.g. means to protest, means to make choices) to preclude the development of challenging behaviours.
- Emotional expression and affect sharing are seen as central to the interactive and learning process.

The DSP approach puts more emphasis on understanding sequences of language development in children with autism and less emphasis on eliciting and measuring

discrete trial behavioural responses as a primary measure of success. The DSP approach focuses on helping the child to participate successfully in extended interactions which are regarded as the measure of success, targeting multiple goals within one activity rather than counting isolated behaviours, and focusing on the interdependency of different aspects of development. Greater emphasis is placed on enhancing communication abilities within meaningful events and routines. Finally, most DSP approaches emphasise developing communication skills within the context of developing relationships and socio-emotional growth. In contrast, the role of affect and emotional expression in motivation and learning is minimised in traditional behavioural approaches (Wetherby & Prizant, 2000).

Delprato (2001) completed a review of the literature, comparing the outcomes of studies involving the use of TB-DT approaches and studies involving the use of ‘normalised language interventions’. He concluded, on the basis of the studies he reviewed, that “normalised language intervention seems capable of producing more successful acquisition and generalisation performance” (p 322) when compared with discrete trial training. In addition, studies reviewed by Delprato, such as Koegel, Bimbela and Schreibman (1996) and Schreibman, Kaneko, and Koegel (1991) found that naturalistic interventions had a greater positive effect for the parents of children with autism than did those involving behavioural treatments. Parents using developmental or ‘naturalistic’ techniques were happier, less stressed and felt they communicated better with their child than parents trained in discrete trial training (Koegel et al., 1996).

Greenspan’s DIR/“Floor Time”

Over the past 20 years, Stanley Greenspan and colleagues have published numerous articles on theories of child development. Only one relates specifically to children with autism; others may include references to autism among an array of disabilities. At the National Centre for Clinical Infant Programs, Greenspan and his colleagues have worked with children with a wide range of disabilities from infancy through to age 10. Greenspan and others have created a developmentally based intervention for early intervention with infants and children with disabilities, titled Developmental Individual-Difference, Relationship-Based Model (DIR). This is also commonly referred to as the “Floor Time” approach (Greenspan, 1998).

Floor Time is based upon Greenspan’s theories of six functional milestones necessary for a child to succeed in further learning and development. According to Greenspan (1998), these are:

- The dual ability to take an interest in the sights, sounds and sensations of the world and to calm oneself down.
- The ability to engage in relationships with other people.
- The ability to engage in two-way communication with gestures.
- The ability to create complex gestures, to string together a series of actions into an elaborate and deliberate problem-solving experience.
- The ability to create ideas.
- The ability to build bridges between ideas to make them reality-based and logical.

DIR/Floor Time includes interactive experiences, which are child directed, in a low stimulus environment, ranging from two to five hours a day. During the preschool program, DIR/Floor Time includes integration with typically developing peers. Greenspan contends that interactive play, in which the adult follows the child's lead, will encourage the child to 'want' to relate to the outside world. Furthermore, Greenspan (1998) stipulates that the program should begin as soon as the child is identified as the longer children are uncommunicative, the more difficult parents find relating to them and the more the children withdraw. According to Greenspan (1998), intervention must transform perseveration into interaction. Once this occurs, he theorizes that the child becomes purposeful, and can imitate gestures, sounds, and play. Greenspan (1998) claimed that "We have worked with a number of children diagnosed with autism or PDD-NOS between the ages of 18 and 30 months who, now older, are fully communicative (using complex sentences adaptively), creative, warm, loving, and joyful" (p.3).

In the process of this review, no independent, peer-reviewed, published studies of Greenspan's DIR/Floor Time's effectiveness for children with autism were identified.

Responsive Teaching

Responsive Teaching (RT) has been described by its authors as "...a new, comprehensive developmental intervention curriculum designed to be used with children up to six years of age who have, or are at-risk for, developmental and social emotional problems" (Responsive Teaching National Outreach Project, 2006). The program is parent-mediated, grounded in contemporary child development theory, and has both transdisciplinary and multidisciplinary applications. The program focuses on helping parents to interact more responsively to their children (Mahoney & Perales, 2005). In addition, a structured curriculum focuses on helping children to develop key pivotal behaviours related to cognition, communication, social emotional functioning, and motivation (Responsive Teaching National Outreach Project, 2006).

Mahoney and Perales (2005) evaluated the outcomes of Responsive Teaching for 20 young children with pervasive developmental disorders including autism. The children, aged 2 to 5 years, and their parents received weekly 1-hour sessions over a period of 8 to 14 months aimed at enhancing the children's socio-emotive development. Children in turn received, on average, 18.6 hours of intervention per from their parents. Pre- and post-test data indicated that mothers' responsiveness to their children increased. Increases were also noted in the children's social cognitive and communication functioning and their scores on standardised measures of social-emotional functioning. The authors noted that the changes in the children's socio-emotional functioning appeared to be associated with increases in parent responsiveness. However, they also noted that it was not possible to establish causality due to limitations in the research design including the lack of a control group. Other limitations of the study include the lack of representative sampling, the heterogenous nature of the group (children with the range of pervasive developmental disorders), the failure to provide measures of the participants' cognitive functioning, and the fact that not all parents increased their responsiveness following the intervention. Further research and replication of these results is required to establish the efficacy of Responsive Teaching. In addition, consideration must be given to the fact that not all

parents responded to the intervention. Research is needed to identify factors which might influence the acceptability of this approach to parents.

Relationship Development Intervention (RDI)

Relationship Development Intervention (RDI) (Gutstein, 2000; Gutstein & Sheeley, 2002) is a series of techniques and strategies built upon the typical developmental processes of social competence. The goal of RDI is to increase motivation and interest in social relating in individuals with autism and to provide activities and coaching to assist them to enjoy and become competent in social relationships. Programming is individualised and based on the Relationship Development Assessment. Once a child's relationship level is determined, an individualised program is prepared, and coaches are trained to implement the program and support the acquisition of skills. RDI has been reported to offer benefits to children with autism, especially those who have 'higher functioning' cognitive skills. The program offers a number of strategies for supporting the social development of children with autism and raises questions about partner interactions with a strong emphasis on the use of declaratives (Letso, 2006). However, these claims have not been tested using well designed, controlled, independent research studies.

In a preliminary evaluation, Gutstein (Accepted for Publication, cited in Letso, 2000) compared the outcomes of 17 children who received RDI with 14 children who received other programs. The participants who received RDI were reported to have demonstrated greater improvement in ADOS scores, and independent classroom functioning than the participants who received other programs. However, the methodological problems and limitations of the study are extensive and preclude any confidence being placed in the findings. Given that more comprehensively evaluated programs exist for the treatment of autism, RDI should be considered an adjunct to those other interventions which have been shown to be effective (Perry & Condillac, 2003).

THERAPY BASED INTERVENTIONS

Therapy based interventions typically focus on communication and social skill development (Speech Pathology) or sensory motor development (Occupational Therapy). These interventions are likely to be used in conjunction with other interventions.

Communication Focused Interventions

A number of communication focused interventions are commonly used with children with autism. These may be used in isolation or integrated into a more comprehensive program. The term 'augmentative and alternative communication' (AAC) is used to encapsulate many of these strategies. AAC strategies include the use of picture symbols, manual signing, and speech generating devices. In this review, each communication strategy is described separately so that distinctions can be made in relation to the unique nature and purpose of each approach.

Visual Strategies & Visually Cued Instruction

Visual supports and strategies are commonly used with children with autism, both in isolation and in conjunction with other programs. Visual supports and strategies are used to facilitate expressive and receptive communication (Augmentative and Alternative Communication (AAC), learning, information processing and navigating the physical and social environment. Real objects, object remnants, miniature representations of objects, visual graphic symbols, line drawings, and orthographic symbols may be used to support both expressive and receptive communication. According to Quill (1997), the use of stable, iconic symbols matches the processing style strengths, and the cognitive profile features of children with autism, including characteristics such as difficulty shifting attention, better visual-spatial skills than auditory skills and better memory for non-verbal material. In addition, Tager-Flusberg (1991) found that retrieval cues supported children's recall of language information and as a result visual supports may have a facilitating effect on language and conversation.

A small number of studies have been conducted examining the effectiveness of visual strategies and visually cued instruction for children with autism. These have included the use of visual schedules, visual symbols to support choice making, and visual symbols to support comprehension such as through the use of aided language stimulation (Mirenda, 2001). Although positive outcomes have been reported, no large, comprehensive, and well controlled studies have been conducted. However, visual symbols are undoubtedly useful in conjunction with and as part of more comprehensive educational interventions. This is exemplified in the SCERTS program and TEACCH program where visual supports are an integral component and are used in the context of the broader educational approach.

Manual Signing

Manual signing has long been used to support the comprehension and expression of children with autism. According to Jordan, Jones, and Murray (1998), manual signing was the most commonly used AAC strategy for children with autism and learning difficulties in the UK in the 1990s. Proponents argue that manual signing makes communication 'visual' for children with autism and may augment and facilitate the development of speech. In addition, it has been suggested that the act of using manual signs inadvertently slows communicative interactions between communication partners and children with autism, thus allowing greater time for the children to process the spoken communication. Mirenda (2003) conducted a review of research outcomes for children with autism who used AAC, including those who use manual signs. Mirenda noted that the available research suggests that manual signing (also known as total communication) results in children acquiring receptive and expressive vocabulary more rapidly than when speech alone is used. However, (a) the studies generally involved the children learning to 'label' objects in clinical contexts rather than using the signs to express other pragmatic functions (e.g., requests), and (b) that the outcomes for different children varied, possibly due to differences in their fine motor abilities (Mirenda, 2003). Consequently, although there is preliminary evidence to support the use of manual signing with children with autism it has limitations and should be used as an adjunct to other approaches and programs which have been the subject of more rigorous research.

Picture Exchange Communication System (PECS)

The Picture Exchange Communication System (PECS) is a program that teaches children to interact with others by exchanging pictures, symbols, photographs, or real objects for desired items. The goals of PECS include (a) the identification of objects that may serve as stimuli for each child's actions and (b) the learning of responses to simple questions with multi-picture systems. The Picture Exchange Communication System is a highly structured program that uses behavioural principles of stimulus, response, and reward to achieve functional communication. The program claims to teach children to initiate communication and to generalise these skills to a variety of objects and communicative partners (Schwartz, Garfinkle, & Bauer, 1998). The manual that accompanies this method of teaching describes procedures as empirically tested and describes very positive results (Atchison et al., 1997; Bondy & Frost, 1994). The PECS is an example of a behavioural program that uses ABA to teach functional communication via the strong visual modality characteristic of children with autism. This is in contrast to the oral/aural focus on speech development of the more traditional behavioural programs (e.g., Lovaas, 1987).

There are few well controlled studies that have evaluated PECS. Schwartz et al. (1998) conducted two studies that looked at the rate of acquisition of PECS and the program's effect on communication across settings and modalities in children with a range of disabilities including autism. All the children mastered the stages of PECS but the study was limited by the lack of a control group, the reliance on pre-school records for information, and the heterogeneous group of children studied. The second study indicated that the children increased their communicative functions and showed generalisation to settings outside the teaching situation. About half of this group developed spontaneous speech by the end of the PECS training and were found to continue to make gains in their verbal skills during observations after the end of the PECS teaching. Charlop-Christy,

Carpenter, Loc, LeBlanc and Kellet (2002) studied three children with autism to determine the rate of acquisition and the effect on the children's verbalisations. They found that the children acquired the skills in an average time of 170 minutes and showed increases in their mean length of utterance. The findings of increased verbal speech in the latter two studies is an interesting phenomena given that functional communication, rather than verbal speech is the aim of the program and that the program has been criticised for the lack of emphasis on verbal skills (Richards, 2000).

Social Stories

Social stories were originally developed by Carol Gray (Gray & Garand, 1993) in order to explain social situations to children with autism and help them to learn appropriate responses to social cues. A basic social story consists of descriptive sentences, which help children understand and pick up on cues in their environment (e.g., "*The bell rings and then the children go to class*"), perspective sentences that explain how the situation affects other people ("*My teacher is happy when the children listen*"), and directive sentences that tell children how to respond ("*I can try to use a quiet voice in class*"). While social stories may help to teach children with autism how to manage their own behaviour, there are few independent empirically sound studies into the efficacy of this approach.

Richards (2000) suggested that social stories can be effective with a range of children and situations but cautions that children's comprehension of the language and format of the story must be carefully evaluated and the story adjusted appropriately. He also noted that since the social story format is published and accessible, teachers, parents and professionals alike are able to learn and apply the format. To date, only four studies have been conducted involving a small number of school age children (Mirenda, 2001). While findings were positive, larger studies are required including studies involving younger children to gauge the effectiveness of using social stories with preschool aged children with autism.

Speech Generating Devices

Speech generating devices (SGDs) are being used increasingly to support both the receptive and expressive communication of children with autism (Mirenda, 2001). The simplest SGDs store a single pre-recorded message, which is produced in the form of digitised speech when the person using the device presses a button, switch, or key. The most elaborate SGDs feature software that allows users to create and combine words to produce novel utterances in the form of computerised synthetic speech. Research has indicated that SGDs may offer benefits for children with autism. The combination of visual graphic symbols with consistent speech output may complement the visual learning style and preference for sameness demonstrated by many children with autism (Sigafoos & Iacono, 1993). In addition, communication partners may benefit from the production of clear, unambiguous messages (Mirenda & Schuler, 1988).

For children with autism, SGDs have been shown to be effective in supporting comprehension (Schlosser, Blischak, Belfiore, Bartley, & Barnett, 1998), improving spelling (Ronski, Sevcik, Robinson, Mervis, & Bertrand, 1995), promoting symbol learning (Ronski, Sevcik, & Wilkinson, 1994; Schepis, Reid, Behrmann, & Sutton, 1998), increasing interactions with adults and peers (Schepis et al., 1998), and supporting the expression of wants and needs (Dyches, 1998; Sigafoos, Didden, & O'Reilly, 2003). Mirenda et al. (2000) conducted a retrospective analysis of the technology use by individuals with autism within the British Columbia education system over a five year period. The researchers reported that SGDs were most commonly prescribed for students with autism for the purposes of addressing communication needs, supporting the development of literacy skills, and facilitating social interactions. The majority of SGDs were used successfully, particularly by younger students with moderate to severe intellectual disabilities (Mirenda et al., 2000). Nevertheless, further research is required to examine (a) which children are most likely to benefit from the use of a variety of SGDs (b) to identify the most effective strategies for supporting their introduction and use, and (c) to what extent this experience fosters the children's general adaptive functioning.

Facilitated Communication

Facilitated Communication is a form of assisted communication first introduced to the US in 1990 by Donald Biklen (National Autistic Society, 1994). It is based on the work of Rosemary Crossley in Victoria, Australia with people with cerebral palsy. Crossley's therapy involved teaching communication by physically prompting to form a pointing finger, supporting the hand as a point is made, and assisting withdrawal from the point. The rationale for the therapy was based on the difficulty experienced by people with cerebral palsy in making and controlling movements. The claim that communicative intentions and thoughts of the person with a disability can be revealed if sensitive support is given to directing hand movements has received widespread publicity and led to considerable controversy. Biklen and others proposed that people with autism could also communicate using FC. Proponents proposed a re-conceptualisation of autism (Mesibov et al., 1997). Autism was suggested to be primarily a motor disorder involving difficulty producing voluntary movement, (apraxia) and therefore precluding the production of speech (Howlin, 1997). Rather than accepting that 80% of people with Autistic Disorder also have intellectual disability, proponents suggested that FC reveals at least average intelligence and great sensitivity in virtually all people with autism (Mesibov et al., 1997).

At the peak of its use in some states in America, children with autism, who had been assessed as having additional severe learning difficulties and who had no speech, were being taken out of special schools and put into mainstream classes to follow an age-appropriate mainstream curriculum with the help of their facilitator. Extensive research has been done to determine the efficacy of FC for people with autism. No evidence has been found of consistent, useful or spontaneous communication using this method (Edelson, Rimland, Berger, & Billings, 1998). Howlin (1997) and Prior & Cummins (1992) considered the research into the efficacy of FC. Howlin (1997) found that across 45 studies, independent communication was confirmed in only 6% of a total of 359 participants in that in the majority of the 6%, responses were often only partially correct

and generally consisted of minimal one word answers. Howlin concludes that the negative outcomes associated with the widespread use of FC for people with autism (in the US and UK) are cause for major concern. These outcomes include increasing passivity, channelling of educational resources to FC to the detriment of other programs, unrealistic mainstreaming of students and most disturbingly, unfounded allegations of physical/mental/sexual abuse against parents or carers. As a result of these concerns in 1994 the American Psychological Association adopted the resolution that 'Facilitated Communication is a controversial and unproved procedure with no scientifically demonstrated support for its efficacy.'

Functional Communication Training (FCT)

FCT is a behavioural strategy for teaching people with autism to use signs or other AAC techniques as substitutes for the 'messages' underlying their challenging behaviour. FCT interventions teach the individual to communicate one or more functional messages, while at the same time they provide a positive alternative to his or her challenging behaviour (Keen, Sigafos, & Woodyatt, 2000). Mirenda (1997) conducted a comprehensive review of FCT studies published between 1985 and 1996. She reported that for those participants with autism, there was an immediate and substantial reduction in challenging behaviour after the FCT interventions were initiated. These gains were maintained for as long as 12 months for those participants for whom follow-up data were available. FCT is currently considered to be a 'treatment of choice' in the management of challenging behaviours in children.

SENSORY-MOTOR INTERVENTIONS

Auditory Integration Training (AIT)

Auditory Integration Training was first introduced by Beard (1982, cited in Sinha, Silove, Wheeler, & Williams, 2006). The intervention aims to address the hearing distortions, hyper-acute hearing, and sensory processing anomalies, which are said to cause discomfort and confusion in persons suffering from learning disabilities, including autism (Stehli, 1995). These hypersensitivities are believed to interfere with a child's attention, comprehension, and ability to learn (MADSEC, 2000). The training involves the child attending two 30 minute sessions per day for ten days (Mudford et al., 2000). During the session, the children listen to a musical program through headphones. The program is modified for each child with certain frequencies of sound filtered using an electronic device called an Audio-Kinetron (Stehli, 1995, cited in MADSEC, 2000).

Sinha, et al., (2006) recently published a Cochrane review in which they examined the research evidence for the effectiveness of AIT and other sound therapies (e.g., Tomatis, Somano Sound Therapy) for young children with autism. Only six randomly controlled trials of AIT met the stringent criteria for inclusion in the review (Bettison, 1996; Edelson et al., 1999; Mudford et al., 2000; Rimland & Edelson, 1995; Veale, 1993; Zollweg, Palm, & Vance, 1997). No studies involving other sound therapies met the criteria for inclusion. Three of the studies failed to demonstrate benefits for the children who received AIT compared with those who did not. The other three studies reported improvements for the children at three months from the start of treatment. However, as a group, the studies featured a number of methodological flaws including (a) the wide age range of participants, (b) the lack of 'gold standard' diagnoses, (c) the use of a broad range of outcome measures making the comparison of outcomes impossible, and (d) the use of outcome measures which were of questionable validity (Sinha et al., 2006). These limitations must be taken into account when interpreting the results of the studies.

Proponents of AIT have argued that the Cochrane review failed to acknowledge a range of other studies in which positive outcomes were reported for children with autism. However, the authors of the review maintain that stringent criteria for inclusion must be applied in order to rule out studies that are prone to bias (Sinha et al., 2006). At present, auditory based therapies should be considered experimental in nature and parents should be provided with accurate information about the research evidence for these approaches and the costs involved in pursuing these programs (Sinha et al., 2006).

Sensory Integration Therapy

Sensory integration is the ability to process, immediately and simultaneously, the many different sensory messages that result from even the simplest action. It has been established that children with autism frequently have problems in dealing with complex sensory stimuli and that they may be sensitive to particular kinds of stimuli such as noise or texture (Howlin, 1997). Children with autism appear to have difficulties modulating their response to sensory input and maintaining optimal arousal and focused attention (Prior & Ozonoff, 2006). Poor sensory processing may contribute to the development of

maladaptive behaviours and difficulties with social relating which are common in children with autism (Schaaf & Miller, 2005).

As many as 40% of children with autism are reported to have some form of sensory difficulty (Attwood, 1998; Rimland, 1990; Taley-Ongan & Wood, 2000). The sensory motor theory of autism proposes that motor problems in autism are related to praxis, the formation of a motor goal, the motor planning to carry out the goal and the execution of the motor movement to complete the goal. The cognitive and sensory characteristics of autism affect the first two steps in particular and can result in significant motor problems, or dyspraxia (Anzalone & Williamson, 2000). Developmental dyspraxia relates to fine and gross motor performance and in turn affects sensorimotor exploration, play and functional tasks. Oral/verbal dyspraxia interferes with the proper development of speech and eating skills. The issue of the co-occurrence of autism and dyspraxia remains unresolved. In a recent study of imitation and autism no evidence was found relating imitation deficits in young children with autism to dyspraxia (Rogers, in press).

Sensory Integration Therapy aims to improve the sensory processing capabilities of the brain through the provision of vestibular, tactile, and/or proprioceptive stimulation (Ian Dempsey & Foreman, 2001; Schaaf & Miller, 2005). The treatment is commonly delivered by occupational therapists and may involve activities such as swinging in a hammock, balancing on beams, and brushing or stroking the child's body (Dempsey & Foreman, 2001). Therapists select activities for each child based on his or her 'sensory needs.' Sensory Integration Therapy is believed to work directly on a child's nervous system functioning, capitalizing on plasticity within his or her nervous system, and resulting in the development of adaptive behaviours and an increased ability to learn (MADSEC, 2000).

Despite recommendations for use of Sensory Integration therapy with children with autism (e.g., Mailloux, 2001; Richards, 2000) and anecdotal reports (e.g., Cook, 1991; Sachs, 1995), little experimental evidence of its benefits have been reported in the literature. Dawson and Watling (2000) reviewed the evidence regarding sensory integration, auditory integration and traditional occupational therapy and found only poor quality evidence providing either no, or at best equivocal, support for Sensory Integration therapy and found no empirical evidence on the practice of occupational therapy in autism. The MADSEC Autism Task Force (2000) reported similar findings following a review of the literature. They concluded that SI cannot be considered to be an effective treatment for children with autism on the basis of current research and that caution is called for on the basis of one study reporting an increase in self injurious behaviour.

Despite the lack of randomised controlled trials, Schaaf and Miller (2005) noted that over 80 studies, measuring some aspect of the effectiveness of Sensory Integration Therapy, have been conducted. However, they also noted several key limitations which impact on the validity of the research conducted to date. These limitations include (a) the heterogeneous nature of the populations studied, (b) the failure of researchers to identify a consistent independent variable (treatment) in their studies to date, (c) the fact that dependent variables (outcomes measures) were often not clearly related to the purpose of

the intervention provided or too many dependent variables were measured, and (d) the implementation and evaluation of Sensory Integration Therapy in isolation rather than as part of a comprehensive occupational therapy program (Schaaf & Miller, 2005). The lack of research supporting SI places the role of this therapy in the treatment of autism in a difficult position. Its effectiveness is unsubstantiated at this point and yet Sensory Integration Therapy is widely accepted and practiced by professionals working with children with autism in Australia.

It is important to distinguish between sensory integration therapy (SI) and the management of the sensory characteristics frequently associated with autism. Intervention to manage sensory issues may consist of environmental management or involve the person with autism directly. Clearly the effective management of sensory issues in autism is of potentially great benefit and more research is needed to evaluate this type of intervention.

Doman Delacato Method

Glen Doman and Carl Delacato originally designed a sensory integration training program for children with brain injuries but used it with a wide variety of disabilities. The program advocated 'patterning' or the hands on, systematic exercising of autistic children by their parents and usually teams of volunteers. The program was advocated as a cure for autism. By stimulating muscle activity in a controlled and intensive manner, it was claimed that neural networks were repaired. There has been no systematic appraisal of the effectiveness of this program for children with autism, and serious criticisms about the use of such methods have been raised by a number of authors (Howlin, 1997). According to Cummins (1988, cited in Dempsey and Foreman, 2001), methodological flaws associated with the studies of this program make it impossible to draw conclusions about the effectiveness of this method.

COMBINED INTERVENTIONS

These are interventions and programs which combine elements of behavioural and developmental models and take account of evolving knowledge about autism and typical development. In addition there is a tendency for these interventions to account for the characteristics of autism by building on strengths to address weaknesses. There is likely to be a focus on managing the environment to facilitate learning and development.

The SCERTS Model

The SCERTS model (Wetherby & Prizant, 2000) focuses on Social-Communication, Emotional Regulation, and Transactional Support as the principal dimensions for intervention planning. The goal of the program is to directly address the core deficits observed in children with autism based on a highly individualised approach which addresses the primary deficits affecting each child. The emphasis is on communication, social relatedness, sensory characteristics and family centred practices that reflect acknowledged 'best practices' in contemporary literature on autism (Prizant, Wetherby, Rubin, & Laurent, 2003). SCERTS is a model of service provision rather than a program and has not been independently validated. However, the authors have stated that the model draws from a variety of empirically supported treatment methodologies (Prizant et al., 2003).

The key components of the SCERTS model are as follows:

- Communication and language deficits are addressed through social-pragmatic language therapy, which emphasises the functional use of pre-verbal and verbal communication skills in natural and semi-structured interactions. The model includes the use of validated and effective strategies to support the use of non-speech communication systems such as picture symbols. Social-pragmatic approaches are now practiced in both contemporary ABA programs as well as developmentally based programs.
- Deficits in social relatedness and social-emotional reciprocity are addressed through strategies developed as part of Greenspan's floor time approach. See section on developmental/naturalistic approaches (pages 53-56).
- Sensory processing deficits are addressed through sensory integration therapy and environmental adaptations and supports. Many children with autism also have motor planning issues affecting daily living skills, which are also addressed.
- The model also emphasises supporting and educating family members, to best enhance the child's development.

Wetherby and Prizant (2000) stress that the whole of the SCERTS model is greater than the sum of the parts. They argue that the developmental challenges experienced by children with autism do not occur in an isolated manner, and therefore cannot be treated in such a way. Daily activities such as mealtimes, for example, involve the full range of skill areas outlined above. In addition, the SCERTS program draws on the child's developmental strengths and natural motivations to address areas of weakness.

Division TEACCH

(Treatment and Education of Autistic and Related Communications Handicapped Children)

TEACCH is a 'whole life' approach aimed at supporting children, adolescents, and adults with autism through the provision of visual information, structure, and predictability (Cumine, Leach, & Stevenson, 2000). The program was founded at the University of North Carolina in 1972 and is now offered throughout the state of North Carolina as well as in an increasing number of countries throughout the world. According to Lord and Schopler (1994), in the mid 90's approximately 250 new preschool children attended TEACCH preschools every year, and as many as 650 to 700 preschool aged children were enrolled at any one time. Emphasis is placed on providing continuity of services to people with autism and their families. Consequently, the program caters for children as young as two years of age and continues to support them well into adulthood (Jordan et al., 1998).

The TEACCH program focuses on structuring the environment in order to facilitate skill development and facilitating independence (Dawson & Osterling, 1997). Clear physical and visual boundaries are established to help children understand what they are expected to do in each area (Cumine et al., 2000). Visual supports are used to support children's comprehension. The TEACCH program aims to provide the least restrictive teaching as possible. One to one support is available to children as they learn new skills (Dawson & Osterling, 1997). However, they are encouraged to develop independence and opportunities for integration and reverse integration are provided (Jordan et al., 1998).

Program goals are individualised for each child, based on a comprehensive assessment at the start of the program (Cumine et al., 2000). Each child's strengths and interests are identified and used as the basis for supporting him or her to develop other functional, and even vocational, skills (Jordan et al., 1998). Particular attention is paid to the development of communication skills and the use of multimodal communication is encouraged. Emphasis is also placed on supporting comprehension through the provision of structured teaching incorporating visual supports which are geared towards the visual learning style that is characteristic of children with autism (Cumine et al., 2000). Parents are involved as equal partners throughout the program (Panerai, Ferrante, & Zingale, 2002).

Schopler, Mesibov and Baker (1982) evaluated the outcomes of 647 students graduated from or currently enrolled in the TEACCH program, ranging in age from 2 to 26 years of age. Fifty-one percent of these students had a diagnosis of autism. One group of students received only a diagnostic evaluation; one group received an evaluation and parent training; and a third group received an evaluation and placement in the TEACCH classroom. Questionnaires were mailed to participants' homes to be filled out by parents of participating students. Results indicated that persons most involved in the program saw the most improvements. Additionally, adults and adolescents in the study were found to have an institutionalisation rate of 7%. This was compared to the rate of institutionalisation of adolescents and adults with autism prior to the introduction of

Division TEACCH in the 1960s of 39% to 74% (Schopler, Mesibov & Baker, 1982). However, caution must be exercised when interpreting the findings given that no control group was used, the assessors were not blind to the study, and the data were confined to parent feedback and institutionalisation practices have changed in the last two decades.

Three additional follow-up studies (Lord, 1991; Lord & Schopler, 1989, 1994) evaluated the outcome data of students who received TEACCH services. In each of these studies, substantial increases in IQ scores were reported. Children who received services beginning at the age of three, who were non-verbal and had IQ scores ranging from 30 - 50, demonstrated a 22 to 24 point increase in IQ scores by the age of seven (Lord & Schopler, 1989). These gains were most substantial in the very young children who were non-verbal prior to intervention (Lord & Schopler, 1994). However, the studies lacked the level of control necessary to account for other factors, such as maturation, which may have contributed to the outcomes (Jordan et al., 1998).

More recently, Ozonoff and Cathcart (1998) conducted a study of the effectiveness of a TEACCH home-based program, which featured greater control. Parents were taught to implement the TEACCH program with their preschool aged children with autism at home. Two groups of 11 children were matched by age, diagnosis, and severity of autism characteristics. Children in both groups attended a preschool or school program in which they received an applied behaviour analysis program. However, the treatment group also received four months of home-based TEACCH intervention while the control group did not. Each group was given a pre- and post-test. Results indicated that the children in the treatment group made significant progress and demonstrated overall improvement that was three to four times greater than that of the control group (Ozonoff & Cathcart, 1998).

Panerai, Ferrante, and Zingale (2002) compared intervention outcomes for two groups of eight children with autism and severe intellectual disability. The groups were matched for gender, chronological age (mean = 9 years), and mental age. The experimental group received the TEACCH program while the control group was integrated into regular schools with a support teacher. Psychometric assessments were conducted prior to intervention and were repeated at 12 months. The results indicated that the group of children who received TEACCH made significantly greater gains than those in the control group. The results provide preliminary evidence for the effectiveness of the TEACCH program. However, these results need to be replicated in further studies involving larger groups of children in order to establish the effectiveness of the program. In particular, studies are needed to assess the outcomes for younger, preschool aged children, given the importance of early intervention and the current debate around the efficacy of different treatment approaches.

Panerai, et al. (2002) acknowledged that although the TEACCH program represents a 'model' for therapists and families, it must be adapted to different social and family contexts. Such adaptations may confound the comparison of research outcomes and make it difficult to generalize results to other populations. Howlin (1997) raised concerns about the influence that staff member skills and experience may have on intervention outcomes, while Jordan et al (1998) called for larger, systematic and controlled studies to be

conducted by independent researchers in order to evaluate the immediate and long term outcomes of the TEACCH program for children with autism.

The Denver Model

The Denver Model is a developmentally based program employing behavioural techniques, which began in 1981 at the University of Colorado Health Sciences Center, Denver. Similarly to the TEACCH program, the Denver Model aims to build upon the skills the child with autism has already gained. The child's individualized curriculum is developed around quarterly meetings between the parents and the treatment team. Goals, objectives, instructional plans and activities are discussed for the child's instruction across all settings. The Denver Model includes several teaching elements: shaping of natural gestures followed by conventional gestures; teaching motor-imitation skills related to language; and teaching the meaning and importance of speech. This model uses the tools of functional behavioural analysis; communication training; positive teaching of alternative, more conventional behaviours; and redirection to provide new behavioural strategies by which the child can achieve their goals. No studies evaluating the effectiveness of the Denver Model were identified in the process of conducting this review.

Learning Experiences-An Alternative Program for Preschoolers and Parents (LEAP)

LEAP is a comprehensive preschool service, developed in Pennsylvania, by Phillip Strain, designed for both children with autism and typically developing children. LEAP has the components of an integrated preschool program and a behaviour skills training program for parents. The program contains aspects of behavioural analysis, but it is primarily a developmentally based approach. Services include parent involvement and training. The program does not provide one-to-one intervention; instead, services consist of 15 hours per week of classroom instruction provided by a teacher and an assistant who implement the program with 10 typically developing children and 3-4 children with autism. A full time speech therapist and contracted occupational and physical therapists also work with the children in specially arranged classrooms designed to support child-directed play. The primary goals of the curriculum are to expose children with autism to typical preschool activities and to adapt the typical curriculum for the children with autism only when necessary. Independent play skills are facilitated by using peer models and by prompting, fading, and reinforcing target behaviours (Strain & Hoyson, 2000).

Approximately 36 single case study designs have been used to evaluate discrete components of the program that focus on social, communication, cognitive, and parenting skills (Strain & Kohler, 1998). The role of peer-mediated teaching in the inclusive educational settings offered by LEAP preschools has been a particular focus of this research (Kohler & Strain, 1999; Strain & Kohler, 1998). A large longitudinal research initiative is currently underway to examine the broader effects of the LEAP program. Strain and Hoyson (2000) reported on outcomes for six children who entered the program in 1982, at which time they all had scores on the Childhood Autism Rating Scale which

placed them in the moderate to severe range. A range of standardised and direct observation assessments were used pre-intervention, post-intervention, and during follow up to measure long term and short term gains. At the completion of the program and again at age 10, the children were found to not meet the threshold required to be characterised as having autism on the Childhood Autism Rating Scale. Five of the six children went on to attend regular mainstream classrooms throughout their school years without additional support. However, Strain and Hoyson (2000) noted that the small number of participants, and the challenges associated with controlling for other intervention and learning effects mean that caution must be taken in interpreting these findings. Replication of these results and independent evaluation and testing of intervention is required before firm conclusions can be made in relation to the effectiveness of the LEAP program.

OTHER INTERVENTIONS

Daily Life Therapy/Higashi School

The Daily Life Therapy approach aims to support children to develop necessary daily living skills in the context of a group therapy program. The primary goals are (a) to develop self esteem and independent living skills; (b) to improve physical strength, coordination and stamina; and (c) to stimulate the child's intellect across a range of learning areas including music, art, and drama (Cumine et al., 2000). The curriculum content and mode of delivery is based on age rather than developmental level and the aim is to teach the child at a level that will allow integration into mainstream. The program is offered in purpose built schools in Tokyo and Boston. The schools in Japan cater for children with and without autism whereas the school in Boston only caters for children with autism (Jordan et al., 1998). The school in Boston also features a number of the characteristics seen in other education centres for children with special needs including the use of individualised educational plans (IEPs) and computer technology. There are plans to establish schools in the UK following Daily Life Therapy principles.

Only a small number of studies have been conducted in relation to the effectiveness of Daily Life Therapy provided through the Boston school. Despite reports of positive outcomes, none of these studies has the methodological rigor required for firm conclusions to be drawn; for example, Hardy, Henrichs, and Edwards (1991) showed differential improvement in the children undergoing Daily Life Therapy. However, a comparison group rather than a control group was used and measures to rule out assessor bias were not employed. Richardson and Langley (1997) did use a control group, however no details of how matching was conducted were provided and the study was retrospective, based on parent and teacher reports. Larkin and Gurry (1998) collected observational data in order to measure the learning outcomes for six children with autism attending the Boston program. The researchers reported that the students made strong gains in behaviour. However, the lack of an appropriate control group, the use of unpublished purpose built assessment scales, the use of a different assessor at follow up, and the lack of independence of assessors preclude conclusions being drawn about the effectiveness of the treatment. At present, the claims of positive outcomes for children with autism who attend Daily Life Therapy programs have not been adequately tested and further research is therefore required.

Option Approach (Son-Rise Program)

The Option Approach is a parent-mediated, home-based, child-centred program which aims to create environments in which children with autism can engage in safe and pleasurable social interactions with others (Cummins, 1988). The program assumes that children find their world to be confusing and distressing, which causes them to withdraw from social interactions and learning opportunities (Howlin, 1997). Parents, therefore, are trained to alter the manner in which they interact with their child: to become more accepting of his or her behaviours and to join in the activities or behaviours that he or she finds interesting, even when these behaviours are not socially acceptable (Howlin, 1997; Williams & Wishart, 2003).

Treatment sessions are typically conducted in a designated 'playroom' designed to shield the child from the confusion and distractions associated with everyday environments (Williams & Wishart, 2003). Parents and professionals provide one-to-one intervention with the child, for periods of approximately two hours at a time, throughout the day, every day (Jordan et al., 1998). Some children may spend months or years during their early years engaging in sessions in the 'playroom' or other similar rooms. During sessions, adults follow the child's lead, often imitating his or her actions and attempting to join in his or her activities. Adults are encouraged to demonstrate 'Excitement, Enthusiasm, and Energy' during the interactions in order to motivate the child to engage with them (Cummins, 1988).

Jordan, et al (1998) reviewed the research evidence for the effectiveness of the Option Approach. They noted that some of the principles and techniques which are used in the treatment have been shown to be effective in research studies (e.g., following the child's lead). However, despite anecdotal reports of positive outcomes in a small number of case studies (Williams & Wishart, 2003), no studies of the long term outcomes of the study have been conducted. Howlin (1997) raised concerns about the marketing of the program and claims of miraculous improvements in the functioning of children with autism following the program, given the lack of research evidence. She also questioned the repercussions of conducting therapy in specialised, rather than natural environments, citing anecdotal reports by teachers that some children with autism have great difficulty integrating into regular classroom environments following treatment. Further research is required to evaluate the program's long term learning outcomes for children with autism

Music Therapy

The Australian Music Therapy Association (2006) describes music therapy as an allied health profession which uses music in a planned and creative manner to promote good health and to address physiological, emotion, cognitive, and social needs through the development of a therapeutic relationship. Music therapy is believed to create a context in which relationships between a child and a therapist can develop. According to Allgood (2005), music therapy has been used effectively with people with autism to promote relationship building, communication skills, sensory integration, movement and physical development, and cognitive development. In the United Kingdom, an approach called Music Interaction Therapy has been developed specifically for children with autism and has been incorporated into the curriculum of a number of schools and adopted by many speech pathologists and psychologists (Jordan et al., 1998). The program focuses on the development of early communication skills and involves parents, carers, therapists, or educators interacting with the child as a professional plays an instrument (Jordan et al., 1998).

At present, the evidence for the effectiveness of music therapy for children with autism is primarily anecdotal, with only a small number of clinical reports and pre-experimental studies available (Gold & Wilgram, 2006). Whipple (2004) conducted a meta-analysis involving 12 studies in which music therapy was used as a separate independent variable in training for children and adolescents with autism. Based on the results of the meta-analysis, Whipple (2004) concluded that "all music intervention, regardless of purpose or

implementation , has been effective for children and adolescents with autism” (p.90). However, the criteria used in the meta-analysis were broad. Only two of the nine studies were from published sources, despite all using ‘music therapy’ the objectives and approaches differed, the studies employed different outcome measures, and involved a small number of children with a broad range of ages. No large scale randomised control trial involving young children with autism has been conducted. Without this level of evidence, broad claims about the universal effectiveness of music therapy for all children with autism must be met with caution and tested through studies with appropriate design and methodological rigor.

SPELL (Structure-Positive-Empathetic-Low Arousal-Links)

SPELL is framework, developed by the National Autistic Society in the United Kingdom, which aims to support practitioners and parents in developing, implementing, and appraising interventions for people with autism. The framework recognises the individual needs of each child with autism and emphasises the need for programs to focus on strengths in order to address learning and participation needs (National Autistic Society, 2006d). Programs which adopt the SPELL framework are characterised by a focus on providing children with structure and consistency, reducing disturbing stimuli, ensuring a high degree of organisation, and ensuring collaborative design of education and care plans to encompass all of the child's time 24 hours, 7 days per week. SPELL is still an approach in the developmental stages and hence is continually being monitored and assessed. No studies evaluating the effectiveness of the SPELL framework were identified in the process of conducting this review.

The Camphill Movement

This approach incorporates the ‘Waldorf’ or ‘Rudolf Steiner’ curriculum and has three guiding principles, namely importance of community life, sharing of experiences and resources, and development of a social, educational, and therapeutic approach (Smith, Laird, & Smith, 2001). There are 600 Waldorf schools worldwide. However, there appears to be no research based evidence of its effectiveness for those with autism or other developmental disability.

The Miller Method

A description of the program can be found on the Miller Method® website (Miller & Eller-Miller, 2006). The Miller Method is based on “Cognitive-developmental systems theory” which assumes that typical development depends on the ability of the children to form systems and organised "chunks" of behaviour. The program claims to transform the child’s “aberrant systems (lining up blocks, driven reactions to stimuli, etc.) into functional behaviours.” Strategies employed include narrating the children's actions while they are a metre above the ground on an ‘Elevated Square’. Jordan, Jones, and Murray (1998) conducted a review of research evidence for the effectiveness of the Miller Method. They reported only one study of outcomes of the program, which failed to evaluate the direct effects of the independent variable (i.e., the treatment program). Further research is required in order to evaluate the effectiveness and long-term outcomes of the program. Jordan, Jones, and Murray (1998) cautioned that, in the absence of such research evidence, the program must be considered pre-experimental in nature.

FAMILY BASED INTERVENTIONS

Introduction

Parents of children with autism play a critical role in supporting their children's learning. In many programs, parents not only drive the decision making process, they take a primary role in delivering the intervention. Consequently, parents require emotional support, advice, and training in working with their children. They also require access to up to date and accurate information about available treatment options and support services. A small but growing body of literature has examined the experiences of parents of children with autism, providing therapists and educators with information about how best to provide support. In this section, several key issues relating to working with parents of children with autism are discussed, and examples of programs which have been specifically designed to address these needs are described.

It is of interest to note that there has been a recent rapid growth of parent training based intervention for toddler age children with autism in North America and the UK as a result of increasingly early identification and focus on provision of intervention as soon as possible once the child is identified. This trend highlights the importance of early identification of autism and the need for consistent well informed diagnosis and assessment nationally in Australia. It is essential that services are available when the child is identified and that there is coordination of diagnosis and service provision. This is a key goal for policy makers, funders and service providers across Australia.

Family Stress

Parents of children with autism experience greater stress than do parents of both (a) children with other disabilities and (b) parents of children without a disability (Honey, Hastings, & McConachie, 2005). They are at high risk for psychological disorders (Bromley, Hare, Davison, & Emerson, 2004; Duarte, Bordin, Yazigi, & Mooney, 2005) and relationship breakdown (Higgins, Bailey, & Pearce, 2005). Stress is often related to the antisocial behaviours displayed by children with autism which may be self-injurious, ritualistic, and obsessive (Higgins et al., 2005). The level of stress experienced by parents is closely related to the availability of support, and that mothers of children with autism are likely to experience greater stress than fathers (Honey et al., 2005). Other family members, particularly vulnerable siblings, could be at an increased risk for stress associated with having a brother or sister who has autism. There is a need for more specific investigation of the effect of having a brother or sister with autism on siblings. Families report a need for specific programs for siblings of children with autism. Siblings need information and support post diagnosis and ongoing support throughout their development.

Recent studies have explored the experiences of family members of children who have autism (e.g., Bromley et al., 2004; Honey et al., 2005) and attempted to identify and understand the coping mechanisms displayed by family members who demonstrate increased resilience (e.g., Hastings et al., 2005; Higgins et al., 2005; Sivberg, 2002). The

results of these and other studies should be used to inform the development and implementation of support programs for parents and families of children with autism.

Support at the Time of Diagnosis

Each parent has a unique reaction to his or her own child's diagnosis. Responses include surprise, devastation, helplessness, and at times affirmation of concerns about their child's development (National Autistic Society, 2006c). Futagi and Yamamoto (2002) studied the views of mothers on the disclosure of a diagnosis of autism. The mothers identified a number of factors which reduced stress and helped them to accept their children's diagnosis. These included (a) early assessment and diagnosis, (b) the provision of information about their children's behaviours and strategies to support communication, (c) and the existence of a parent self-care group which provided information and support. Many parents request information about their child's prognosis at the time of diagnosis and it is the responsibility of the professional involved to explain the difficulties inherent in provision of definitive prognosis at this early stage (National Autistic Society, 2006c).

Clearly, professionals have a vital role to play in supporting families at the time of diagnosis. Nissenbaum, Tollefson, and Resse (2002, p37-38) recommended that professionals support families by;

- becoming knowledgeable about autism,
- establishing a family-friendly setting understanding families' needs,
- communicating effectively and providing lists of resources and interventions,
- providing follow-up, discussing prognosis and providing hope, and
- recognising that personal reactions are common when communicating a diagnosis of autism.

Professionals need to engage in ongoing professional development activities so that they can provide appropriate information and support to families of children with autism at the time of diagnosis.

Parents' Need for Information

Parents of children with autism require information to help them to understand their child's diagnosis and to make informed decisions about support services which are available. Pratt (1998), in reporting the outcomes of 10 forums held for family members of children with autism across the state of Indiana, emphasised the need to provide information to families at the point of diagnosis. This could take the form of a simple document with basic information, a checklist for future action, practical information about their child's disability, and the names and phone numbers of important organisations and resources. Parents also require information in the longer term, including;

- strategies to help them support their child's learning,
- information about therapy and educational services which are available,
- information about their child's rights such as those related to educational placement,
- information to help address financial concerns and other issues that commonly arise in relation to raising and supporting a child with a disability.

Many parents have reported that it is hard to know which interventions to use and that it would be helpful to have information about various approaches stored in one central location. Pratt (1998) noted that many parents would prefer information provided initially to be more optimistic and also emphasised the need to provide support and training to siblings and the entire family unit.

It is important to note that when guides for parents and professionals are available they may not reach a substantial portion of families in need. This is particularly the case for disadvantaged groups such as ethnic minorities, socio-economically disadvantaged families and those who are distant from major urban centres.

Examples of Family Based Interventions

The Hanen Program

The Hanen Program for children with autism is likely to be the best known and most widely internationally disseminated of all autism early intervention programs focusing on parent training. The Hanen Centre is a government-funded agency in Toronto, Canada, which specialises in training caregivers to facilitate communication development in children from birth to six years of age. 'More Than Words' is the Hanen intensive training program for parents of pre-school children with autism. The program derives its theoretical framework from a social-pragmatic developmental perspective (see previous section) and emphasises the blending of aspects from both behavioural and naturalistic child-centred programs: The breakdown of activities into structured, small steps found in an ABA program and the provision of opportunities to use language for functional purposes that are built into approaches that are more naturalistic. The aim of the program is for parents to learn how to use their child's everyday activities as the context for learning to communicate. According to the Hanen Centre website, 'More Than Words' incorporates current best practice guidelines and emphasises the importance of affect, predictability, structure and the use of visual supports to enhance learning in children with ASD. The program applies the principles of adult learning to teach a group of parents in eight interactive classes and three individual in-home videotaping and coaching sessions. Through knowledge and practical, hands-on training, the goal of the program is to enable parents to turn everyday activities into learning experiences and support other treatments that their child may receive throughout his life.

McConachie, Randle, Hammal, and Le Couteur (2005) conducted a control trial for 51 children with autism between the ages of two and four years who received the 'More than Words' program. One group received intervention immediately while the other group received the intervention after a delay. Outcomes were measured 7 months after recruitment. These included measures of parents' use of facilitative strategies, their stress levels, and their ability to adapt to meet their child's needs during interactions. Measures were also taken of each child's level of ability, vocabulary size, behaviour problems, and social-communication skills (McConachie et al., 2005). The results indicated that (a) parents were able to learn to use strategies that might facilitate their child's development and (b) that the children of parents who attended the course had a larger vocabulary than the group of children whose parents who were delayed in receiving the program. However, these findings must be considered in light of the fact that (a) a small number of

children involved in the study, (b) allocation to groups was not randomized, (c) follow up time reported in the study was short due to the second group needing to commence the program, (d) the delayed group were receiving other interventions while waiting for the program, and (e) that the direct measure of children's skills (ADOS) did not show a significant treatment effect, (McConachie et al., 2005). The researchers suggested that future studies involving the assessment of outcomes across a number of treatment centres, the use of randomised designs, and the comparison of the More Than Words program with other intervention programs is required to provide concrete evidence for the effectiveness of the program.

The Help! Program

The Help! Program is a post-diagnostic support program for parents and carers of autistic children, developed by the National Autistic Society of the United Kingdom. The program aims to provide parents and full-time carers with post-diagnostic information and advice, to develop their knowledge and understanding of autism spectrum disorders, positive management strategies, and local support services (National Autistic Society, 2006b). The program targets parents/carers of children with autism aged 5+ or in full-time education, and young people or adults who have received a diagnosis of an autism spectrum disorder within the previous 12 months.

Participants in the program attend an introductory 'getting to know you' session, six three-hour core sessions, and a closing/farewell session. The topics of the core sessions include (a) autism spectrum disorders, (b) understanding where your child is on the spectrum, (c) communication and social interaction, (d) strategies for behaviour support, (e) education and transitions or adult life and transitions, and (f) legislation and rights. Each program supports ten families and a parent manual including handouts, information booklets, and leaflets, together with a child/adult life folder accompanies the program. No research studies into the effectiveness of the Help! Program were identified during the process of this review.

NAS EarlyBird Program

The EarlyBird Program, developed by the National Autistic Society, is a parent-focused program designed to help parents understand and work with their children with autism. The aims of the program are:

1. To support parents in the period between diagnosis and school placement.
2. To empower parents and help them facilitate their child's social communication and appropriate behaviour within the child's natural environment.
3. To help parents establish good practice in handling their child at an early age so as to pre-empt the development of inappropriate behaviours (National Autistic Society, 2006a)

The EarlyBird program incorporates group training sessions with individual home visits and video feedback to help parents to acquire knowledge and develop skills in working effectively with their children. Parents participate in the program for three months, during which time they are required to commit to either a three hour training session or a home visit each week. The NAS provides training courses to other organisations and agencies

which are then licensed to offer the program. Autism New Zealand is licensed to provide the EarlyBird Program.

The NAS is engaged in an ongoing evaluation of the EarlyBird Program. Hardy (1999) conducted a pilot study examining the outcomes for parents involved in the program. The results indicated that parents were less stressed, perceived their child more positively, and reduced the complexity of their language during interactions with their child following the program. These results were replicated in a larger study (Engwall & MacPherson, 2003), involving 119 families of children with autism. The results provide preliminary evidence for the effectiveness of the program in supporting families. However, a large randomized control trial is needed.

Pre-Schoolers with Autism: An Education and Skills Training Programme for Parents.

This program was developed at Monash University in Victoria, Australia and involves a 20 week program for parents of children with autism. The program focuses on parent education about autism and the development of parental skills in behaviour management intervention. A study designed to evaluate the impact of the program on the mental health and adjustment of parents, found that the intervention resulted in significant improvement in parental mental health and adjustment which was maintained at follow up 6 months later (Tonge, Brereton, Kiomall, Mackinnon, King, & Rinehart, 2006).

Family-centred positive behaviour support (PBS) programs

Family-centred PBS programs involve parents and professionals working together, in a systematic and collaborative fashion, to address a child's challenging behaviour. The programs are usually focused on supporting children during everyday activities and involve five phases:

1. Building relationships between the family and the professionals.
2. Conducting a functional assessment of the behaviours of concern.
3. Identifying natural routines as contexts for intervention.
4. Developing behaviour support plans related to each of the routines.
5. Implementing and revising the support plans as needed.

Family-centred PBS plans include (a) strategies for teaching and increasing skills that are intended to replace the problem behaviours, (b) strategies for preventing the problems before they occur, (c) strategies for dealing with the problems if and when they do occur, and (d) strategies for monitoring progress. According to Marshall and Miranda (2002), these programs have the potential to produce substantial long-term changes in behaviour resulting in improved quality of life for the child and his or her family. Boettcher, Koegel, McNerny, and Koegel (2003), for example, provided a family-wide PBS program to the family of a child with autism during a time of potential crisis. The program resulted in a reduction of disruptive behaviours for the child with autism and her siblings, and other family-wide collateral positive effects, including decreased stress and increased positive interactions among family members. These and other findings (e.g., Lucyshyn, Albin, & Nixon, 1997; Marshall & Miranda, 2002) provide preliminary

evidence for the effectiveness of family-centred PBS. However, further research involving larger controlled studies is needed to replicate and extend these findings.

Evaluating Family Based Interventions

As parent/family-centred interventions have become the preferred approach to behaviour support for children with autism, it is important that they are subjected to proper evaluation in order to gauge their effectiveness. Bailey, McWilliam, and Darkes et al. (1998) identified a framework for determining the extent to which early intervention has accomplished the goals inherent in a family-centred approach which could serve as a stimulus for discussion among professionals, parents, and policymakers engaged in fundamental inquiry into the purposes and anticipated benefits of early intervention. There is a need for more research to evaluate the effectiveness of programs designed to support families. In particular evaluation should include consideration of any family breakdown, depressive illness and other potential indirect effects.

Summary

Family based interventions are designed to provide guidance, training, information, and support to family members of children with autism. Emphasis is placed on empowering parents, who are experts about their own children, to take the leading role in supporting their children's learning. The success of these programs is clearly dependent on the establishment of strong and collaborative parent-professional relationships. In particular, success relies on the ability of health professionals and support workers to enhance the well-being of children with autism and their families by addressing the needs of the entire family. This entails (a) facilitating family choice and control of supports; (b) helping families to navigate the complex service system; (c) helping families to identify and access informal support through family, friends, and neighbours; and (d) considering the family context in the assessment and intervention planning process.

COSTS-BENEFITS OF INTERVENTIONS

Despite increasing research activity in relation to treatments for children with autism, few studies have examined the costs and benefits associated with various treatments for children, families, and society at large (Jarbrink, Fombonne, & Knapp, 2003). In a rare study, Jacobson, Mulick, and Green (1998) used cost-benefit models to provide tentative estimates of the overall costs and benefits of early intensive behavioural intervention (EIBI) to society. However, the calculations were performed on the basis that all children achieve the ideal outcome of 'normal' functioning rather than a partial benefit, as is often the case and hence are hardly realistic assessments. Jarbrink, et al. (2003) noted that further studies are required in which the costs and benefits of different programs are compared.

To date, no studies have examined the cost-effectiveness of treatment programs provided in Australia. Consequently, there is no evidence to suggest that one program is more effective than another based on cost versus benefit. In the absence of this evidence, the authors of this review surveyed service providers offering programs to children with autism in Australia. The survey has yielded information about the types of programs available, treatment times, funding sources, associated costs and expected short-term outcomes and benefits over time. A summary of this information is provided in Table 6. It must be noted that this information is based on self reporting from programs and has not been independently verified. Hence, there is a need to examine more closely the family costs of having a child with autism, the rates of service utilisation and associated costs, and an individual evaluation of the cost-effectiveness of early intervention programs.

COMPARATIVE EVALUATION OF EDUCATIONAL INTERVENTIONS FOR CHILDREN WITH AUTISM

Several authors have comprehensively reviewed key programs available internationally for children with autism (e.g., Dawson & Osterling, 1997; Howlin, 1997; Marcus, Garfinkle, & Wolery, 2001; Rogers, 1998). Based on their reviews of the research, these authors have all defined the common elements they consider necessary for effective intervention, regardless of the theoretical framework underlying any one particular approach. Dawson and Osterling (1997) reported that the directors of the programs they reviewed agreed on many of the key elements they believed are essential for a program to be effective regardless of theoretical perspective. However, the methods employed by different programs to address each of the elements listed below may vary due to differences in philosophical approaches.

Key Elements of Effective Interventions

Curriculum Content

Within this element there are five basic skill domains; ability to attend to elements of the environment, ability to imitate others, ability to comprehend and use language, ability to play appropriately with toys (Howlin, 1997), and ability to socially interact with others (Dawson & Osterling, 1997). Marcus, Garfinkle & Wolery (2001) suggested that effective programs utilise the following intervention strategies based on the learning characteristics of children with autism: Clarifying meaningful information, organisation and scheduling; teaching across settings and people; active directed instruction; individualisation of teaching materials and curriculum; provision of visual supports; teaching imitation at a developmentally appropriate level; and using strengths and interests to help with weak areas of development.

Supporting the Need for highly supportive teaching environments and generalisation strategies

The core skills outlined above are taught in a highly supportive teaching environment and are then systematically generalised to more complex, natural environments. Howlin (1997) stressed the need for behaviourally oriented strategies.

Supporting the Need for Predictability and Routine

Research shows that children with autism become more socially responsive and attentive when information is provided in a highly predictable manner and, conversely, that their behaviour is severely disruptive when the same stimuli are presented in an unpredictable manner.

A functional approach to challenging behaviours

Most programs focus on the prevention of problem behaviour by means of increasing the child's interest and motivation, structuring the environment and increasing positive reinforcement for appropriate behaviour. Should the problem behaviour persist despite ecological management, the behaviour is analysed to determine the function of the behaviour for the child. The environment is then adapted in specific ways to avoid

triggers and reinforcers for the problem behaviour and appropriate behaviour is taught to give the child an alternative more acceptable behaviour. Howlin (1997) stressed the importance of recognising the communicative function of problem behaviour and the need to teach the child more appropriate alternative means of communication.

Transition Support

Most programs recognise that transition to school is a time when children with autism need a great deal of support. Effective programs actively teach school skills to enable the child to be as independent as possible. Programs frequently take an active role in finding school placements that will best suit the child and then actively integrate the child with autism into the new setting.

Family involvement

Effective programs recognise that parents are a critical component in early intervention for children with autism. Most programs support parents to choose the type and intensity of their involvement in their child's program. Effective programs are sensitive to the stresses encountered by families of children with autism and provide parent groups and other types of emotional support (Dawson & Osterling, 1997).

In addition, reviewers discussed important strategies or methods not utilised by all models but utilised by a significant number and worth noting:

Use of Visual Supports

Dawson and Osterling (1997) noted that the provision of augmentative communication methods is a characteristic of many programs reviewed. In addition, both Howlin (1997) and Quill (1997) stressed the importance of visually cued instruction to provide the child with a predictable and readily understood environment.

Sufficient Intensity

Dawson and Osterling (1997) noted that programs reviewed recommend a **minimum** of 15 hours of treatment per week. The authors stressed the point that the concept of intensity as discussed in the research is complex and not necessarily conveyed solely by the 'number of hours per week'. Focusing exclusively on the number of hours per week detracts from the amount of actual meaningful engagement, which is the key factor. Marcus, Garfinkle and Wolery (2001) suggested that while it is unfortunate that the early intervention movement emphasises the number of hours per week, a lower limit of 15 hours minimum per week is sensible in that the focus should be on the importance of more relevant factors of curriculum and content of instruction rather than on hours of treatment alone (Marcus et al., 2001).

Multi disciplinary collaborative approach

While program directors emphasised the need to provide occupational therapy services for those children who can benefit from them (Dawson & Osterling, 1997), there is no doubt that autism requires a multi disciplinary approach to assessment and service provision (Jordan, 2001). The team is likely to include speech pathologists, physiotherapists, teachers, psychologists and parents.

Inclusion of Peers

Many successful programs include typically developing peers (Dawson & Osterling, 1997).

Emphasis on Independent Functioning

Marcus, Garfinkle and Wolery (2001) noted that many successful programs emphasise child independence, initiative and choice making

Addressing Obsessions and Rituals

Howlin (1997) suggested that a good program will recognise the importance of obsessions and rituals as underlying causes of many problem behaviours. However, these behaviours may have a positive function for the child in regulating anxiety and may also act as a powerful source of motivation and reward (see Attwood, (2003) for examples of positive uses of obsessive behaviours).

Individual Variation

It is important to account for the spectrum of autism disorders and to recognise that while the core characteristics of autism spectrum disorders are consistent, no one child with autism will have the same pattern of strengths and needs as another. In addition families differ in their goals and resources, strengths and needs. Therefore, there is no one program that will suit all children with autism and their families.. Research suggests that there are substantial short and long term benefits from early, intensive, family-based treatment programs, whatever their theoretical basis, so long as these are appropriately adapted to the child's pattern of strengths and weaknesses and take account of family circumstances (Webster, Webster, & Feiler, 2002).

EDUCATIONAL PLACEMENT OF CHILDREN WITH AUTISM

Introduction

When young children with autism reach school age, appropriate school placement is a priority for parents and for early childhood service providers. The type of school placement to choose is an issue because children with autism face particular challenges in the school environment. While there is no doubt that education remains the treatment approach with the best 'track record' for dealing difficulties associated with autism (Jordan et al., 1998), there is significant debate about the best type of placement for children with autism, in particular the pros and cons of inclusion in regular education versus enrolment in special education, which may be generic or autism specific.

The decision about school placement is determined in the first instance by what is available, and in regional and rural areas of Australia there may be no or very limited choice. Ideally choice of school placement should be determined by the needs and strengths of each child and family. In reality choice of placement is also influenced by the capacities of schools to cater for the child's needs. Parents and service providers, including educators, should be able to make as informed a decision as possible. In this section relevant issues and research are outline briefly. For a more comprehensive review refer to *Autism Spectrum Australia (Aspect), Satellite Class Project: A Proactive Transition Model for the Inclusion of Students with Autism in Regular Education Settings* (Roberts, 2004).

It is of interest to note that school placement is seen as a general indicator of success or otherwise of early intervention programs, despite the absence of data on how suitable and successful inclusive education is for ALL children with autism.

Table 7 describes what is available in terms of types of educational placement for children with autism across Australia

Definition of Terms

Inclusion in education refers to unconditional placement of students in regular education settings, regardless of type or degree of disability. Inclusion implies the existence of one comprehensive education system for all children.

Mainstreaming means the student with disabilities is educated partly in a special education program and partly in the regular classroom. This is an integration model.

In the **integration** model, students with a disability may attend a regular school and periodically join a regular class when their teachers believe they will be successful, but their home base remains the special education setting.

Mainstreaming and integration imply a **full continuum of special education services**. In Australia this continuum usually consists of special schools, support classes in regular school, regular school placement with support, regular school placement.

Government schools are operated by state government education departments and **non-government schools** by the non-government sector including Catholic education and disability services such as autism associations.

Special education placements may be **Generic** for all students with some kind of disability or **Specialised**, i.e. specific to a particular disability (e.g. **autism specific**)

Inclusion versus Continuum of Services for Students with Special Needs

Education is primarily a social group activity designed to prepare students for life in their society and culture (Jenkins, 2002). Internationally, educational support for children with disabilities has moved towards a model of inclusive education. The Salamanca Statement (United Nations Educational Scientific and Cultural Organization, 1994) called on all governments to adopt an inclusive education policy by enrolling all students in regular schools. In the United States, 95% of students of school age with disabilities are placed in regular education settings (Kavale & Forness, 2000). It is likely that in Australia, the majority of students with autism are also enrolled in regular education. The inclusive education of individuals with special needs is supported by the Disability Discrimination Act (Australian Commonwealth Government, 1992), which sets out to prevent discrimination against a person on the grounds of disability alone. The DDA specifies that schools must comply unless the enrolment of a child with a disability will impose unjustifiable hardship on the school. Typically Australian schools have relied on policies rather than legislation in determining the provision of services for students with disabilities (Dempsey, 2001). Policy provision varies from state to state and some are more pro-inclusion than others. In addition, while all states in Australia have educational policies that support inclusion, the provision of additional resources to support inclusion is variable among the states. The release of federal 'Disability Standards for Education' in 2005 marks the provision of standards binding on all states, however the impact of these standards is not yet evident.

Inclusion as a policy for all children with special needs, has met with some opposition. For example in NSW, the Teachers Federation has made its opposition to inclusion clear on the basis of the state education department's approach to inclusion, particularly in relation to resources and workplace issues. There is also a significant parent lobby supporting the continued provision of a continuum of services for children with disabilities.

Australia wide, 44% of school students attend non-government schools. The proportion of students with a disability, as per the Australian Government Department of Education, Training & Youth Affairs (DETYA) guidelines, attending non-government schools in

Australia has changed from less than 0.5% in 1985 to close to 2% in 2000. This represents a 1060% increase compared with the overall growth in numbers in non-government schools of 30%. This is likely to be the result of identifying students already in the system as having special needs now that funding is available for their support (Dempsey, 2001).

Many students with special needs in Australia continue to be placed in special education settings, and for some initially enrolled in regular classrooms, there is a later move to support classes or special schools (Chalmers, Carter, Clayton, & Hook, 1998). The severity of the child's disability and degree of 'social maladjustment' have been identified as significant factors in determining the segregated or inclusive placement of individuals (Thomas & Loxley, 2001). Cole (1999) suggested that defining factors in the debate over the optimum model for the provision of education for students with disabilities, inclusion or continuum of services, is primarily influenced by two factors; the commitment of parents of students with disabilities to regular education and the goal of the state to confine the costs of educational and social services within particular budget parameters.

Reviews of the literature indicate that general and special educators have mixed reactions to inclusion related to the efficacy of implementation and the degree of administrative support, resources and training they have received (Danne, Beirne-Smith, & Latham, 2000). Inclusive education requires significant resources to implement; complaints of lack of resources are ubiquitous. Studies in NSW indicate that teachers feel they lack the necessary time, skills, training and resources to implement inclusive practices (Wright & Sigafos, 1997). For principals, the negation of previous enrolment rights and/or practices may become a major source of conflict with parents (Bailey & Du Plessis, 1998).

The Education of Children with Autism

Historically the educational inclusion of students with autism has been a fiercely controversial topic. In the past students with autism tended to be segregated from their peers and even from society as a whole. In Australia there appears to have been an increasing trend towards the inclusion of children with autism in regular education settings as part of the movement towards including all students with disabilities in regular education. Given the potential complexities of regular education settings for at least some students with autism, the lack of empirical investigation is of concern. It may be preferable to put the focus on providing students with appropriate education to meet their needs rather than assuming that inclusion in a regular classroom is the optimum placement for all students with autism at all stages of their education (Shaddock, 2003).

The key question remains; what kind of education is most effective in facilitating the development of children with autism. The way the question is phrased is critical. Is it a question of which type of educational placement is better, a continuum of special services or inclusion in a regular classroom or is it a question of which educational approach in terms of process and content will best meet the learning needs and develop the strengths of children with autism. The type of placement, teaching methods employed and

curriculum content are all key interrelated aspects of any educational program for students with autism. That is: the where, how and what of learning. All three of these elements are interrelated and need to be addressed simultaneously in a coordinated approach, if education for children with autism is to meet their needs and facilitate development (Roberts, 2004).

What are the Challenges Inherent in Autism for Students and Educators?

Otherwise skilled and competent educators often report that they consider themselves to be less than fully capable of meeting the needs of students with autism because of the baffling nature of the disorder (Spears, Tollefson, & Simpson, 2001). Educating students with autism requires an understanding of the unique cognitive, social, sensory and behavioural deficits that characterise autism. These include limited and disordered language skills, unusual sensory processing, difficulty combining or integrating ideas, difficulty interpreting the underlying meaning or relationship of events they experience, problems processing multiple sensory stimuli and resistance to unpredictability and change (Mesibov & Shea, 1996). Simpson, de Boer-Ott, Smith-Myles (2003) pointed to the irregular patterns of cognitive and educational strengths and deficits, including splinter skills and isolated discontinuous abilities, combined with behavioural symptoms, as presenting particular educational challenges to significantly test even the best school programs.

Facilitating transition is key to successful placement of students with autism in schools. The gradual introduction of change presented in a way the student can understand using visual supports, is likely to increase the success of the placement. This applies to the change from preschool to school, the change to a new class/teacher each school year, the change from primary to high school which can be particularly difficult for students with autism, and the change from school to post school placement.

A report from South Australia (2000) on students with autism in high schools recognises that the unique character of each student with an autism spectrum disorder presents school communities with a range of issues for which there are no simple solutions. However, an understanding of the thinking and learning styles of these students and the nature of autistic disorders, provides a foundation for creative response at both school and systemic levels. The results of the South Australian study (2000) illustrate that many issues affecting secondary students with autism are directly related to their core disabilities in communication, socialisation, thinking and learning, and sensory processing. Specifically, limited organisational skills along with poor social and interpersonal skills were identified as major issues for these students. In addition, the data indicated that secondary students were adversely affected by attendant emotional problems such as chronic anxiety.

Towards the Development of a Model for the Inclusive Education of Students with Autism

Clearly, placing students with autism in regular classrooms without supports to meet their needs and strengths will be detrimental to all concerned, especially for the student with autism and will certainly not meet his/her needs while failing to develop his/her strengths. Similarly providing a student with autism with supports designed for other special needs students may also fail to meet their needs and predispose the placement to failure. Failing to provide students with autism with the social and learning opportunities available in regular school settings is also likely to substantially disadvantage their development. What is required is a model to support the particular individual strengths and difficulties of students with autism; a flexible model that is able to address the individual needs of students with autism and the needs of the school system. However, despite increasing trends towards the inclusion of students with autism in regular classrooms there are few models and procedures for the facilitation of placement and maintenance of students with autism in regular classrooms. As a result teachers, related service professionals and parents, often feel unsupported (Robertson, Chamberlain, & Kasari, 2003) and have no option but to design inclusion programs for students with autism in the absence of clear guidelines and procedural protocols (Simpson et al., 2003). Rose, Dunlap, Huber and Kincaid (2003) list core elements of educational practice with empirical support which should be included in any sound comprehensive instructional program for students with autism:

- environmental and curricular modifications, general education classroom support and instructional methods including systematic instruction
- specialised curriculum content
- individualised supports and services for students and families
- comprehensible/structured learning environments
- functional approach to problem behaviour
- family involvement/home-school collaboration
- attitudinal and social support
- coordinated team commitment
- recurrent evaluation of inclusion procedures

Simpson et al (2003) proposed several major interlinked components in their model for the successful inclusion of students with autism in regular classrooms: the **Autism Spectrum Disorder Inclusion Collaboration Model**. The authors point out that collaboration underpins the model which also allows for consideration of the individual learner and instructional factors. The components of the model include the core elements outlined by Rose et al., (2003) and others:

Availability of appropriately trained support personnel. The complex needs of students with autism necessitate a multi-person, multifaceted, multidisciplinary,

collaborative approach to planning and implementing a comprehensive program (Jordan, 1999).

Access to collaborative problem-solving relationships. Collaborative consultation in which an expert consultant is able to share information and provide consultative support to the teacher (Idol, 1997; Simpson et al., 2003).

Availability of para-educators (teachers' aides). Simpson et al, (2003) suggest that availability of trained aides to support students with autism is a pivotal part of ensuring student success. They stress however that aides should only be used to support students directly when necessary and that at other times they are best employed working with other students on an 'as needed' basis.

Reduced class size to allow for the more intensive input required for students with autism

Adequate teacher planning time including time for collaborative consultation.

Availability of paraprofessional (teachers' aide) and teacher in-service training. Training needs to be continuous, provided in both autism and collaborative consultation, and provided for general educators in group and individual formats depending on need. (Simpson et al., 2003).

The importance of a positive school climate. Several authors (e.g., Mesibov, 1992; Simpson et al., 2003) have stressed the critical importance of a positive, accepting attitude on the part of the whole school community for the success or otherwise of inclusion of students with special needs, including autism. The attitude of the school principal is critical in setting the overall tone or the attitude of the whole school. Parents of both disabled and typically developing students in the school are an essential part of the school community and their attitudes towards inclusion will influence the success or otherwise of the inclusion of students with disabilities.

The development of social skills for the student with autism in inclusive settings. Highly systematic approaches have been shown to be most effective for promoting interaction between children with autism and their typical peers (Odom & Strain, 1984, 1986) and gains made are more likely to be maintained in inclusive settings.

Shared responsibility by general and special educators and regular school community ownership of the included student(s) with autism. Historically there has been little consultation with general education teachers prior to enrolment of students with disabilities, hence the term 'mainstream dumping'. Simpson et al. (2003) point out that shared responsibility is an essential underpinning to ensure success and that this is best achieved by effective communication, shared decision making and participatory management.

Home-school collaboration. Mandalawitz (2002) stresses that parents and schools should not view each other as the enemy, because without basic trust, there will continue to be legal battles between the two groups. Trust between parents and educators is a key element in enhancing communication and effective implementation of the educational program in general.

Recurrent Evaluation of Inclusion Practices; including; curriculum delivery and implementation, environmental arrangement, interaction amount and type, participation level of student, attitudes of teacher, teachers' aides and peers (Simpson et al., 2003).

Summary

When Mesibov and Shea (1996) reviewed the research literature on full inclusion and students with autism in 1996, they found that there was insufficient evidence on which to base decisions about the benefits of this approach for these students. What research they found suggested that the benefits of full inclusion for students with autism were likely to be more limited than for students with other disabilities.

Harrower and Dunlap (2001) reviewed the research on behavioural analytic supports for students with autism in inclusive contexts and found that there are positive outcomes for many students with autism in inclusive settings **if the required supports are in place.** Mesibov and Shea (1996) suggest that full inclusion as a policy, explicitly and implicitly discourages the development of specialised approaches, while the unique characteristics of students with autism make some level of specialisation essential. Transition is particularly difficult for students with autism and must be proactively managed.

While there is no doubt that students with autism require a specialised approach in any type of placement, this can also be perceived as an opportunity for the regular school system. Experience to date in NSW suggests that regular class teachers who make the time and effort to develop strategies for the students with autism in their class frequently find that strategies such as the provision of structure, routine, visual supports and the teaching of social skills, often benefit other students with learning problems in the class/school and potentially all students in the school. Teachers have also reported that they believe that successfully rising to the challenge of having a child with autism in their class has made them better teachers. Clearly more outcome and process research is needed in this very important area (Roberts, 2004).

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Appendix A

Literature Review Search Strategy

Multiple database searches were conducted to identify recent publications. Search terms were limited to publication dates ranging from 2003 to 2006 (inclusive). All identified documents were examined and those that were relevant were retrieved for inclusion in the review. Reference lists of retrieved documents were hand searched to identify additional publications. A summary of the database searches that were performed during the process of conducting the review is set out below.

Database Searches

Database Searched	Search Terms	Results
CINAHL @ Ovid	autism	836
ISI Web of Science	autism	2045
Wiley Interscience	autism + treatment	333
Medline	autism + early intervention	39
	autism + treatment outcomes	4
	autism + treatment effectiveness	1
	autism + treatment evaluation	2
	autism + family support	2
	autism + diagnosis	231
PsychInfo	autism + early intervention	137
	autism + treatment	12
	autism + treatment effectiveness	12
	autism + treatment evaluation	6
	autism + treatment outcomes	32
	autism + treatment	499
	Autism + caregiver burden	7
	autism + social support networks	19
	autism + health care services	26
Embase	Autism + early intervention or treatment effectiveness or treatment evaluation	200
	Autism + family support	68
PUBMED	Autism + early intervention or treatment effectiveness or treatment evaluation or treatment outcomes	192
	Autism + family support	201
ERIC	Autism + intervention or treatment or program or model	162
	Autism + family support or social support	9

Appendix B: REVIEWS AND GUIDELINES

BCOHTA (2000). *Autism and Lovaas Treatment. A systematic review of effectiveness evidence*. British Columbia Office of Health Technology Assessment, The University of British Columbia.

Crewther S.G., Goodyear M.J., Bavin E.L., Lawson M.L., Wingenfield S.A., & Crewther D.P., (2003) *Autism in Victoria: An investigation of prevalence and service delivery for children aged 0-6 years*. Victorian Government Department of Human Services, Melbourne, Victoria.

Evans, S. (2003). *Service Guidelines: Children with Autism Spectrum Disorders*. The Department of Health and Senior Services, New Jersey.

Jordan R, Jones G, & Murray D. (1998). *Educational Interventions for Children with Autism: A literature review of recent and current research*. School of Education, University of Birmingham, UK.

Librera, W. L., Bryant, I., Gantwerk, B., & Tkach, B. (2004). *Autism Program Quality Assurance Indicators: A self-review and quality improvement guide for programs serving young students with autism spectrum disorders*: New Jersey Department of Education.

Ludwig S & Harstall C. (2001). *Intensive intervention programs for children with Autism*. Health Technology Assessment Report. Alberta Heritage Research Foundation for Medical Research, Canada.

MADSEC (2000). *Report of the MADSEC Autism Task Force: Maine Administrators of Services for Children with Disabilities*.

Medical Research Council (2001). *Autism: Epidemiology and Causes*.

McGahan L. (2001). *Behavioural intervention for preschool children with Autism*. Ottawa: Canadian Coordinating Office for Health Technology Assessment.

Newfoundland and Labrador Department of Education (2003). *Teaching Students with Autism Spectrum Disorder: Programming for Individual Needs*.

Osborn, P., & Scott, F. (2004). *Autism spectrum disorders: Guidance on providing supports and services to young children with autism spectrum disorders and their families*. Technical assistance manual: New Mexico Public Education Department.

Perry A. & Condillac, R., (2003). *Evidence-based practices for children and adolescents with autism spectrum disorders: Review of the literature and practice guide*. Report

commissioned by Children's Mental Health, Ontario, Canada.

www.cmho.org/autism_training.shtml

Special Programs Branch (2000). *Teaching Students with Autism: A Resource Guide for Schools*. British Columbia Ministry of Education.

A SURVEY OF SERVICE PROVIDERS OF EARLY INTERVENTION FOR CHILDREN WITH AUTISM AND THEIR FAMILIES IN AUSTRALIA

Introduction

A survey was designed and sent out to all known agencies providing services for young children with autism in Australia. Agencies were identified as a result of follow up from an earlier survey completed in 2003 and from discussion with autism associations and others in the autism community across Australia.

While the focus of the survey was services for children with autism and their families, many agencies provide generic services for children and families with special needs and some of these work with a significant number of children with autism and their families. The majority of children with autism will access services from agencies which are not autism specific. A sampling of generic agencies working with large numbers of children with autism was also surveyed and have been included in the survey results. These are identified in tables by (G) for generic services.

The goal of the survey was to provide useful information to families and professionals about the services available across Australia for young children with autism. Priorities were to provide basic information about services including:

- Contact details, age range, diagnostic criteria and geographical reach (Table One).
- Type of program in relation to characteristics such as; applied behaviour analysis, relationship development, focus on sensory issues, inclusion, transition, generalisation (Table Two).
- Family involvement (Table Three).
- Staff composition and training (Table Four)
- Program outcomes and accountability (Table Five).
- Costs and funding (Table Six).
- School services (Table Seven)
- Contact information for autism associations across Australia is set out in Table Eight.

In Table One services are shown for each state and territory. In subsequent tables 2-6 services are listed alphabetically for ease of location of information. Where there is more than one program of the same name in different states and territories the state/territory is noted after the name of the program.

Response to Survey

The clear majority of agencies who received a survey responded (75%). Most of these completed all the sections of the survey. When information was incomplete there are gaps

in the tables. Of the agencies which failed to respond it is possible some of these are no longer offering services. It is also possible that the authors were not aware of all agencies providing services to young children with autism and that some services were missed as a result. No autism specific services were identified in the Northern Territory.

Self Report

It is important to note that the information reported in this section of the review comes from self report only. There was no independent verification of information provided by agencies to the authors. In Table 2 in particular where information about the type of program offered is presented, it is likely that concepts such as ‘child versus adult directed’ and ‘skill development versus relationship development’ have been variably interpreted by service providers. It must be noted that the information in this table reflects the **perception of service staff** of the orientation of the service.

Age Range

The focus of the survey was young children with autism and their families; this includes early intervention services and services provided in the early school years. Some services cater for a wide age range and some are very specific. Where information about age range was provided by agencies it is shown on the first table.

Lack of Seamless Service Provision and Unacceptable Waiting Lists

For some children there will be an overlap in service provision as they move from early intervention to school, with good collaboration between staff of different services and families in the best cases. For many families this is not their experience. Families frequently report that it is difficult to get comprehensive objective information about services, that there are often long waiting times and that services are not coordinated. We know that transition generally and in particular transition from early intervention to school is very difficult for children with autism yet the coordination of service provision from early intervention to school continues to be poorly managed in most states and territories.

Table One: Intervention Services

State	Lead agency	Program	Year	Location	Contact	Type	Ages	Entry criteria
ACT	ACT Department of Education and Training	Autism Intervention Units	2001	3 units: South, central, and north Canberra	Executive Officer, Early Intervention & Special Education Tel. 02 6205 9198	S	0-6	Children aged 3 to 5 years with a diagnosis of autism.
ACT	ACT Department of Education and Training	Communication & Social Awareness Playgroups (CASA)	1998	Canberra	Executive Officer, Early Intervention & Special Education Tel. 02 6205 9198	G	0-6	Children aged 2 to 3 years with significant needs in communication and social skills development. Children can access multi-disciplinary assessment service through Therapy ACT.
ACT	ACT Department of Education and Training	Learning Support Units (Autism)	Circa 2000	17 units throughout Canberra	Special Education & Early Intervention Manager Tel. 02 6205 9198	S	5-15	Diagnosis of an ASD + adaptive behaviour rating at least 2 standard deviations below the mean in four areas of functioning.
ACT	ASD Consultancy and Support Service	ASD Consultancy and Support Service	2003	ACT and all NSW regional areas	Deanne Michaels 45 Carter Crescent Calwell ACT 2905 Office: 62910425	S	All	Children with challenging behaviours. Diagnosis of an ASD is not required.
ACT	Autism Spectrum Disorders Consultancy and Support Service	The Social and Friendship Skills Program	2002	Based in ACT with copies of programs used throughout Australia and O.S.	Deanne Michaels 45 Carter Crescent Calwell ACT 2905 Office: 62910425	G	6-12	Children with social difficulties. Diagnosis of an ASD is not required.
ACT	Gay von Ess, Autism Consultant and Special Educator	Gay von Ess, Autism Consultant and Special Educator	2003	All of the ACT and surrounding NSW. Will travel anywhere if costs are covered.	0413 776922 autism@gvones.com	S	0-12	Children with current or suspected diagnosis of an ASD

State	Lead agency	Program	Year	Location	Contact	Type	Ages	Entry criteria
NSW	Autism Spectrum Australia (ASPECT)	ASPECT Schools for Children with Autism	1966	Geographical regions: Sydney Metro, Hunter, Central Coast, Illawarra, & Riverina.	ASPECT (02) 8977 8300	S	0-16	A medical diagnosis of an ASD and a current psychometric assessment.
NSW	Autism Spectrum Australia (ASPECT)	BUILDING BLOCKS® Early Intervention Service	Circa 1970s	Services offered throughout Sydney metropolitan area & far north coast of NSW	ASPECT (02) 8977 8300	S	0-6	Children under 3 years must have a diagnosis of an ASD or features of an ASD. Children aged 3-5 years must have diagnosis of an ASD.
NSW	Autism Spectrum Australia (ASPECT)	Behaviour Intervention Service	2003	Western suburbs of Sydney only (i.e. Blacktown, Penrith, Hawkesbury, & Blue Mountains).	ASPECT (02) 8977 8300	G	0-18	Children, 0 to 18, with a diagnosis of a developmental disability (not autism-exclusive) and current or emerging challenging behaviour.
NSW	Autism Spectrum Australia (ASPECT)	Central Coast School Early Intervention Service	1997	Gosford/Wyong LGA	(02) 4384 5971	S	0-6	Children with a diagnoses of an ASD.
NSW	Autism Behavioural Intervention NSW	Behaviour Support Program	<i>To commence 2007</i>	Northern Sydney	Sam Loricco 0438 074 604 Sam.loricco@abinsw.org.au	S	0-6	Children with a diagnosis of autism.
NSW	Connect Therapy	Connect Therapy	2002	Greater Sydney metropolitan area	3/9 Alexander St Crows Nest, 2065 0402119319	S	0-12	Children with a diagnosis of autism.
NSW	Autism Spectrum Australia (ASPECT)	Jigsaw Program	2004	Wollongong, Peakhurst, Forestville, Wetheril Park	ASPECT (02) 8977 8300	S	0-6	Children with a diagnosis of an ASD or related disorder.
NSW	Autism Spectrum Australia (ASPECT)	“Recipe for Success” Parent/Carer Training Program	2005	4 regional and 3 metropolitan workshops per annum.	ASPECT (02) 8977 8300	S	0-20	Parents or carers of children (aged 0-20) with a diagnosis of an ASD.

State	Lead agency	Program	Year	Location	Contact	Type	Ages	Entry criteria
NSW	Autism Spectrum Australia (ASPECT)	School Outreach Service (SOS)	1991	Greater metropolitan area of Sydney. Other regional areas can be negotiated.	ASPECT (02) 8977 8300	S	0-18	Children of school age (K-12) in mainstream school with a diagnosis of an ASD.
NSW	Centre for Autism and Related Disorders (CARD)	Centre for Autism and Related Disorders (CARD)	1997	Based in Sydney. Services throughout Australia + Asia Pacific	Karen Wong, Suite 45, 11-21 Underwood Rd Homebush NSW 2140	S	0-18	Children with a current, suspected, or pending diagnosis of an ASD.
NSW	First Chance: The University of Newcastle	Early Childhood Intervention	1977	Lake Macquarie and Port Stephens local government areas	University Drive Callaghan NSW 2305	G	0-6	Children up to school age with a diagnosis of a disability or at risk of developmental problems.
NSW	Giant Steps	Early Learning	1995	Gladesville	Giant Steps (02) 9879 4971	S	3-6	Diagnosis of autism
NSW	Giant Steps	Play Steps	2000	Gladesville + Caringbah	Giant Steps (02) 9879 4971	S	0-6	Current or pending diagnosis of autism
NSW	Hunter Prelude	Hunter Prelude Early Intervention	1986	Kurri Kurri – Cessnock, Maitland, Dungog, Singleton, Upper Hunter LGAs	(02) 4937 4549	G	0-6	Children with a developmental delay in at least two areas (e.g., cognitive and physical development).
NSW	Koorana Child and Family Centre	Supported Playgroups	2002	Canterbury and Bankstown LGAs	Koorana (02) 9750 4100	G	0-6	Referral with the aim to target vulnerable groups within the community
NSW	Koorana Child and Family Centre	Home Based Early Intervention	1994	Canterbury LGA	Koorana (02) 9750 4100	G	0-6	Children with a diagnoses of developmental disability or delay
NSW	Koorana Child and Family Centre	Inclusion Support Program	1999	Croydon St + Lakemba/Phillip St Preschool Roselands	Koorana (02) 9750 4100	G	3-6	Children aged 3 to 6 years with a diagnoses of developmental disability or delay

State	Lead agency	Program	Year	Location	Contact	Type	Ages	Entry criteria
NSW	Koorana Child and Family Centre	Preschool Preparation Group	1995	Canterbury LGA	Koorana (02) 9750 4100	G	3-6	Children aged 3 to 6 years with a diagnoses of developmental disability or delay
NSW	Learning Links	Let's Play	2005	South East Sydney	Learning Links Tel. 02 9534 1710	G	0-6	Children with diagnosed disability, developmental delay or at risk of delay.
NSW	Learning Links	Early Starter's Program	1994	Hurstville, Sutherland, Liverpool, Fairfield LGAs	Learning Links Tel. 02 9534 1710	G	0-6	Children with diagnosed disability and developmental delay; children at risk of not reaching milestones.
NSW	Learning Links	Learning Links Preschool	2005	At child's preschool in Hurstville LGA	Learning Links Tel. 02 9534 1710	G	2.5 - 6	Two and a half years to school entry, including children with and without special needs.
NSW	Learning Links	Linking with Pre-School Program	1980's	South-East and South-West Sydney	Learning Links Tel. 02 9534 1710	G	0-6	Children with a disability, developmental delay, or difficulties attending pre-school or childcare.
NSW	Learning Links	Parents experiencing children with autism (PECA)	2003	Group is run at Peakhurst	Learning Links Tel. 02 9534 1710	G	0-18	Parents with children with autism spectrum disorders.
NSW	Learning Links	The Hanen Program: More Than Words	2004	South-East and South-West Sydney	Learning Links Tel. 02 9534 1710	G	0-6	Children under the age of 6 years with communication and social difficulties or children with an ASD.
NSW	Lifestart Cooperative Ltd	Lifestart Cooperative	1996	Putney, Nepean Cumberland, Prospect, Hornsby, Eastwood, Inner-West, Eastern Sydney, Northern Beaches	PO Box 3277 Putney NSW 2112	G	0-12	Children, 0 to 6 years, with a diagnosis of developmental disability or delay.

State	Lead agency	Program	Year	Location	Contact	Type	Ages	Entry criteria
NSW	Mission Australia	Macarthur Early Childhood Intervention Service	1979	Campbelltown, Camden, and Wollondilly LGAs	Helen Lunn, Child Family & Migrant Services lunnh@missionaustralia.com.au	G	0-6	Children with a written diagnosis of developmental disability or delay in a minimum 2 areas of skill development.
NSW	Sound Therapy International	Sound Therapy for Children	1989 (AUS)	Based in Gerringong. Take-home program available throughout the world.	2/9 Bergin St Gerringong NSW 2534 1300 55 77 96	G	All	Any child with a need for auditory stimulation. Parents assess the need and elect to purchase the program.
NSW	Wisconsin Early Autism Project	Early Autism Project Pty Ltd	2001	Intensive supervision in Sydney and Canberra. Interstate workshops available.	321A/8 Lachlan St Waterloo NSW	S	0-12	Children, under 8 years, with a diagnosis of an ASD, or other PDD and IQ 40+
QLD	Autism Early Intervention Outcomes Unit (AEIOU)	Autism Early Intervention Outcomes Unit (AEIOU)	2005	Queensland, Brisbane	(07) 3849 6099 simon@aeiou.org.au	S	0-6	Diagnosis of an ASD, Aged between 2½ and 5½. Appropriate fit with current students.
QLD	Autism Intervention and Management Strategies	Applied Behavioural Analysis		17 Rhyndarra Street, Yeronga QLD	0402 854 390 aim_s@bigpond.net.au	G	All	No formal requirements – children typically diagnosed with an ASD
QLD	Autism Queensland	ProAQtive Early Intervention Group Placement	2001	Sunnybank Hills Therapy & Education Centre (head office)	Sarah Littmann Early Intervention Program Manager (07) 3273 0000	S	0-6	Available to children with a diagnosis of an ASD, between 3 ½ - 4 ½ years, and who are registered with Autism Queensland
QLD	Autism Queensland	EarlyAQtion Programs + Advisory Visits	2006	Head office in Sunnybank Hills. Service throughout QLD	Frances Scodellaro Manager Therapy & Education Outreach Service. (07) 3273 0000	S	0-6	Children 6 years and under with a diagnosis of an ASD. Ascertained ASD level 5 or 6 OR eligible for special education program

State	Lead agency	Program	Year	Location	Contact	Type	Ages	Entry criteria
QLD	Minds and Hearts Clinic	Minds and Hearts Clinic	2005	Clinic located in West End, QLD	(07) 3844 9466	S	All	Specialist clinic for children with Autistic Disorder & Asperger's syndrome.
QLD	Symmetry Psychological Services	Intensive Home-Based Applied Behaviour and Verbal Behaviour Intervention Program	2001	Clinic located at Southport. Home based services Murwillumbah (NSW) to Brisbane (QLD)	Sharon L Monahan Suite 12, Gold Coast Specialist Medical Centre, 127 Nerang Street, Southport	S	0-12	Diagnosis of PDD, including an ASD (for individualised ABA program). Further screening criteria for individual programs and suitability for intensive behavioural intervention apply.
SA	Autism SA	Diagnostic Services			Coordinator of Diagnostic Services (08) 8379 6978	S		No entry requirements
SA	Autism SA	The Early Development Program		Metropolitan area. Country visits arranged by the School Program team twice per year.	Coordinator of Early Development Program (08) 8379 6976	S	0-6	Preschool age with a diagnosis of an ASD.
SA	Autism SA	Family Support Program		Home visits to families in metro area and phone calls to families in country areas.	Coordinator, Family Support Program (08) 8379 6976	S		Available to families of children recently diagnosed with an ASD.
SA	Department of Education and Children's Services (DECS)	The Briars Special Early Learning Centre	2000	Adelaide metropolitan area	(08) 8365 9808	G	0-6	Intake panel review child's information to determine whether he or she has significant developmental delay/disability.
SA	Pyramid Educational Consultants of Australia P/L	Pyramid Educational Consultants of Australia P/L	2002	All states and territories of Australia	PO Box 4115, Norwood South, SA, 5067 (08) 8240 3811	G	All	No specific entry requirements. Children all have significant communication impairment, but diagnostic category is not relevant.

State	Lead agency	Program	Year	Location	Contact	Type	Ages	Entry criteria
SA	SASRAPID Inc	Aquatic Therapy for Children with Autism	1998	Adelaide metro area, various locations	(08) 8410 6999	S	0-12	Rapid Swim: Open age criteria. Must have an Integration Difficulty. Aquatic Therapy for Children with Autism: Up to 12 yrs of age. Must be diagnosed with an ASD.
SA	School of Psychology, Flinders University	Flinders University Early Intervention Research Program	2003	Offered to families throughout SA. Initial two week program on site. Home program and follow up home or phone appointments provided.	Dr Robyn Young, School of Psychology, Flinders University, GPO Box 2100, Adelaide, 5001	S	0-6	Children between 1 and 5 years. Children must not begin any new treatments/therapies/diets over the 20 week program. Must have a diagnosis or provisional diagnosis of Autistic Disorder, or a score of 26 or higher on the CARS.
TAS	Behavioural Intervention Services	Behavioural Intervention Services	2002	Tasmania, concentrating in Hobart, Launceston & North East Coast	12 Oldham Ave, New Town, TAS 7008 0409 557 958	S	0 – young adult	Diagnosis of an ASD although will allow entry to other children on a case by case basis. Commitment from parents to follow the program.
TAS	Giant Steps	Giant Steps	1995	Deloraine	John Christie, Principal Tel. (03) 6362 2522	S	0-18	Diagnosis of an ASD. School program for primary and secondary students.
VIC	Autism Behavioural Intervention Association (ABIA)	Autism Behavioural Intervention Association (ABIA)	1994	State-wide	Tel. 03 9830 0677 info@abia.net.au www.abia.net.au	S	0-12	Caters for children with autism ages two and up.
VIC	Integrated Education and Communication	Integrated Education and Communication	1999	Victoria	182 Canterbury Rd, Blackburn South, 3130 (03) 9893 5547	S	0-12 + post-school	Formal diagnosis not required.

State	Lead agency	Program	Year	Location	Contact	Type	Ages	Entry criteria
VIC	Gateways Support Services. In partnership with Scope, Noah's Ark, & DHS specialist children's services	Barwon ECIS flexible packages program	2006	Greater Geelong, SurfCoast, Queenscliffe, Colac, and Otway LGAs	10-12 Albert St Geelong West 3218 (03) 52212984	G	0-6	Available to families of children with a disability where there are safety or stress issues or critical development concerns which are impacting on the family's ability to continue to care for their child
VIC	Gateways Support Services	Gateways early childhood intervention program	1988	Head Office: 10-12 Albert St Geelong West LGA's of Greater Geelong, SurfCoast and Queenscliffe	10-12 Albert St Geelong West 3218 Ph 03 52212984 Fax 52231789	G	0-6	Children with a development disability including children with a current or pending diagnosis of an ASD.
VIC	Noah's Ark West	Noah's Ark West Autism Program	1992	Hoppers Crossing & Albanvale. Services Brimbank, Hobson's Bay, & Werribee LGAs	Jenny Bott – Coordinator Autism Program Tel. 03 9304 7402	S	0-6	Children under six years with a current or pending diagnosis of an ASD
VIC	Pam Langford Psychological Services	ABA or Intensive Behavioural Intervention Programs – Home based	1996	Victoria	225 Church Street, Brighton, Vic., 3186 phone 95538808 mobile 0419004126	G	All	Children with a developmental or language delay.
VIC	Partnership between Kalparrin ECI Program & Specialist Children's Services	Northern Autism Outreach Service	1993	Staff based at two sites: Kalparrin, Greensborough & SCS, and Preston. Service all of Northern Metropolitan Region	Paula Drum (03) 9435 8311 Seb Papadimitriou (03) 9479 0594	S	0-6	Children with a current, pending, or suspected diagnosis of an ASD.

State	Lead agency	Program	Year	Location	Contact	Type	Ages	Entry criteria
VIC	Southern Autistic School	Southern Autistic School	Circa 1986	Service area: South Eastern suburbs of Melbourne as defined by DE&T Southern Metropolitan Region.	(03) 9563 8139	S	2-13	Entry Criteria for EEP: Diagnosis of autism with a CARS score of 30+. Entry criteria for school age program is under DE&T guidelines. Some children in EEP do not qualify for school program.
VIC	The Learning For Life Autism Centre Inc.	The Learning For Life Autism Centre Inc.	2005	Based in Surrey Hills. Services to suburbs of Melbourne	(03) 9836 0422	S	0-6	Children with a diagnosis of an ASD aged 4 years or under.
VIC	Yooralla Society of Victoria + Broad Insight Group	Early Childhood Autism Services- Northern (ECAS-N)	2000	Northern Metropolitan Region	ECAS-N 48-50 Box Forest Rd Glenroy 3046 Tel. 03 9359 9366	G		Children with severe delays in speech & language. Behaviour and sensory needs which severely restricts the child's ability to learn skills and participate.
WA	David J Leach	The Whole Behaviour Program	1998	15 Hakea Plaza, Canningvale WA 6155	(08) 9456 2423	G	0-6	Any child with developmental disability including Autistic Disorder, Aspergers syndrome, and PDD-NOS
WA	Department of Education and Training	Autism Units	1999	Perth Metro (4 units)	Inclusive Education Standards Directorate, 151 Royal St East Perth WA 6003	S	0-6	Children with diagnosis of an ASD and non-verbal IQ score within normal limits. Parents must support generalisation of skill at home and in the community. Children enter mainstream after maximum of 2 years.
WA	Disability Services Commission	Individual and Family Support, Mildred Creek Autism Team	Circa 1971	Perth metropolitan area	DSC, 146-160 Colin St, West Perth WA 6005	S	0-6	Birth to school age, diagnosis of an ASD, and at risk of intellectual disability

State	Lead agency	Program	Year	Location	Contact	Type	Ages	Entry criteria
WA	Disability Services Commission	Individual and Family Support, Home Based Autism Service	2000	Perth metropolitan area	DSC, 146-160 Colin St, West Perth WA 6005	S	6-12	Diagnosis of autism, children between 6-12 years of age, children and family living in Perth metro area, child has challenging behaviours.
WA	ISADD	ISADD (DSC funded program)	1998	Perth metropolitan area	(08) 9397 5970	S	0-6	Children with a diagnosis of an ASD recognised by the Disability Services Commission
WA	ISADD	ISADD (Private funded program)	1994	Perth (head office), services in Adelaide, Melbourne, Hobart, Singapore, Jakarta, NZ, and UK.	(08) 9397 5970	G	All	No entry requirements.
WA	Kim Beazley School	Kim Beazley School ABA Program	2004	Stevens St, White Gum Valley WA	(08) 9335 7933	S	0-12	Children with a current or pending diagnosis of an ASD: preferably of kindergarten age or younger, pre-primary children also eligible.
WA	Leaps and Bounds Inc	Leaps and Bounds Inc	2003	Guy Daniels Community Centre, Sail Terrace, Heathridge WA	Jackie Twigg (08) 9401 8119	S	6-18	Children 6 years and older with a diagnosis of autism
WA	Therapy Focus	Therapy Focus in Early Intervention	2002	Perth metropolitan area	Level 2, 161 Great Eastern Highway, Belmont WA	G	0-6	Children with a diagnosis of developmental delay across a number of areas including neurological, sensory, physical, and cognitive development (excluding psychosocial development).

Table Two: Program Description (key for tables 2 -5; ✓ service responded 'yes', blank indicates 'no' or no response)

Program	Adult Directed	Child Directed	Adult + Child Directed	Focus on Skill Development	Focus on Relationship Development	Focus on Skill + Relationship Development	Use of ABA methods	Use of Positive Behaviour Support	Use of Visual Supports + AAC	Use of schedules and routines	Sensory support	Opportunities for inclusion with peers	Transition to mainstream Preschool	Transition to mainstream school	Transition to other settings	Generalisation Strategies	Life span approach	Recommended as sole treatment	Recommended to be used with other treatments
ABA or Intensive Behavioural Intervention Programs (VIC)	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓		✓
Autism Behavioural Intervention Assoc. (ABIA)			✓			✓	✓		✓	✓	✓	✓	✓	✓	✓	✓			✓
Applied Behaviour Analysis (QLD)			✓			✓	✓		✓	✓	✓	✓	✓	✓	✓	✓			✓
Aquatic Therapy for Children with Autism	✓			✓		✓		✓	✓	✓	✓					✓	✓		✓
ASD consultancy and support service			✓		✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓
ASPECT Schools for children with autism	✓		✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓
Autism Early Intervention Outcome Unit (AEIOU)	✓			✓	✓	✓		✓	✓	✓	✓		✓			✓	✓		
Autism Intervention Units (ACT)	✓					✓			✓	✓	✓		✓	✓		✓			
Autism Units (WA)	✓					✓	✓			✓			✓			✓		✓	
Barwon ECIS Flexible Packages Program	Parents identify and choose supports to meet their needs																		
Behavioural Intervention Services (TAS)		✓				✓	✓			✓	✓	✓	✓	✓		✓			✓
Behaviour Support Program (NSW) (<i>commencing 2007</i>)			✓			✓	✓	✓	✓	✓		✓	✓		✓	✓			✓
Behaviour Intervention Service (ASPECT)	✓		✓		✓			✓	✓	✓	✓					✓			✓
Building Blocks Early Intervention Service (ASPECT)			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				✓			✓
Centre for Autism and Related Disabilities (CARD)			✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓
Central Coast School Early Intervention Service			✓		✓	✓		✓	✓	✓	✓		✓	✓	✓	✓			✓
Communication and social awareness playgroups (ACT)			✓	✓	✓				✓	✓	✓								
Connect Therapy			✓		✓	✓		✓	✓	✓	✓	✓				✓			✓
Diagnostic Services (Autism SA)																			
Early Autism Project			✓			✓	✓	✓	✓	✓		✓	✓	✓		✓		✓	✓

Program	Adult Directed	Child Directed	Adult + Child Directed	Focus on Skill Development	Focus on Relationship Development	Focus on Skill + Relationship Development	Use of ABA methods	Use of Positive Behaviour Support	Use of Visual Supports + AAC	Use of schedules and routines	Sensory support	Opportunities for inclusion with peers	Transition to mainstream Preschool	Transition to mainstream school	Transition to other settings	Generalisation Strategies	Life span approach	Recommended as sole treatment	Recommended to be used with other treatments
Early AQtion Programs + Advisory Visits (Autism QLD)						✓		✓	✓	✓	✓		✓	✓	✓		✓		✓
Early Childhood Autism Services Northern (ECAS-N)			✓			✓	✓	✓	✓	✓	✓		✓	✓		✓		✓	
Early Childhood Intervention (First Chance)			✓		✓			✓	✓	✓	✓		✓	✓		✓			✓
Early Learning (Giant Steps NSW)			✓			✓	✓	✓	✓	✓	✓		✓	✓	✓	✓			✓
Early Starter's Program (Learning Links)			✓			✓			✓		✓		✓						
Family Support Program (Autism SA)																			
Flinders University Early Intervention Research Program			✓			✓	✓		✓	✓	✓					✓		✓	
Gateways Early Childhood Intervention Program			✓	✓				✓	✓	✓	✓	✓	✓	✓	✓	✓			✓
Gay von Ess Autism Consultant			✓			✓			✓	✓			✓	✓	✓	✓			✓
Giant Steps (TAS)	✓					✓	✓			✓	✓	✓	✓	✓	✓	✓	✓		✓
Home Based Early Intervention (Koorana)	✓			✓	✓	✓		✓	✓		✓		✓	✓	✓	✓			✓
Hunter Prelude Early Intervention	✓			✓	✓	✓	✓	✓	✓	✓	✓		✓						✓
Inclusion Support Program (Koorana)			✓	✓	✓	✓		✓	✓	✓	✓	✓		✓	✓				✓
Individual and Family Support (Mildred Creek Autism Team)			✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	
Individual and Family Support (Home Based Autism Service)	✓						✓	✓	✓	✓						✓			
Integrated Education and Communication (VIC)							✓	✓	✓	✓			✓	✓	✓	✓	✓		✓
Intensive ABA and Verbal Behaviour Program (Symmetry)	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓
Intervention Services for Autism + Develop. Delay (DSC funded)	✓					✓	✓		✓	✓		✓	✓			✓		✓	
Intervention Services for Autism + Develop. Delay (Private)	✓					✓	✓		✓	✓		✓	✓	✓	✓	✓	✓	✓	
Jigsaw Program	✓					✓	✓	✓	✓	✓	✓		✓	✓	✓	✓			✓
Kim Beazley School ABA Program	✓						✓			✓			✓					✓	
Leaps and Bounds Inc		✓				✓	✓	✓	✓	✓						✓			✓
Learning Links Preschool			✓		✓	✓			✓	✓	✓	✓		✓	✓				✓
Learning support units (autism)			✓	✓		✓			✓	✓	✓	✓		✓	✓	✓			

Program	Adult Directed	Child Directed	Adult + Child Directed	Focus on Skill Development	Focus on Relationship Development	Focus on Skill + Relationship Development	Use of ABA methods	Use of Positive Behaviour Support	Use of Visual Supports + AAC	Use of schedules and routines	Sensory support	Opportunities for inclusion with peers	Transition to mainstream Preschool	Transition to mainstream school	Transition to other settings	Generalisation Strategies	Life span approach	Recommended as sole treatment	Recommended to be used with other treatments
Let's Play (Learning Links)			✓			✓			✓		✓		✓	✓	✓				✓
Lifestart Cooperative			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓
Lifestart (Northern Beaches)			✓			✓	✓	✓	✓	✓	✓		✓	✓	✓	✓			✓
Linking with Pre-School Program (Learning Links)		✓		✓	✓	✓		✓	✓	✓	✓	✓	✓	✓					✓
Macarthur Early Childhood Intervention Service			✓			✓			✓	✓	✓		✓	✓	✓	✓			
Minds and Hearts Clinic			✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓			✓		✓
Noah's Ark West Autism Program			✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓
Northern Autism Outreach Service			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓
Parents experiencing children with autism (Learning Links)	✓																		✓
Playsteps (Giant Steps)			✓			✓		✓	✓	✓	✓		✓	✓	✓				✓
Pre-School Preparation Group (Koorana)	✓			✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓			✓
ProAQtive Early Intervention Group Program (Autism QLD)	✓					✓	✓	✓	✓	✓	✓		✓	✓	✓	✓			✓
Pyramid Educational Consultants			✓			✓	✓		✓	✓	✓		✓	✓		✓	✓		✓
Recipe for Success parent/carer training program	✓							✓											✓
School Outreach Service (ASPECT)	✓	✓	✓			✓		✓	✓	✓	✓			✓	✓	✓	✓		✓
Sound Therapy for Children	✓	✓	✓	✓				✓			✓		✓	✓	✓		✓		✓
Southern Autistic School			✓			✓			✓	✓	✓		✓	✓		✓			✓
Supported Playgroups (Koorana)			✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓					✓
The Briars Special Learning Centre			✓		✓			✓	✓	✓	✓	✓	✓	✓	✓				✓
The Early Development Program (Autism SA)																			
The Hanen Program (Learning Links)		✓				✓			✓	✓	✓	✓	✓			✓		✓	
The Learning for Life Autism Centre	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓
The social and friendship skills program			x		x	x		x	x	x	x	x				x			x
Therapy Focus in Early Intervention			✓	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓			✓
The Whole Behaviour Program			✓			✓	✓		✓	✓	✓	✓	✓	✓	✓	✓			✓

Table Three: Family Involvement

Service	Support provided to parents	Information provided to parents	Training provided to parents	Parent training is integral to the program	Parents involved in goal setting	Parents work as part of a team	Parents help deliver the program	Parents involved in program evaluation	Siblings have access to support	Siblings are specifically supported
ABA or Intensive Behavioural Intervention Programs (VIC)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Autism Behavioural Intervention Assoc. (ABIA)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Applied Behaviour Analysis (QLD)	✓	✓	✓	✓	✓	✓	✓		✓	
Aquatic Therapy for Children with Autism	✓	✓	✓		✓	✓	✓	✓		
ASD consultancy and support service	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ASPECT Schools for children with autism	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Autism Early Intervention Outcome Unit (AEIOU)	✓	✓	✓	✓	✓	✓		✓	✓	
Autism Intervention Units (ACT)	✓	✓			✓	✓		✓		
Autism Units (WA)		✓		✓	✓					
Barwon ECIS Flexible Packages Program	Family decided which supports they want to access									
Behavioural Intervention Services (TAS)	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Behaviour Support Program (NSW) <i>(To commence 2007)</i>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Behaviour Intervention Service (ASPECT)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Building Blocks Early Intervention Service (ASPECT)	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Centre for Autism and Related Disabilities (CARD)	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Central Coast School Early Intervention Service	✓	✓	✓	✓	✓			✓	✓	
Communication and social awareness playgroups (ACT)	✓	✓			✓			✓		
Connect Therapy	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Diagnostic Services (AutismSA)										
Early Autism Project		✓	✓	✓	✓	✓	✓	✓	✓	
Early AQtion Programs + Advisory Visits (Autism QLD)	✓	✓	✓			✓			✓	
Early Childhood Autism Services Northern (ECAS-N)	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Early Childhood Intervention (First Chance)	✓	✓	✓	✓	✓	✓	✓	✓	✓	

Service	Support provided to parents	Information provided to parents	Training provided to parents	Parent training is integral to the program	Parents involved in goal setting	Parents work as part of a team	Parents help deliver the program	Parents involved in program evaluation	Siblings have access to support	Siblings are specifically supported
Early Learning (Giant Steps)	✓	✓	✓	✓	✓	✓				
Early Starter's Program (Learning Links)	✓			✓	✓	✓	✓	✓	✓	
Family Support Program (Autism SA)										
Flinders University Early Interven. Research Program	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Gateways Early Childhood Intervention Program	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Gay von Ess Autism Consultant		✓	✓	✓	✓	✓	✓	✓	✓	
Giant Steps (TAS)	✓	✓	✓		✓	✓		✓		
Home Based Early Intervention (Koorana)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Hunter Prelude Early Interv.	✓		✓	✓	✓	✓	✓	✓	✓	
Inclusion Support Program (Koorana)	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Individual and Family Support (Mildred Creek Autism Team)	✓	✓	✓	✓	✓	✓	✓	✓		
Individual and Family Support (Home Based Autism Service)				✓	✓					
Integrated Education and Communication (VIC)	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Intensive ABA and Verbal Behav. Program (Symmetry)	✓	✓	✓	✓	✓	✓	✓		✓	✓
Intervention Services for Autism + Develop. Delay (DSC funded)	✓	✓	✓	✓	✓	✓	✓		✓	
Intervention Services for Autism + Develop. Delay (Private)	✓	✓	✓	✓	✓	✓	✓	✓		
Jigsaw Program	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Kim Beazley School ABA Program		✓			✓					
Leaps and Bounds Inc	✓	✓	✓		✓	✓	✓	✓		
Learning Links Preschool	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Learning support units (autism)				✓	✓	✓		✓		
Let's Play (Learning Links)	✓	✓		✓	✓	✓	✓	✓		
Lifstart Cooperative	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Lifstart (Northern Beaches)	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Linking with Pre-School Program	✓	✓		✓	✓	✓	✓	✓	✓	
Macarthur Early Childhood Intervention Service	✓			✓	✓	✓		✓		
Minds and Hearts Clinic	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Noah's Ark West Autism Program	✓	✓	✓	✓	✓	✓	✓	✓	✓	

Service	Support provided to parents	Information provided to parents	Training provided to parents	Parent training is integral to the program	Parents involved in goal setting	Parents work as part of a team	Parents help deliver the program	Parents involved in program evaluation	Siblings have access to support	Siblings are specifically supported
Northern Autism Outreach Service	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Parents experiencing children with autism (Learning Links)	✓	✓	✓							
Playsteps (Giant Steps)	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Pre-School Preparation Group (Koorana)	✓	✓	✓	✓	✓	✓	✓	✓	✓	
ProAQtive Early Intervention Group Program (Autism QLD)	✓	✓	✓		✓	✓		✓	✓	
Pyramid Educational Consultants	✓	✓	✓	✓	✓		✓			
Recipe for Success parent/carer training program	✓	✓	✓	✓	✓			✓		
School Outreach Service (ASPECT)	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Sound Therapy for Children	✓	✓		✓		✓	✓	✓	✓	
Southern Autistic School	✓		✓		✓					
Supported Playgroups (Koorana)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
The Briars Special Learning Centre		✓			✓	✓				
The Early Development Program (Autism SA)										
The Hanen Program (Learning Links)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
The Learning for Life Autism Centre	✓	✓	✓	✓	✓	✓	✓	✓	✓	
The social and friendship skills program	✓	✓	✓	✓	✓		✓	✓		
The Whole Behaviour Program	✓	✓	✓		✓	✓	✓			
Therapy Focus in Early Intervention	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Table Four: Staff Composition and Training

Service	Service employs:					Staff-Child ratio	Staff have specialist training in:			Training is the result of:		
	Aides	Teachers	Sp/Path	OT	Psych		Autism	Working with families	Working in teams	Conferences workshops	On the job training	Further study
ABA or Intensive Behavioural Intervention Programs (VIC)							✓	✓	✓	✓	✓	✓
Autism Behavioural Intervention Assoc. (ABIA)	✓		✓		✓	1: 1	N/A	N/A	N/A	N/A	N/A	✓
Applied Behaviour Analysis (QLD)							✓	✓	✓		✓	✓
Aquatic Therapy for Children with Autism			✓	✓		1:1	✓	✓	✓	✓	✓	✓
ASD consultancy and support service						1:1	✓	✓	✓	✓	✓	✓
ASPECT Schools for children with autism	✓	✓	✓	✓	✓	1:4	✓	✓	✓	✓	✓	✓
Autism Early Intervention Outcome Unit (AEIOU)	✓	✓	✓	✓	✓	9: 14	✓	✓		✓	✓	✓
Autism Intervention Units (ACT)	✓	✓			✓	1: 2	✓	✓	✓	✓	✓	✓
Autism Units (WA)	✓	✓					✓		✓	✓	✓	✓
Barwon ECIS Flexible Packages Program	-	-	-	-	-	-	-	-	-	-	-	-
Behavioural Intervention Services (TAS)					✓	1: 1-6	✓			✓	✓	
Behaviour Support Program (NSW) <i>(To commence 2007)</i>		✓			✓	1:1	✓	✓	✓	✓		
Behaviour Intervention Service (ASPECT)		✓			✓	N/A	✓	✓	✓	✓	✓	✓
Building Blocks Early Intervention Service (ASPECT)		✓	✓	✓	✓	1: 1-3	✓	✓	✓	✓	✓	✓
Centre for Autism and Related Disabilities (CARD)				✓	✓	1: 1	✓	✓	✓	✓	✓	✓
Central Coast School Early Intervention Service	✓	✓	✓	✓	✓	3:4	✓	✓	✓	✓	✓	✓
Communication and social awareness playgroups (ACT)	✓	✓						✓	✓			
Connect Therapy			✓	✓		1:1	✓	✓	✓	✓	✓	✓
Diagnostic Services (Autism SA)												
Early Autism Project					✓	1:1	✓	✓	✓	✓	✓	
Early AQtion Programs + Advisory Visits (Autism QLD)												
Early Childhood Autism Services Northern (ECAS-N)	✓	✓	✓	✓		1: 5	✓	✓	✓	✓	✓	✓
Early Childhood Intervention (First Chance)	✓	✓	✓	✓		1: 3-4	✓	✓	✓	✓	✓	✓

Service	Service employs:					Staff-Child ratio	Staff have specialist training in:			Training is the result of:		
	Aides	Teachers	Sp/Path	OT	Psych		Autism	Working with families	Working in teams	Conferences workshops	On the job training	Further study
Early Learning (Giant Steps)	✓	✓	✓	✓		1:1	✓	✓	✓	✓	✓	✓
Early Starter's Program (Learning Links)	✓	✓	✓	✓		1: 2.5		✓	✓	✓	✓	✓
Family Support Program (Autism SA)												
Flinders University Early Interven. Research Program						1:1	✓	✓	✓	✓	✓	✓
Gateways Early Childhood Intervention Program	✓	✓	✓	✓	✓	1:18	✓	✓	✓	✓	✓	✓
Gay von Ess Autism Consultant		v				1:1	✓			✓	✓	✓
Giant Steps (TAS)	✓	✓	✓	✓		4:5	✓	✓	✓	✓	✓	✓
Home Based Early Intervention (Koorana)		✓	✓		✓	1:1	✓	✓	✓	✓	✓	✓
Hunter Prelude Early Interv.		✓	✓	✓	✓	1:3	✓			✓	✓	✓
Inclusion Support Program (Koorana)	✓	✓	✓		✓	1:6	✓	✓	✓	✓	✓	✓
Individual and Family Support (Mildred Creek Autism Team)			✓	✓	✓	1:8	✓	✓	✓	✓	✓	✓
Individual and Family Support (Home Based Autism Service)			✓		✓	1: 3.75	✓	✓	✓	✓	✓	✓
Integrated Education and Communication (VIC)	✓		✓		✓	1:1	✓			✓	✓	✓
Intensive ABA and Verbal Behaviour Program (Symmetry)	✓	✓				1:1	✓	✓	✓		✓	✓
Intervention Services for Autism + Develop. Delay (DSC funded)					✓	1:1	✓				✓	
Intervention Services for Autism + Develop. Delay (Private)					✓	1:1	✓				✓	
Jigsaw Program	✓	✓	✓	✓	✓	1:3	✓	✓	✓	✓	✓	✓
Kim Beazley School ABA Program	✓	✓				3:5	✓			✓	✓	✓
Leaps and Bounds Inc	✓					1:1	✓	✓	✓		✓	✓
Learning Links Preschool	✓	✓	✓	✓		1 : 5	✓	✓	✓	✓	✓	✓
Learning support units (autism)	✓	✓				1 : 3	✓			✓	✓	✓
Let's Play (Learning Links)	✓	✓				1 : 2.5	✓	✓	✓	✓	✓	✓
Lifstart Cooperative		✓	✓	✓		1: 1-10	✓	✓	✓	✓	✓	✓
Lifstart (Northern Beaches)		✓	✓	✓		4:2	✓	✓	✓	✓	✓	✓
Linking with Pre-School Program		✓	✓	✓		N/A	✓	✓	✓	✓	✓	✓
Macarthur Early Childhood Intervention Service	✓	✓	✓	✓	✓	2: 4-6			✓	✓	✓	

Service	Service employs:					Staff-Child ratio	Staff have specialist training in:			Training is the result of:		
	Aides	Teachers	Sp/Path	OT	Psych		Autism	Working with families	Working in teams	Conferences workshops	On the job training	Further study
Minds and Hearts Clinic			✓		✓	N/A	✓	✓	✓	✓	✓	✓
Noah's Ark West Autism Program	✓	✓	✓	✓		1: 1-3	✓	✓	✓	✓	✓	✓
Northern Autism Outreach Service		✓	✓			1: 1-3	✓	✓	✓	✓	✓	✓
Parents experiencing children with autism (Learning Links)	✓				✓	N/A	✓	✓	✓	✓	✓	
Playsteps (Giant Steps)	✓	✓				3 : 8	✓	✓	✓	✓	✓	✓
Pre-School Preparation Group (Koorana)		✓	✓	✓	✓	1:3	✓	✓	✓	✓	✓	✓
ProAQtive Early Intervention Group Program (Autism QLD)	✓	✓	✓	✓	✓	3 : 6	✓	✓	✓	✓	✓	✓
Pyramid Educational Consultants			✓	✓		N/A	✓	✓	✓	✓		✓
Recipe for Success parent/carer training program		✓	✓		✓	N/A	✓	✓	✓	✓	✓	✓
School Outreach Service (ASPECT)		✓	✓		✓	N/A	✓	✓	✓	✓	✓	✓
Sound Therapy for Children	✓	✓	✓	✓	✓	1:1		✓		✓	✓	
Southern Autistic School	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓
Supported Playgroups (Koorana)	✓							✓	✓	✓	✓	
The Briars Special Learning Centre	✓	✓				1: 2	✓	✓	✓	✓	✓	✓
The Early Development Program (Autism SA)												
The Hanen Program (Learning Links)		✓	✓			1: 1	✓	✓	✓		✓	✓
The Learning for Life Autism Centre	✓					1: 1	✓	✓	✓	✓	✓	
The social and friendship skills program	✓					1: 1-2	✓	✓	✓	✓	✓	
The Whole Behaviour Program					✓	1:1	✓	✓	✓	✓	✓	✓
Therapy Focus in Early Intervention			✓	✓	✓		✓	✓	✓		✓	✓

Table Five: Program Outcomes and Accountability

Service	Each child has individual treatment plan	Child/family outcomes measures by:				Program reviews:				
		Parent feedback	Formal pre-post assessment	Informal pre-post assessment	Review of treatment data	Conducted 6 monthly	Conducted annually	Are documented	Include input from parents	Program set out in manual
ABA or Intensive Behavioural Intervention Programs (VIC)	✓	✓	✓	✓	✓			✓	✓	✓
Autism Behavioural Intervention Assoc. (ABIA)	✓	✓		✓	✓	Fortnightly		✓	✓	✓
Applied Behaviour Analysis (QLD)		✓		✓		Ongoing				
Aquatic Therapy for Children with Autism	✓	✓		✓	✓	Every 3 months		✓		✓
ASD consultancy and support service	✓	✓						✓		
ASPECT Schools for children with autism	✓	✓	✓	✓	✓	✓		✓	✓	✓
Autism Early Intervention Outcome Unit (AEIOU)	✓	✓	✓	✓	✓	✓		✓	✓	✓
Autism Intervention Units (ACT)										
Autism Units (WA)		✓	✓	✓		✓		✓	✓	✓
Barwon ECIS Flexible Packages Program	✓	✓				✓		✓	✓	✓
Behavioural Intervention Services (TAS)	✓	✓	✓	✓	✓	✓			✓	
Behaviour Support Program (NSW) (To commence 2007)	✓	✓		✓	✓	✓		✓	✓	✓
Behaviour Intervention Service (ASPECT)	✓	✓	✓	✓	✓			✓	✓	✓
Building Blocks Early Intervention Service (ASPECT)	✓	✓	✓	✓	✓	✓		✓	✓	✓
Centre for Autism and Related Disabilities (CARD)	✓	✓	✓	✓	✓	Quarterly		x	✓	✓
Central Coast School Early Intervention Service										
Communication and social awareness playgroups (ACT)	✓	✓		✓	✓	✓				
Connect Therapy	✓	✓		✓	✓		✓	✓	✓	✓
Diagnostic Services (Autism SA)										
The Early Autism Project	✓	✓	✓		✓	✓		✓	✓	
Early AQtion Programs + Advisory Visits (Autism QLD)		x				N/A				
Early Childhood Autism Services Northern (ECAS-N)	✓	✓	✓	✓	✓	6 monthly or as requested		✓	✓	
Early Childhood Intervention (First Chance)		✓	✓	✓	✓	✓		✓	✓	✓
Early Learning (Giant Steps)	✓	✓		✓		✓		✓	✓	

Service	Each child has individual treatment plan	Child/family outcomes measures by:				Program reviews:				
		Parent feedback	Formal pre-post assessment	Informal pre-post assessment	Review of treatment data	Conducted 6 monthly	Conducted annually	Are documented	Include input from parents	Program set out in manual
Early Starter's Program (Learning Links)										
Family Support Program (Autism SA)										
Flinders University Early Interven. Research Program	✓	✓	✓		✓	Fortnightly		✓	✓	✓
Gateways Early Childhood Intervention Program	✓	✓	✓	✓		✓	✓	✓	✓	X
Gay von Ess Autism Consultant	✓	✓		✓	✓		✓			
Giant Steps (TAS)	✓	✓	✓	✓	✓	✓		✓	✓	
Home Based Early Intervention (Koorana)	✓	✓	✓	✓	✓	✓		✓	✓	
Hunter Prelude Early Intervention	✓	✓		✓	✓	Review every 5 weeks		✓	✓	✓
Inclusion Support Program (Koorana)	✓	✓	✓	✓	✓	✓		✓	✓	
Individual and Family Support (Mildred Creek Autism Team)	✓	✓		✓	✓	✓		✓	✓	✓
Individual and Family Support (Home Based Autism Service)	✓	✓	✓	✓	✓	✓		✓	✓	
Integrated Education and Communication (VIC)	✓	✓	✓	available	✓	Monthly		✓	✓	
Intensive ABA and Verbal Behaviour Program (Symmetry)	✓	✓	✓	✓	✓	✓		✓	✓	✓
Intervention Services for Autism + Develop. Delay (DSC funded)	✓		✓		✓		✓	✓	✓	
Intervention Services for Autism + Develop. Delay (Private)	✓		✓		✓	✓		✓	✓	
Jigsaw Program	✓	✓		✓	✓	✓			✓	
Kim Beazley School ABA Program	✓		✓		✓	✓		✓	✓	✓
Leaps and Bounds Inc	✓	✓			✓					✓
Learning Links Preschool	✓	✓	✓	✓		As requested by family		✓	✓	✓
Learning support units (autism)	✓	✓	✓	✓	✓	✓		✓	✓	
Let's Play (Learning Links)	✓	✓				✓		✓		✓
Lifstart Cooperative	✓	✓		✓	✓	✓		✓		
Lifstart (Northern Beaches)	✓	✓		✓	✓	✓		✓	✓	✓
Linking with Pre-School Program	✓	✓		✓	✓	✓		✓	✓	✓
Macarthur Early Childhood Intervention Service	✓	✓		✓	✓	✓		✓	✓	✓
Minds and Hearts Clinic	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Noah's Ark West Autism Program	✓	✓			✓	Ongoing		✓	✓	
Northern Autism Outreach Service	✓	✓		✓	✓	3 monthly		✓	✓	

Service	Each child has individual treatment plan	Child/family outcomes measures by:				Program reviews:				
		Parent feedback	Formal pre-post assessment	Informal pre-post assessment	Review of treatment data	Conducted 6 monthly	Conducted annually	Are documented	Include input from parents	Program set out in manual
Parents experiencing children with autism (Learning Links)	-	-	-	-	-	-	-	-	-	-
Playsteps (Giant Steps)	✓	✓		✓		✓				
Pre-School Preparation Group (Koorana)	✓	✓	✓	✓	✓	✓		✓	✓	
ProAQtive Early Intervention Group Program (Autism QLD)	✓	✓	✓	✓	✓	✓		✓	✓	✓
Pyramid Educational Consultants	✓	✓		✓	✓	N/A	N/A	✓		
Recipe for Success parent/carer training program	N/A	✓	N/A	✓	N/A	N/A	N/A	N/A	N/A	N/A
School Outreach Service (ASPECT)	✓	✓	✓			✓		✓	✓	✓
Sound Therapy for Children		✓		✓		✓				
Southern Autistic School	✓		✓	✓		✓		✓	✓	✓
Supported Playgroups (Koorana)		✓			✓					
The Briars Special Learning Centre	✓	✓		✓		✓		✓	✓	✓
The Early Development Program (Autism SA)										
The Hanen Program (Learning Links)	✓	✓		✓	✓	✓		✓	✓	✓
The Learning for Life Autism Centre	✓	✓	✓	✓	✓	Weekly			✓	
The social and friendship skills program	✓	✓		✓				✓	✓	✓
The Whole Behaviour Program	✓		✓	✓	✓	✓		✓	✓	✓
Therapy Focus in Early Intervention	✓	✓		✓	✓	✓		✓		

Table Six: Funding, Cost and Intensity of Programs in Australia

Program	Approximate Cost of Providing Program	Cost to Family	Sources of funding	Hours per week	Time limit on Enrolment	Waiting time
ABA or Intensive Behavioural Intervention Programs (VIC)		\$1200 per month up to \$3500 per month		25+		
Autism Behavioural Intervention Assoc. (ABIA)	30,000-40,000 per year	30,000-40,000 per year for 30 hour per week program	Parents = 100%	Approx 30 hours	None	
Applied Behaviour Analysis (QLD)		Approx \$25,000 per annum	100% fees	10-25	None	None
Aquatic Therapy for Children with Autism	\$465.60 per year	\$14.55 per session	50% fees 50% funding	1 or less	None	> 6 months
ASD consultancy and support service		\$40 per hour	100% fees	1-5	None	None
ASPECT Schools for children with autism	\$34,332.00 per student per annum	\$2,400 per year	7% fees 0.4% fundraising 85% funding	25+	Up to 16/18 years of age	From 1 to 12+ months
Autism Early Intervention Outcome Unit (AEIOU)	\$8,750 per term	\$3,500 per term	40% fees 60% fundraising	25+	Up to 6 years of age	6-12 months
Autism Intervention Units (ACT)						
Autism Units (WA)		Nil	100% funding	10-25	2 years	None
Barwon ECIS Flexible Packages Program		Nil	100% funding	\$4000-5000 package of funding per year that can be used flexibly.	Regular review	none
Behavioural Intervention Services (TAS)		\$35 per hour	100% fees	1-10	none	Director on sabbatical 2006
Behaviour Support Program (NSW) (commencing 2007)	\$2800	\$200	5% fees 5% fundraising 90% funding	1-5	None	Commencing 2007

Program	Approximate Cost of Providing Program	Cost to Family	Sources of funding	Hours per week	Time limit on Enrolment	Waiting time
Behaviour Intervention Service (ASPECT)	Approx \$100,000 to service 76 clients in 2005	\$50 registration fee	Fees negligible 100% funding	Block of up to 8 visits per year	Generally 8 visits per year	1-3 months
Building Blocks Early Intervention Service (ASPECT)	\$800 for home-based & \$600 for centre-based	\$200 per term for fortnightly home based program & \$150 per term for weekly centre-based program, \$500 for the Hanen "More than Words" program	11% fees 25% fundraising 64% funding	Home based 2 hours fortnightly & centre-based 2 hours weekly for child & 2 hours weekly for parent/s	12 months	Dependent on date of referral (time before commencement of next program)
Centre for Autism and Related Disabilities (CARD)		Approx \$53,200 for 30 hours of therapy per week and fortnightly supervision over 50 weeks (excl. materials)	100% fees	Dependent on child	none	1-3 months
Central Coast School Early Intervention Service				0-6	none	6-12 months
Communication and social awareness playgroups (ACT)		None	100% funding	1-5	3 years of age	None
Connect Therapy	\$2,197	\$477 for DVD \$3677 for 13 week in home training + DVD \$160 per hour in home speech or occupational therapy following program	100% fees	1-5	None	1-3 months
Diagnostic Services (Autism SA)						
Early Autism Project	\$12,000 per year cost of providing EAP service	\$30,000 - \$60,000 per year (EAP + therapists)	100% fees	10+	None	None
Early AQtion Programs + Advisory Visits (Autism QLD)		No cost unless parents wish to access user pays services	10% fundraising 90% funding	1-5	None	1-3 months

Program	Approximate Cost of Providing Program	Cost to Family	Sources of funding	Hours per week	Time limit on Enrolment	Waiting time
Early Childhood Autism Services Northern (ECAS-N)	\$6450	\$480 per year	10% fees 90% funding	1-5	Children move to other services when ready	1-3 months
Early Childhood Intervention (First Chance)	\$7614	\$22 for full day \$15 for 3 hours session \$13 for 2.5 hours session \$11 for 2 hours session	9.3% fees 22.7% fundraising 68% funding	5-10	None	1-12 months depending on age
Early Learning (Giant Steps)	\$40,000 per child	Parents actively involved in program	60% fund raising 40% funding	10-25	None	>12 months
Early Starter's Program (Learning Links)	\$7161	\$13.50 per session \$15 membership	6% fees 34% fundraising 60% funding	1-5	3 years of age	6-12 months
Family Support Program (Autism SA)						
Flinders University Early Intervention Research Program	\$6000 per child/family	none	95% fundraising 5% funding	1 or less	Before age 5	6-12 months
Gateways Early Childhood Intervention Program	\$4575 government funding plus trust and donations used to buy equipment and a \$40,000 community donation per year to assist 10 high needs children and families.	Parents may incur a cost for venue rental and materials.	0.1% fees 7.4% fundraising 92.5% funding	1-3	Specialist playgroups run for 6 months	0-6 months
Gay von Ess Autism Consultant		\$80 per hour	100% fees	1-5	None	None
Giant Steps (TAS)	\$35,000 per child	\$4350 per child	11% fees 12% fundraising 77% funding	25+	None	None
Home Based Early Intervention (Koorana)	\$7500 per child per year	\$50 per term	2% fees 98% fundraising	1 or less	6 years of age	6-12 months
Hunter Prelude Early Intervention	\$9000	\$5 per week	2% fees 8% fundraising 90% funding	1-5	5 years of age or starting preschool	1-3 months

Program	Approximate Cost of Providing Program	Cost to Family	Sources of funding	Hours per week	Time limit on Enrolment	Waiting time
Inclusion Support Program (Koorana)	\$5700 per child per year	\$28 per day (subsidies may be available)	20% fees 80% funding	2x 6 hours days	Up to starting school	6-12 months
Individual and Family Support (Mildred Creek Autism Team)	\$5,600 per child	None	100% funding	1-5	none	6-12 months
Individual and Family Support (Home Based Autism Service)	\$5572	\$0	100% funding	1-5	Approximately 6 months	6-12 months
Integrated Education and Communication (VIC)		Approx \$50,000 per year depending on intensity	100% fees	10-25	none	1-3 months
Intensive ABA and Verbal Behav. Program (Symmetry)		Approx \$500 per week	Majority through fees	10-25	None	1-3 months
Intervention Services for Autism + Develop. Delay (DSC funded)	\$6500 per year	none	100% funding	1-5	Up to school age	6-12 months
Intervention Services for Autism + Develop. Delay (Private)		Full time program approximately \$45,000	100% fees	10-25	none	1-3 months
Jigsaw Program	\$83,392 per group p.a. (5-6 children)	\$45 per session x 10 sessions per term	51.8% fees 48.2% funding	5-10	2-6 years of age	0-12+ months depending on region
Kim Beazley School ABA Program	Nil	Nil	100% funding	10-25	None	None
Leaps and Bounds Inc	\$6,120.00 per annum	\$50 per session	10% fees 90% fundraising	1-5	None	None
Learning Links Preschool		\$36 full day \$18 half day		5-18	Up to six years of age	>12 months
Learning support units (autism)	Standard voluntary contributions	Amount set by each school	100% funding	25+	Kindergarten to Year 10	Units generally full. No waiting list maintained.
Let's Play (Learning Links)		\$18 per session \$15 membership		1-5	Up to six years of age	>12 months
Lifestart Cooperative	7,000 per child per year	250 per term	9% fees 18% fundraising 71% funding	1-5	none	1-12+ months depending on region

Program	Approximate Cost of Providing Program	Cost to Family	Sources of funding	Hours per week	Time limit on Enrolment	Waiting time
Linking with Pre-School Program		\$289 + \$15 membership fee	5% fees 65% fundraising 40% funding	1 or less	Up to school age	Approx 12+ months
Macarthur Early Childhood Intervention Service	unknown	\$5 per week per family	33% mission Australia 67% Government funding	1-5	Up to school age	1-3 months
Minds and Hearts Clinic		\$250 assessment \$150 per session	100% fees	1 or less	none	0-12 months depending on service
Noah's Ark West Autism Program	\$4575 per child provided in funding	\$80 per term per child	98% funding	1-5	Up to school age	>12 months
Northern Autism Outreach Service		None	Majority funding	Not set	Short term service while family waiting for other programs	0-3 months
Parents experiencing children with autism (Learning Links)	Approx \$500 per family	Nil		1-5	Nine fortnightly sessions	1-3 months
Playsteps (Giant Steps)		\$40 per two hour session	80% fees 20% funding	1-5	none	0-3 months
Pre-School Preparation Group (Koorana)	\$11,250 per child		10% fees 90% funding	5-10	12 months	6-12 months
ProAQtive Early Intervention Group Program (Autism QLD)		\$75 per week	DSQ provides \$31,500 per year. Autism Queensland covers the rest.	5-10	12 Months	6-12 months
Pyramid Educational Consultants	\$10,000	\$160 p/h	100% fees	1-5	none	none
Recipe for Success parent/carer training program	126 parents and 112 professionals completed workshops at a cost of \$100,000	\$30 per person for catering	100% funding	3 day workshop	N/A	N/A
School Outreach Service (ASPECT)	Services for 305 clients in 2005 cost \$404,826	\$150 initial visit \$110 review \$35 per child social skills program	30% fees 27% ASPECT 43% Funding	Up to 2 x ½ day visits per year	Duration of school enrollment	6-12 months
Sound Therapy for Children		\$149 to \$821	100% fees	1 or less	None	none

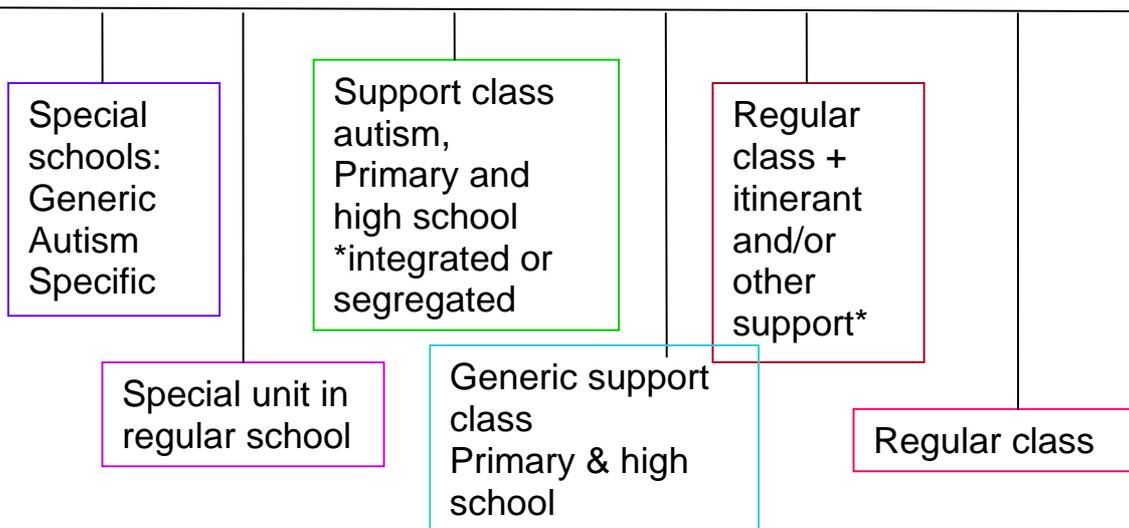
Program	Approximate Cost of Providing Program	Cost to Family	Sources of funding	Hours per week	Time limit on Enrolment	Waiting time
Southern Autistic School				18		6-12 months
Supported Playgroups (Koorana)	\$1,800 per family per year	\$0	100% funding	1-5	N/A	1-3 months
The Briars Special Learning Centre	Unknown	\$20 per term for 1 day a week \$40 per term for 2 days per week	1% fees 99% funding	5-10	Approx 3.5 to 5 years of age	none
The Early Development Program (Autism SA)						
The Hanen Program (Learning Links)	\$2072	\$200 per course	1% fees 98% fundraising	1-5	Approx 10 sessions over 6 months	6-12 months
The Learning for Life Autism Centre	\$70,000	\$20,000	33% fees 67% fundraising	25+	Up to school age	> 12 months
The social and friendship skills program	\$2000 per family	\$400 per family for 10 week program plus \$80 for resource books	100% fees	1-5	10 week program	> 12 months
Therapy Focus in Early Intervention		\$0	100% funding	1-5	As long as child meets eligibility criteria	6-12 months
The Whole Behaviour Program		\$25 p/h for tutors \$150 p/h for Psych	100% fees	5-25	none	None

Services for school aged children with autism

There is a range of school services for young children with special needs including autism available in different states and territories of Australia. These placement options may be provided by government state education departments or by the non-government sector which includes autism associations and the Catholic education system.

Continuum of services from most to least specialised/inclusive

State (Gov) Independent (non-Gov)



*May or may not be autism specific.

The range of educational placements and services catering specifically for students with autism varies across the states and territories of Australia. Options available in different states and territories are set out in the following table. It should be noted that in each state and territory there may be great variation in availability of specialist autism educational placements and support. If these are available they are more likely to be clustered in the large population centres.

It is important to note that the majority of students with autism in Australia have non-autism specific school placements. Some are being home schooled.

Table Seven: School placements and support services for students with autism in Australia

	NSW	VIC	WA	TAS	Q'LAND	SA	ACT	NT
Gov. Schools classes	NSW DET autism support classes	Vic DET operates 5 special schools for children with autism including Western and *Southern Autistic schools	WA DET x4 autism support classes	No autism specific schools or classes	No autism specific schools or classes	No autism specific schools or classes	ACT DET 17 Learning Support Units (Autism)	No autism specific schools or classes
Gov. school support services	DET itinerant autism support teachers	Support provided but not autism specific	Autism Intervention Team	Generic support plus clusters have autism specialists	Itinerant teachers for autism	Generic support provided	Generic support provided	Generic support provided
Non-Gov. Schools classes	*Aspect autism schools x6 *Aspect autism support classes x54 in DET and CEO schools	Mansfield Autistic centre	No autism specific schools or classes	*Giant Steps	Autism Queensland schools Sunnybank and Brighton	No autism specific schools or classes	No autism specific schools or classes	No autism specific schools or classes
	Giant Steps School							
	Woodbury school (IBI)							
Non-Gov School support services	*Aspect school support service (SOS)		AAWA school aged consultancy services.		Autism Queensland school support services (TEOS)	Autism SA School support Program		

*Services which have returned surveys. Please see tables for more information

Table Eight: Contact info for autism associations in Australia

<p>Autism Council of Australia</p> <p>Head: Mr Mick Clark (President) Address: PO Box 361, Forestville, Secretary NSW 2087 Phone: 02 8977 8300 (Secretary) Fax: 02 8977 8399 Web: http://www.aspect.org.au/aca/</p>	<p>Autism Victoria</p> <p>Head: Mrs Amanda Golding (CEO) Address: PO Box 235, Ashburton VIC 3147 Phone: (03) 9885 0533 Fax: (03) 9885 0508 Email: admin@autismvictoria.org.au Web: www.autismvictoria.org.au</p>
<p>Autism Association of South Australia</p> <p>Head: Jon Martin (Executive Director) Address: PO Box 339, Eastwood, SA 5063 Phone: (08) 8379 6976 Fax: (08) 8338 1216 Email: admin@autismsa.org.au Web: http://www.autismsa.org.au/html/contact.html</p>	<p>Autism Spectrum Australia (ASPECT)</p> <p>Head: Adrian ford (CEO) Address: PO Box 361, Forestville NSW 2087 Phone: 02 8977 8300 Fax: 02 8977 8399 Email: contact@aspect.org.au Web: http://www.aspect.org.au/contact/centraloffice.asp</p>
<p>Autism Association of Western Australia</p> <p>Head: Mrs Joan McKenna Kerr (Executive Director) Address: Locked Bag 9, Post Office, West Perth WA 6872 Phone: (08) 9489 8900 Fax: (08) 9489 8999 Email: autismwa@autism.org.au Web: http://www.autism.org.au/</p>	<p>Autism Tasmania</p> <p>CEO: Mrs Penny Cromarty (President) Rose Clark (Family Support Cordinator) Address: PO Box 1552 Launceston TAS 7250 Phone: (03) 6423 2288 Email: autism@autismtas.org.au Web: http://www.autismtas.org.au/oldsite/index.htm</p>
<p>Autism Northern Territory</p> <p>Head: Alison Bird (Director) Address: PO Box 36595, Winnellie NT 0821, Australia Phone: (08) 8948 4424 (9-1pm) Fax: Email: autismnt@bigpond.net.au Web:</p>	<p>Autism Queensland</p> <p>Head: Mrs Penny Beetson (CEO) Address: PO Box 363 Sunnybank QLD 4109 Phone: 07 3273 0000 Fax: 07 3273 8306 Email: tonic@autismqld.com.au Web: http://www.autismqld.asn.au/</p>
<p>Autism ACT</p> <p>Head: Mrs Gaye Von Ess (President) Address: SHOUT Office Pearce Community Centre Collett Pl Pearce 2607 Phone: (02) 6290 1984 Email: autismact@home.com.au aspergersyndrome_act@assn.org.au Web: http://autism.anu.edu.au/</p>	

