

Educating Persons with Autistic Spectrum Disorder – A Systematic Literature Review

Caroline Bond, Wendy Symes, Judith Hebron,
Neil Humphrey and Gareth Morewood, University of Manchester

NCSE RESEARCH REPORTS NO: 20



A report commissioned by the NCSE.
All NCSE research reports undergo peer review.

2016

The National Council for Special Education has funded this research.
Responsibility for the research (including any errors or omissions) remains with the authors.
The views and opinions contained in this report are those of the authors and
do not necessarily reflect the views or opinions of the Council.

© NCSE

The National Council for Special Education (NCSE) was originally set up under the Education Act (1998) in December 2003, and was formally established under the Education for Persons with Special Educational Needs Act on 1st October 2005.

National Council for Special Education

1-2 Mill Street

Trim

Co Meath

An Chomhairle Náisiúnta um Oideachas Speisialta

1-2 Sráid an Mhuilinn

Baile Átha Troim

Co na Mí

T: 046 948 6400

F: 046 948 6404

www.ncse.ie

Educating Persons with Autistic Spectrum Disorder – A Systematic Literature Review

Caroline Bond, Wendy Symes, Judith Hebron,
Neil Humphrey and Gareth Morewood, University of Manchester

NCSE RESEARCH REPORTS NO: 20



Authors' acknowledgements

We would like to thank the Advisory Group for their advice and suggestions throughout the research process. We would also like to thank Lawrence Wo and Robert Buck for their perseverance throughout the process of coding the studies and Aleesha Coupland for her support with the formatting of this report.

Foreword

The NCSE commissioned this review of the research evidence available on educational interventions for children with ASD.

We wanted to build on the knowledge base established by the International Review of the Literature of Evidence of Best Practice Provision in the Education of Persons with ASD, which the NCSE published in 2009 (Parsons et al.). This report considers the relevant research studies published between 2008 and 2013.

The researchers considered over 1,000 studies and determined that 176 of these were relevant for inclusion. 85 of these were rated high enough to be included in the final report. Despite the considerable amount of research in this area since 2008, it is disappointing to note that similar limitations in the evidence base to those identified by Parsons et al. in 2008, still prevail. There continues to be limited longitudinal research to determine if interventions result in long-term changes; limited large scale studies, which reduces the generalisability of findings; limited direct research in schools, creating challenges for translating interventions into real school settings; and limited research on effective interventions for older students with ASD and research that includes the views of students and parents.

The researchers conclude the evidence provided in the systematic review and guidance strands indicates that a range of provision types and intervention strategies are needed. For school age ASD provision, the research states that interventions need to focus on key features of ASD, particularly social interaction and flexibility of thought with access to supplementary learning, communication and life skills interventions as needed.

Teresa Griffin

Chief Executive Officer

2016

Table of Contents

Authors' acknowledgements	i
Foreword	ii
List of Tables and Figures	viii
Acronyms	x
Glossary	xii
Executive Summary	1
Background	1
Methodology	2
Main Findings	2
Interventions with the most evidence	2
Interventions with moderate evidence	3
Interventions with some evidence	4
Interventions with a small amount of evidence or insufficient evidence in this review	4
Case studies	4
Guidance documents	5
Conclusion	5
Issues Identified and Implications	5
1 Introduction and Context	7
1.1 Introduction	7
1.2 Irish Context	7
1.2.1 Legislation and policy	7
1.2.2 Prevalence rates	8
1.3 Educational Provision	9
1.3.1 Early Years provision	9
1.3.2 Home tuition	9
1.3.3 School age provision	10
1.4 Teacher Education	11
1.5 Evaluation of Provision	11
1.6 Educational Interventions for Children and Young People with ASD	12
1.6.1 Diagnosis and diagnostic terminology	12
1.6.2 Prevalence of ASD	13
1.6.3 Evaluating educational interventions for children with ASD	13
1.7 Summary	15

2 Methodology	16
2.1 Overview	16
2.2 Procedure: Systematic Literature Review Strand	17
2.2.1 Systematic literature review process	17
2.2.2 Review Stage 1: Literature searching	18
2.2.3 Review Stage 2: Reference harvesting	20
2.2.4 Review Stage 3: Application of inclusion criteria	20
2.2.5 Review Stage 4: Development of coding framework	23
2.2.6 Review stage 5: Using the coding framework	26
2.2.7 Review stage 6: Presentation and description of review findings	27
2.3 Procedure: Case Study Strand	27
2.3.1 Overview	27
2.3.2 Case study data collection	28
2.4 Procedure: Guidance Strand	28
2.5 Data Synthesis	30
3 Results: Systematic Literature Review	31
3.1 Overview of Included Studies	31
3.1.1 Quality and type of studies	31
3.1.2 Country of origin	32
3.1.3 Studies by age group and focus of intervention	32
3.1.4 Intervention type	35
3.2 Presentation of Data and Interpretation	36
3.3 Studies Focusing on Joint Attention Interventions	38
3.3.1 Findings from the joint attention section	40
3.4 Studies focusing on social interventions	41
3.4.1 Findings from the social interventions section	52
3.5 Studies focusing on play-based interventions	54
3.5.1 Findings from the play-based interventions section	57
3.6 Studies focusing on communication interventions	58
3.6.1 Findings from the communication section	63
3.7 Studies focusing on challenging/interfering behaviour interventions	64
3.7.1 Findings from the challenging/interfering behaviour interventions section	73
3.8 Studies focusing on pre-academic/academic skills	75
3.8.1 Findings from the pre-academic and academic interventions section	79
3.9 Studies focusing on school readiness skills	80

3.10	Studies focusing on cognitive skills	81
3.11	Studies focusing on adaptive/self-help skills	82
3.11.1	Findings from the adaptive/self-help skills interventions section	84
3.12	Studies focusing on motor skills interventions	85
3.13	Studies focusing on comprehensive intervention programmes	86
3.13.1	Findings from the comprehensive intervention programmes section	92
3.14	Summary of evidence	94
3.15	Discussion of systematic review results	97
3.15.1	Implications for practitioners	97
3.15.2	Implications by age and setting type	97
3.15.3	Implications for policy makers	98
3.15.4	Implications for researchers	99

4 Best Practice Guidance **100**

4.1	Introduction	100
4.1.1	Autistic spectrum disorder guideline summary (New Zealand)	108
4.1.2	Autism strategy and action plan (Northern Ireland)	110
4.1.3	Interventions for autism spectrum disorders: State of the evidence (Maine)	110
4.1.4	Early intervention for children with autism spectrum disorders: Guidelines for good practice (Australia)	111
4.1.5	National standards report: The national standards project – Addressing the need for evidence-based practice (US)	112
4.1.6	What is good practice in autism education? (UK)	113
4.1.7	Education options for children with autism spectrum disorder (Australia, South)	114
4.1.8	Educational provision for children and young people on the autism spectrum living in England: A review of current practice, issues and challenges (UK)	115
4.1.9	Evidence-based practices in educating children with autism (North Carolina)	115
4.1.10	Educational provision and outcomes for people on the autism spectrum – Full technical report (UK)	117
4.1.11	Autism: The management and support of children and young people on the autism spectrum (England and Wales)	117
4.1.12	Education and autism spectrum disorders in Australia: The provision of appropriate educational services for school-age students with autism spectrum disorders in Australia (Australia)	118
4.1.13	Schools report 2013: Are schools delivering for young people with autism? (England)	118
4.1.14	Autism diagnosis in children and young people: Recognition, referral and diagnosis of children and young people on the autism spectrum (England and Wales)	118
4.1.15	Transition support for students with additional or complex needs and their families' submission to New South Wales inquiry (Australia)	119

4.2 Summary of Findings	119
4.2.1 Overview	119
4.2.2 Sources of evidence	119
4.2.3 The role of research in informing policy	120
4.2.4 The role of practice-based evidence	122
4.2.5 Interventions according to age	122
4.2.6 Educational interventions beyond the school	123
4.2.7 Interventions according to setting types	123
4.2.8 Professionals involved	123
4.2.9 Working in collaboration with families and young people	124
4.2.10 Professional education	124
4.2.11 Transition	124
4.2.12 Data management	124
4.3 Implications	124
4.3.1 Implications for practitioners	124
4.3.2 Implications by age range and setting type	126
4.3.3 Implications for policy makers	126
4.3.4 Implications for research	127

5 Discussion and Implications 128

5.1 Introduction	128
5.2 Policies and models underpinning education for people with ASD	128
5.3 International research evidence on best practice	129
5.3.1 Findings from the current review	129
5.3.2 Previous literature reviews	133
5.4 Evidence available from best practice guidelines documents	138
5.5 Lessons that can be identified from this evidence	139
5.6 Implications of this review	140
5.6.1 Pre-school provision and interventions	141
5.6.2 School age ASD provision and interventions	141
5.6.3 Guidance	143
5.6.4 Professional development	143
5.6.5 Collaborative research partnerships	143
5.6.6 Developing the evidence base for ASD interventions	144

References 145

International statutes 150

Appendices

Appendix A: Best evidence studies	151
Appendix B: Studies not included as best evidence	157
Appendix C: Studies excluded through the application of inclusion/exclusion criteria	165
Appendix D: Worked examples of IC3 (educational utility)	211
Appendix E: Guidance Coding Framework	212
Appendix F: Case Studies	213
Appendix G: Case Study Template	243
Appendix H: Country Scoping Template	246

List of Tables and Figures

Tables

Table 1: Search terms for the literature review	19
Table 2: Inclusion criteria	21
Table 3: Exclusion criteria	21
Table 4: Quality of evidence criteria (quantitative studies)	24
Table 5: Methodological appropriateness criteria	25
Table 6: Evaluation of effectiveness	26
Table 7: Included studies by country of origin	32
Table 8: Included studies by focus on intervention and age group	33
Table 9: Studies by intervention focus and type	35
Table 10: Effectiveness of intervention – ratings	36
Table 11: Joint attention interventions	38
Table 12: Social initiation training (behavioural) programmes	41
Table 13: Computer-assisted emotion recognition interventions	43
Table 14: Peer-mediated interventions	44
Table 15: Multi-component social interventions	48
Table 16: Consultation-based interventions	51
Table 17: Social interventions by age group	52
Table 18: Lego therapy®	54
Table 19: Play-based interventions	55
Table 20: Play interventions by age group	57
Table 21: Video modelling interventions (communication)	58
Table 22: Picture Exchange Communication System (PECS) interventions	60
Table 23: Behavioural interventions (communication)	61
Table 24: Peer-mediated intervention (communication)	62
Table 25: Communication interventions by age group	63
Table 26: Behavioural interventions	64
Table 27: Narrative interventions	68
Table 28: Self-monitoring interventions	70
Table 29: Computer-assisted interventions (behaviour)	71
Table 30: Yoga interventions	72
Table 31: Challenging/interfering behaviour interventions by age group	73
Table 32: Discrete skills training informed by behavioural principles	75
Table 33: Computer-assisted instruction interventions	77

Table 34: Multi-sensory interventions	78
Table 35: Academic interventions by age group	79
Table 36: School readiness interventions	80
Table 37: Cognitive skills interventions	81
Table 38: Computer-assisted life skills instruction	82
Table 39: Visual cueing interventions	83
Table 40: Adaptive/self-help skills interventions by age group	84
Table 41: Aquatic interventions	85
Table 42: Pre-school comprehensive intervention programmes	86
Table 43: School age comprehensive intervention programmes	91
Table 44: Comprehensive ASD interventions by age group	92
Table 45: Summary of review evidence (2008–2013)	96
Table 46: Overview of guidance	101
Table 47: Recommended interventions from guidance documents	121
Table 48: Comparison of best evidence interventions identified in Systematic Literature Reviews	134

Figure

Figure 1	17
-----------------	----

Acronyms

AAC	Augmentative and alternative communication
ABA	Applied behaviour analysis
ADI-R	Autism Diagnostic Interview – Revised (Rutter, LeCouter and Lord, 2003)
ADOS	Autism Diagnostic Observation Schedule (Lord et al., 1989)
ASD	Autism spectrum disorder
BEAM	Barnet Early Intervention Model
CAI	Computer aided instruction
CARS	Childhood Autism Rating Scale (Schopler et al., 1988)
CFT	Children’s Friendship Training
CMR	Concept mastery routines
COMPASS	Collaborative model for promoting confidence and success
CSBI	Comprehensive school based intervention
DCSF	Department for Children, Schools and Families (UK)
DES	Department of Education and Skills [Science] was renamed Department of Education and Skills in 2010
DRO	Differential reinforcement of other behaviours
DSM-IV	Diagnostic and Statistical Manual of Mental Disorders – Fourth Edition (American Psychiatric Association, 1994)
DSM-5	Diagnostic and Statistical Manual of Mental Disorders – Fifth Edition (American Psychiatric Association, 2013)
DTT	Discrete trial teaching
EIBI	Early intensive behavioural intervention
EPPI	Evidence for Policy and Practice Information and Co-ordinating Centre (UK)
ESCS	Early Social Communication Scales
FCT	Functional Communication Training
FT	Fluency training
GARS	Gilliam Autism Rating Scale
GRTL	Get ready to learn
HFA	High-functioning autism
ICD-9	International Statistical Classification of Diseases and Related Health Problems, 9th Revision (World Health Organization, 1978)
ICD-10	International Statistical Classification of Diseases and Related Health Problems, 10th Revision (World Health Organization, 1994)
IEP	Individual education plan

JASPER	Joint attention symbolic play engagement and regulation
LEAP	Learning Experiences – An Alternative Program for Preschoolers and Parents
LFA	Low-functioning autism
NCSE	National Council for Special Education (Ireland)
NHS	National Health Service (UK)
PACT	Pre-school autism communication trial
PACTS	Parents of Autistic Children Training and Support
PDD	Pervasive developmental disorder
PDD-NOS	Pervasive developmental disorder – not otherwise specified
PECS	Picture Exchange Communication System
PRT	Pivotal response training
PTR	Prevent–Teach–Reinforce
RCT	Randomised control trial
SEN	Special educational needs
SENCO	Special educational needs co-ordinator
SENO	Special educational needs organisers (Ireland)
SGD	Speech generating device
SLR	Systematic Literature Review
SSRS	Social Skills Rating System (Gresham and Elliot, 1990)
STAR	Strategies for teaching based on autism research
SULP	Social use of language programme
TAU	Treatment as usual
TEACCH	Treatment and Education of Autistic and Related Communication Handicapped Children
UK	United Kingdom
US	United States
VABS	Vineland Adaptive Behaviour Scales (Sparrow et al., 1984)
VCS	Visual cueing system
VM	Video modelling
VSM	Video social modelling

Glossary

Applied behaviour analysis	The science in which tactics derived from the principles of behaviour are applied systematically to improve socially significant behaviour, and experimentation is used to identify the variables responsible for behaviour change (Cooper, Heron and Heward, 2007).
Alternating treatment design	These research designs are used in order to ascertain the comparative effect of two treatments. Two treatments are alternated in rapid succession and compared using graph plots.
Baseline	A baseline condition is a measure of the participants' responses on a measure or series of measures, which are anticipated to change as a result of the intervention. These measures are taken prior to implementing the intervention.
Cohen's kappa coefficient	A statistical measure of the level of agreement between two raters.
Delayed treatment control	A group who initially act as a control group but receive the intervention at the end of the experiment. This overcomes a common ethical issue in educational research of withholding intervention.
Discrete-trial teaching	A specific teaching technique based on ABA principles that involves prompting and reinforcing responses.
Mainstream School	Also known as general or regular schools where the majority of children are without disabilities.
Mand training	A process where the learner is taught to request highly preferred items under conditions where those items are most valuable (Plavnick and Ferreri, 2012).
Milieu strategies	Behaviourally based strategies within naturalistic classroom routines.
Multiple baseline design	A single case experimental design commonly used with a group of participants. In order for outcomes not to be attributable to chance, the intervention is staggered to begin at different times for each participant. A stable baseline needs to be achieved prior to intervention and measures should return to a stable level post intervention.
Multiple probe design	Multiple probes (additional measures) are a variation of the multiple baseline design. Additional probes are added to a single case experimental design in order to understand what is happening at different points in the training sequence.
Picture Exchange Communication System	An established approach developed by Bondy and Frost (1994) that uses behavioural principles (such as prompting and reinforcement) to teach spontaneous communication skills using objects, symbols or pictures.

Pivotal response training	A naturalistic behavioural treatment intervention based on the principles of applied behaviour analysis. Interventions aim to enhance 'pivotal' behaviours (responsiveness to multiple cues, motivation, self-management and child self-initiations), which can lead to improvement in non-targeted behaviours.
Portage	A home visiting educational service for pre-school children with additional support needs and their families.
Pre-school	Also known as nursery school or kindergarten.
Primary school	Also known as elementary or junior school.
Quasi-experiment	A research design used to measure the causal impact of an intervention on its target population. Quasi-experimental research shares similarities with the traditional experimental design or RCT but lacks the element of random assignment to treatment or control groups.
Repeated measures design	A research design in which each individual participates in each condition of the experiment.
Randomised control trial	A research design in which participants are randomly allocated to intervention or control (no intervention) groups and the same measures are taken at the same time for both groups.
Secondary school	Also known as second level, post-primary or high school.
Single case experimental design	Also known as single subject designs. These are typically used with individuals or small numbers of participants and are research designs in which participants act as their own control. These designs include combinations of baseline, intervention and reversal phases.
Special schools	Special schools cater specifically for the needs of children and young people with disabilities and/or special educational needs, including ASD.
TEACCH	A lifespan approach which includes services, training and research to support individuals of all ages and skill levels with autism spectrum disorders.
Treatment conditions	Participants in an experiment may be allocated to one or more 'treatment conditions' otherwise known as interventions.
Token economy	Behaviour modification based on the systematic reinforcement of target behaviour using 'tokens' that can be exchanged for other reinforcers.
Withdrawal of treatment design	Withdrawal of treatment or A-B-A-B design measures baseline (A), treatment (B), withdrawal of treatment (A) and re-introduction of treatment (B).
1:1	One to one

Executive Summary

The current research was commissioned by the National Council for Special Education (NCSE) and sought to address six key questions:

1. What policies underpin the education for persons with autism spectrum disorder (ASD) in a number of other countries/jurisdictions?
2. What are the models of provision and services that espouse the policies in these countries/jurisdictions?
3. What does the international research evidence tell us about what works best in the provision of education for persons with ASD?
4. What evidence is available from best practice guidelines documents?
5. What lessons can be identified from this evidence?
6. What are the implications arising from this review for the provision of education for persons with ASD in Ireland?

Since 2001 educational policy in Ireland has been developing rapidly. The Report of the Task Force on Autism (Task Force on Autism, 2001) outlined the need for a range of services for children and young people with ASD. This was further supported by the establishment of the NCSE in 2005 under the Education for Persons with Special Educational Needs (EPSEN) Act (Government of Ireland, 2004) and the Disability Act (Government of Ireland, 2005). The two Acts provide a framework for assessing and supporting children and young people aged 0–18 years. Most recently, the universal free pre-school year (FPSY) has also established a commitment to pre-school provision for all children aged between three years, two months and four years, seven months.

ASD is a high profile diagnosis, and interventions for people with ASD represent a controversial area that attracts considerable scrutiny and debate. Since 2005, ASD has been classified as a low incidence disability in Ireland, and students with this diagnosis in mainstream schools are eligible for additional resource teaching hours and may also receive access to support from a special needs assistant (SNA). Students may also be educated in a special class in a mainstream school or in special schools with reduced pupil–teacher ratios and support from SNAs.

In 2008 the NCSE commissioned a review of the literature on best practice in the education of persons with ASD (Parsons et al., 2009). Since the publication of the review, ASD provision in Ireland has continued to develop and there has also been a continued proliferation of international research on educational interventions for children and young people with ASD. These developments led to the NCSE commissioning the current review. This review builds on the Parsons et al. (2009) report by providing a systematic review of the ASD educational intervention literature from 2008 to 2013. In addition, five country case studies and a review of guidance documents explore how practice is informed by best evidence and good practice.

Background

The number of children identified with ASD in schools in Ireland has continued to grow steadily. Data provided by NCSE indicate that in 2011–12 there were 8,829 students with ASD in the total school population and in 2012–13 this number had increased to 10,719. The majority of these children attended mainstream schools.

Educational policy in Ireland recognises the need for a continuum of provision, and alongside support in mainstream schools there has been a substantial increase in the number of early intervention settings and

schools with ASD specific classes. As ASD is a spectrum disorder, the level of impairment and presence or absence of co-occurring difficulties will make each child's experience of ASD and response to interventions different. This means that it is important to have a range of interventions available to select from, according to the individual child's profile of need.

Research into interventions for children and young people with ASD and practice in schools has been developing at a rapid rate since the Parsons et al. (2009) review. The current review aims to address this by narrowing its focus to research conducted from 2008–13 and drawing upon additional sources of evidence such as guidance documents.

Methodology

Three 'strands' of evidence gathering were undertaken for the current review. For the primary systematic literature review strand, a systematic process was adopted in order to ensure rigour in the selection and review of studies. The review process identified 1,021 possible articles for inclusion. Following a process of applying inclusion and exclusion criteria and the application of criteria to determine the quality of the evidence, methodological appropriateness of the evidence and effectiveness of the intervention, 85 studies were included and determined to be best evidence.

The systematic review process was complemented by two supplementary strands, which explored how educational provision for children and young people is articulated in policy and practice. Illustrative case studies aimed to provide an overview of provision, policy and practice in five selected countries and jurisdictions, drawing upon web searches and contact with identified experts in each one. The final strand was a review of guidance documents focusing on how these documents enable the integration of policy, research and practice. The guidance documents were sourced during the country case study data collection phase.

Focusing the literature review on the evidence from 2008–13 enabled this study to reflect the most recent trends in ASD intervention research; however, a limitation of this is that the review is not able to provide a definitive or cumulative analysis of all interventions to support children and young people with ASD in education settings over a longer period. This wider body of literature should be considered when deciding whether to deliver or fund specific interventions. The case study strand also had a number of limitations as data were not collected or available in relation to many of the areas of policy and provision focused on in relation to the review.

Main Findings

It is promising that the final group of 85 best evidence studies included in the review were assessed as being of at least medium standard in terms of the criteria upon which they were assessed: quality of the evidence; methodological appropriateness of the evidence; and effectiveness of the intervention. However, only nine studies scored highly across all three areas. The majority of studies reported in this review focus on pre-school children and children aged 5–8 years. From the 85 best evidence studies, it was possible to identify those interventions with the most evidence.

Interventions with the most evidence

For pre-school children, two interventions were rated as having most evidence (rated 4) in this review: these were interventions designed to increase joint attention skills, and comprehensive early intervention programmes. Joint attention interventions usually involved one-to-one (1:1) delivery of a play-based/turn-taking intervention by a teacher or parent and showed positive outcomes in relation to joint attention and

joint engagement. Comprehensive pre-school interventions were ASD-specific interventions, which offered a comprehensive educational experience for the child, with the intervention targeting a number of areas of development such as behaviour, social skills, communication, life skills and learning. Most of the interventions in this group were based in education settings and informed by (or based upon) behavioural principles, but also included some combined interventions. Comprehensive pre-school interventions were able to demonstrate positive outcomes in a range of areas, particularly adaptive behaviour and language development.

For school-aged children, three interventions were rated as having most evidence (rated 4) in this review: peer-mediated interventions for children attending mainstream schools; multi-component social skills interventions; and behavioural interventions to reduce challenging/interfering behaviours. Peer-mediated interventions were group interventions with peers to support the development of social skills in children with ASD and/or teach peers skills to enable them to interact more successfully with children with ASD. Outcomes for children with ASD attending mainstream schools included increased interaction with peers and improvements in social skills. Multi-component social skills interventions included several elements, such as social skills training or peer support in school or the involvement of parents in supporting the child's social skills in addition to a child-focused programme. Studies in this group demonstrated positive outcomes in areas such as social skills, emotional recognition and friendships. A range of behavioural interventions based upon behavioural principles were also used to target challenging/interfering behaviours in children with ASD. These 1:1 interventions were often based upon an initial functional assessment followed by specific interventions such as prompting, environmental modification or reinforcement. Outcomes included decreases in challenging behaviour.

Interventions with moderate evidence

For pre-school children, two interventions were rated as having moderate evidence (rated 3) in this review: play-based interventions and video modelling to develop communication. Play-based interventions included use of play interventions with peers and teaching of play skills in 1:1 and group situations. Most of these studies demonstrated positive changes in play skills. All but one of the video modelling interventions included in this review focused on pre-school children. These aimed to increase specific behaviours after the child observed the behaviour being modelled via video. All of the pre-school video modelling studies showed increases in target behaviours. There was also evidence within the review to indicate that social initiation training to develop social skills, discrete skills training informed by behavioural principles, and Picture Exchange Communication System (PECS) can potentially be effective with pre-school children as well as with school-aged children.

For school-aged children, five interventions were identified in the current review as having a moderate level of evidence (rated 3): social initiation training; computer-assisted emotion recognition interventions; PECS for children attending special school; narrative approaches; and discrete skills teaching informed by behavioural principles. Social initiation training involved the use of social scripts and prompts to teach social initiation. Outcomes included increased social initiation and engagement. Another group of studies used computer programmes to develop emotion recognition, with participants showing improvement in their ability to identify emotions. PECS is an individualised intervention that uses pictures and symbols to assist children in their communication. For children in special schools, outcomes included an increase in spontaneous requesting among children receiving the intervention. Narrative interventions are individualised interventions such as social stories that are written to prompt particular behaviours. Outcome measures showed increases in target behaviours. Finally, 1:1 behavioural interventions to teach discrete skills such as reading single words and recognising letters or numbers also showed a positive impact on targeted skills.

Interventions with some evidence

Two interventions were identified in the current review as having some evidence (rated 2). Due to the small number of studies in each of the intervention groups it was not possible to present them by age group. The interventions identified as having some evidence were: Lego therapy® to develop play skills, and school age comprehensive interventions. Lego therapy® is a structured group intervention, which uses the construction of models to develop social skills. Outcomes included increased social interaction. School age comprehensive interventions targeted a number of areas and involved training staff in evidence-based practices and coaching to develop individualised interventions. Factors supporting positive outcomes were collaboration with parents and staff coaching.

Interventions with a small amount of evidence or insufficient evidence in this review

Seven interventions were identified as having a small amount of evidence in the current review (rated 1): self-monitoring; computer-assisted and yoga interventions to reduce challenging/interfering behaviour; behavioural interventions to improve communication; computer-assisted instruction and multi-sensory intervention to develop academic skills; and aquatic intervention to develop motor skills.

A further six interventions had insufficient evidence to meet criteria for a rating of 1: consultation to develop social skills; peer-mediated intervention to develop communication; school readiness interventions; cognitive interventions; and computer-assisted and visual cueing interventions to develop adaptive behaviour/life skills.

Although there was only a small amount of evidence or insufficient evidence to support these interventions in the current review, this may be due to the limited timeframe or the intervention being relatively new, as in the case of computer-assisted instruction, which is increasingly being used across a wider range of areas.

Limitations in the evidence base are also highlighted in this review including the small number of studies focusing on interventions for post-primary and post-compulsory aged young people, and a lack of follow-up measures post intervention in many studies. A number of interventions also had limited evidence regarding their implementation in education settings, and few studies looked at the perceptions of children and young people receiving interventions.

Comparison between the current review and previous systematic reviews (Ministries of Health and Education, New Zealand, 2008; National Standards Project, 2009; National Professional Development Centre, 2010 and Wong et al., 2013) highlights many similarities in the interventions recommended. For pre-school children these include: comprehensive interventions, joint attention and play. For school-aged children and young people, they include peer-mediated interventions, behavioural interventions functional assessment, narrative interventions and discrete trial teaching. However, there are differences between the reviews, which reflect differences in size and scope of reviews, coding frameworks used and when the reviews were undertaken. This means that some interventions and studies are rated more or less highly across reviews.

Case studies

There was a strong commitment to inclusion in most case study countries. However, this strand yielded significantly less detailed information regarding educational policy and provision in other countries/ jurisdictions than anticipated. For instance, in some countries, special educational needs (SEN) were not defined in legislation, which meant that very limited information was available in relation to SEN generally and even less in relation to ASD. Although ASD was identified as a data collection category in some countries,

provision might be devolved to more local levels with limited national/jurisdiction data collection. These significant limitations affected the gathering of information across all areas of the case studies and for this reason they are presented in Appendix F. The case studies did however provide some examples of good practice (as defined by Parsons et al., 2009, and Charman et al., 2011). These included: clear systems and frameworks for translating educational policy into practice; a range of provision; coordinated specialist support and training; a range of training for practitioners; partnership with parents; and emerging systems for collecting and using data to inform provision.

Guidance documents

In relation to the guidance documents there were similar limitations. These documents reflected country/jurisdiction policy orientation, such as the extent to which policy was informed solely by research evidence or by research evidence plus good practice and/or expert opinion. Wider limitations of the research evidence base were also reflected in the guidance, with more guidance being available in relation to pre-school children and limited consideration given to the needs of children and young people in post-primary and post-compulsory education. Many of the guidance documents were also limited in their description of the specific mechanisms for guidance to be translated into practice. However, drawing on the review of the guidance documents, some positive examples of how practitioners and families can be supported by guidance emerged. These examples share the following traits – they emphasise the importance of individualised planning; support collaboration between parents/carers and professionals; outline provision available; specify endorsed/funded interventions; recommend specific good practice; provide professional development frameworks for school staff; use data collection to inform future planning; and develop and review guidance with stakeholders.

Conclusion

The systematic review provided evidence to support a number of comprehensive interventions targeting specific areas such as attention, social skills, play, communication, learning and behaviour. Across the policy and guidance strands there was a commitment to inclusion of children with ASD and recognition that a range of supports and interventions should be available so that provision can be individualised to the needs of the child in collaboration with parents/carers.

Issues Identified and Implications

1. Pre-school provision and intervention

Evidence from the current review indicates that there is most evidence for comprehensive pre-school ASD-specific intervention informed by behavioural principles and specific interventions focusing on core skills such as attention. A range of options are required, which can be tailored to child and family needs.

2. School age ASD provision and interventions

The evidence provided in the systematic review and guidance strands indicates that a range of provision types and intervention strategies are needed. Interventions need to focus on key features of ASD, particularly social interaction and flexibility of thought with access to supplementary learning and communication skills interventions as needed. These interventions can be delivered using different formats and some can be delivered effectively by teaching staff and parents.

3. Guidance

The evidence from the guidance strand in particular indicates that guidance documents relating to the education of children and young people with ASD can provide a helpful framework for practitioners and parents.

4. Professional education

The evidence from the guidance and case study strands indicates that there is a need for a framework for ASD professional development at different levels, from basic awareness to higher level accreditation for specialist practitioners. This will ensure that sufficient professional education is available to meet a range of practitioner needs. Given the recent extension of pre-school provision in Ireland, it will be particularly important to ensure that a range of professional development is provided that is specific to the early years and matched to the needs of the wide range of practitioners working in these settings. Standards and quality indicator frameworks should also be considered in order to assist practitioners in evidencing quality skills and provision. The development of local networks will also facilitate ongoing development and sharing of good practice.

5. Collaborative research partnerships

The evidence from the systematic review and guidance strands indicates that the development of interventions can become disconnected from practice in education settings. In order to bridge this gap the authors suggest that there need to be structures in place to support school-based practitioners to be actively engaged in multi-agency research collaborations focused around professional practice. Such collaborations will support the development of effective interventions based in schools.

6. Developing the ASD interventions evidence base

The current review has highlighted gaps in the evidence base particularly in relation to effective interventions for different groups of children and young people with ASD, effectiveness of interventions over time, and perceptions of children and young people participating in interventions.

1 Introduction and Context

1.1 Introduction

The current report has been commissioned to build on the previous review of best practice provision in the education of persons with autistic spectrum disorder (ASD) conducted by Parsons et al. (2009) on behalf of the National Council for Special Education (NCSE). This report is designed to support the NCSE in their policy development role.

ASD is a high profile diagnosis, and interventions for people with ASD represent a controversial area that attracts considerable scrutiny and debate. Since the Salamanca agreement (UNESCO, 1994) there has been an increased expectation that all children with SEN, including those with ASD, will be educated in their local communities. Many children with ASD are now educated in mainstream schools. In many countries, including Ireland, there has also been recognition of a need for a continuum of provision, which includes specialist provision in order to effectively support this diverse group of children and young people (Batten et al., 2006; EPSEN, 2004).

Informed by international policy developments, educational policy in Ireland has been developing rapidly. The Report of the Task Force on Autism (Task Force on Autism, 2001) committed to: providing a range of services for children and young people with ASD including mainstream inclusion; partnership with parents; multi-agency working; and staff training. This was further supported by the establishment of the NCSE in 2005. The Education for Persons with Special Educational Needs (EPSEN) Act (Government of Ireland, 2004) and the Disability Act (Government of Ireland, 2005) also provide a framework for assessing and supporting children and young people from 0 to 18 years of age.

As ASD research is a rapidly growing field it is important to ensure that policy makers and practitioners are able to develop policy and practice informed by the most up to date knowledge. This review seeks to address the need for up to date evidence by providing an analysis of academic evidence from 2008 to 2013, case studies of practice in five countries and a review of country guidance documents.

1.2 Irish Context

1.2.1 Legislation and policy

In 2001, the Report of the Task Force on Autism (Task Force on Autism, 2001) made recommendations regarding policies and practices for the educational provision of children and young people with ASD in Ireland. Although acknowledging the importance of having a range of provision, the report proposed that students with ASD should have priority of placement in mainstream schools. To support this goal the report recommended adequate training for all relevant staff, closer partnerships with parents and multi-disciplinary and cooperative approaches between agencies and services. Furthermore, it highlighted the need for monitoring procedures to be put in place to evaluate the effectiveness of provision. The recommendations of the report have been addressed to some extent through two subsequent pieces of national legislation. These are the EPSEN Act (Government of Ireland, 2004) and the Disability Act (Government of Ireland, 2005). Taken together, the two pieces of legislation provide a framework within which the needs of all children with disabilities or special educational needs (SEN) can be assessed, supported and monitored throughout their education.

The EPSEN Act relates to the educational provision for children and young people aged 0–18 years with SEN. SEN is defined in the Act as a:

restriction in the capacity of the person to participate in and benefit from education on account of an enduring physical, sensory, mental health or learning disability, or any condition which results in a person learning differently from a person without the condition. (Government of Ireland, 2004: 6)

The Act states that children with SEN shall be educated in an inclusive environment with peers who do not have such needs (unless this is inconsistent with the best interests of the child or their peers). Furthermore, children with SEN have the same right as those without SEN to access and benefit from an appropriate education. However, the full implementation of the Act has been deferred indefinitely.

As mentioned at the beginning of this section, the Report of the Task Force on Autism (Task Force on Autism, 2001) made a number of recommendations for improving the educational provision for children and young people with ASD. The legislation and policy discussed throughout this section have undoubtedly had a clear impact upon the education of students with ASD. Furthermore, the Centre for Excellence for Children with Autism Spectrum Disorders (otherwise known as the Middletown Centre for Autism) in Middletown, Co. Armagh, has assisted with capacity building. This north–south initiative is funded by the Department of Education (Northern Ireland) and the Department of Education and Skills (Ireland) and was established on the basis of recommendations made by the Report of the Task Force on Autism and the Report of the Task Group on Autism (Northern Ireland). Both reports highlighted the need to address the increasing prevalence of ASD, recognise good practice and support and complement current services. The Middletown Centre for Autism seeks to achieve this through offering training and advice, research and information, educational assessment and learning support. Established in 2002, its services were phased in from 2007 onwards.

The NCSE was established under the EPSEN Act. Its roles include conducting research, providing policy advice to the Minister for Education and Skills on matters relating to special education, and providing information and advice to parents, schools and others. It is also responsible for the provision of appropriate services and supports to schools for students with SEN. Approximately 80 special educational needs organisers (SENOs) oversee the local allocation of resources to schools such as additional resource teaching and special needs assistant (SNA) support. Resource teachers support schools or clusters of schools in meeting the needs of children with SEN through activities such as individual assessment of children, direct teaching or advice to teachers. SNAs provide support for children with significant care needs.

Children with SEN can also access assistive technology and the Special School Transport Scheme. Other supports are described later in this chapter.

1.2.2 Prevalence rates

Based on local and international studies, the Task Force on Autism (2001) recommended that 'as an initial target, provision be made for services for at least 20 per 10,000 with Autistic Disorder and for 36 per 10,000 with Asperger's Syndrome'. Combined, this gave an estimated prevalence rate for Ireland of 0.56:100, which is lower than more recent estimates in other countries such as the United States (US) (1:68, CDC, 2014).

NCSE used the 0.56:100 prevalence rate in their implementation plan (2006) which, combined with the views of experts and the 2002 census population suggested that there were approximately 6,026 children aged 0–18 years with ASD in Ireland (NCSE, 2006). However, the Task Force on Autism (2001) figures are now over 10 years old and given that there has been a steady increase in ASD prevalence rates it is not surprising that more recent research (Dublin City University, 2013) cited a preliminary prevalence rate of one per cent for Ireland.

This figure of one per cent also reflects more accurately the number of children with ASD being supported in schools. Data provided by NCSE indicate that the total mainstream and special school population in 2012–13 889,296. There 9,158 students with ASD being supported by the NCSE in mainstream and special schools in 2012/13. The overall proportion of students with ASD in the total school population was therefore 1.03 per cent in 2012–13.

1.3 Educational Provision

Children and young people with ASD in Ireland may receive their education in a range of early years and school settings, including mainstream, special classes and special schools. The EPSEN Act emphasises the importance of having 'a continuum of special educational provision [that] is available as required in relation to each type of disability'. A continued commitment to inclusion is also reiterated in a recent document (NCSE, 2013), which outlines six key principles: these include the entitlement of all children to be enrolled at their local school, equitable distribution of resources, and access to necessary resources to meet needs.

1.3.1 Early years provision

Early years provision is expanding in Ireland. In 2012–13, 384 children with ASD attended early intervention classes in schools supported by the NCSE (this does not include a small number of pre-school children in former ABA schools).

For pre-school children, the free pre-school year (FPSY) was introduced in January 2010 by the Department of Children and Youth Affairs (DCYA) for children aged between three years, two months and four years, seven months. Children can access a FPSY programme for three hours daily, five days per week, 38 weeks a year. The objective of the FPSY is to provide educational opportunities for children in the key developmental period prior to starting school. Provision is made under the FPSY scheme for children assessed as having special educational needs to access the scheme on a pro-rata basis over a two-year period, where these needs have been identified as delaying their entry to primary school or where it may be deemed more appropriate that they access the FPSY on a pro-rata basis over two years. Access to early intervention has been highlighted as important in previous reviews of intervention for children with ASD (Parsons et al., 2009) and this scheme is likely to provide an important funding infrastructure to support early intervention.

1.3.2 Home tuition

In addition to the education setting types discussed above, children with ASD may also receive home tuition as part of the Department of Education and Science home tuition scheme (DES, 2008). In 2012–13, 625 pupils with ASD without a school place were also receiving home tuition. Home tuition is an educational intervention available to children from two and a half years of age until the summer following their fifth birthday, or earlier if they cannot find a place in a special class within a mainstream or special school. To access home tuition, the child must not already be attending an early intervention setting, and must be assessed by health service staff under Part 2 of the Disability Act (2005) as needing early educational intervention. Children aged three years or under are entitled to 10 hours tuition a week, and children over three are entitled to 20 hours a week. All home tutors are registered with the Teaching Council.

1.3.3 School age provision

1.3.3.1 Mainstream education provision

Typically, students with ASD attending mainstream schools will be placed in ordinary classes with additional support and will be eligible for resource teacher hours. Access to SNA support may be provided where a child has significant care needs.

Students with ASD are regarded as having a low incidence disability (DES, 2005), which means it has a lower prevalence rate amongst the general population than a high incidence disability such as specific learning disability. Additional resources for students with a low incidence disability are allocated on the basis of each type of SEN having a specified number of hours attached to it. Students who had a diagnosis of ASD from either a psychiatrist or psychologist according to DSM-IV or ICD-10 criteria are entitled to a maximum weekly allocation of 4.25 hours support from a resource teacher.

NCSE data from the SEAS for the school year 2012–13 show that there were approximately 7,067 students with ASD were in receipt of resource teaching (RT) support in mainstream schools.

1.3.3.2 Special classes

A special class is a class that is part of a mainstream school (or in some cases a special school) with lower pupil–teacher ratios depending on the type of disability. Special classes for pupils with ASD will have six children, one teacher and two SNAs. There are more special classes for ASD than for any other designated disability (NCSE, 2012). NCSE data show there were 1,835 students in ASD special classes in mainstream schools in 2012–13.

The use of special classes for children with ASD arose in part from the Report of Task Force on Autism (2001) recommendations for smaller classes that could be more responsive to student needs. Prior to this a pilot project funded by the DES offered applied behaviour analysis (ABA) informed programmes at education centres. At their peak, there were 13 ABA centres in Ireland, attended by approximately 246 young children (Parsons et al., 2009). However, once a national network of special classes catering specifically for children with ASD had been established, the pilot programme discontinued. The pilot ABA centres subsequently converted to special schools, provided the appropriate standards and conditions were met. It is important to note that although specialist provision is offered through special classes and special schools, schools are also expected to plan for integration into mainstream classes as and when appropriate, according to the child's needs and achievement level (DES, 1999).

1.3.3.3 Special school provision

Special school provision includes ASD specific schools and schools catering for pupils with a wider range of needs, such as pupils with moderate general learning disabilities. The number of children attending special schools for children with ASD 2012–13 was 507. A further 1,356 students with ASD were in non-ASD specific special schools in that school year, bringing the total number of students with ASD in special schools to 1,863 in 2012–13.¹

¹ See special school data on DES website accessed March 12th 2014.
<http://www.education.ie/en/Publications/Statistics/Primary-and-Special-Schools-List-2012-2013.xls>.

1.3.3.4 July provision

The extended school year (July provision) operates during July, when schools in Ireland are closed for the summer holidays. The extended school year programme, which is funded by the DES, was originally provided solely for pupils with severe and profound general learning disabilities, but has since been extended to include children with ASD. Mainstream primary schools with special classes for children with ASD and special schools will typically extend their educational provision during this month as part of the scheme, and post-primary schools with special classes for ASD are becoming increasingly likely to do so too. Schools taking part in the scheme receive additional funding and extra salary payments are made to staff involved, such as school principals, teachers and SNAs. In 2012–13, 2,791 children participated in the scheme (this includes children with ASD and severe and profound general learning disabilities). If a child is eligible for additional support, but the school does not offer extended provision, they may be offered home tuition instead. Data from 2013 indicated that 3,470 children were in receipt of home-based July provision.

1.4 Teacher Education

In order to meet the needs of children and young people with ASD, the Report of the Task Force on Autism (2001) recommended not only that a range of provision should be offered, but also that pre-service and in-service teachers should have access to relevant professional development to enhance their practice. Whilst there is no mandatory training, qualified teachers can access professional development from a number of providers. There are two postgraduate courses specifically for teachers of children with ASD. These are the Graduate Certificate in Education of pupils with ASD, run by St Patrick's College, Dublin and the Postgraduate Certificate/Diploma in Special Educational Needs (ASD) offered by St Angela's College, Sligo. Both courses have been designed specifically 'to assist teachers in meeting the learning and teaching needs of students with ASDs' (DES, 2013a, 2013b). The DES offers up to 18 fully funded places annually on the former course, and 25 partially funded places on the latter. Teachers are required to pay €300 per module, with the remainder being funded by the DES through the Special Educational Support Service (SESS).

The SESS offers a range of professional development opportunities for teachers and other school staff working with children with a range of SEN. They identify 10 key categories of SEN, of which ASD is one, and provide targeted information, resources and training for each one. Recent courses for ASD have included training in the TEACCH method, language and communication. Further professional education and support is offered by the Middletown Centre for Autism. They offer a wide programme of courses focusing on a range of issues relating to the education of children and young people with ASD. Recent courses have included general information about ASD, such as issues in information processing, the use of strategies (i.e. visual resources), and specific issues (i.e. relationships and anxiety).

1.5 Evaluation of Provision

An evaluation of ASD provision in Ireland (DES, 2006) sampled a range of mainstream through to specialist education settings. The evaluation noted the progress that had been made in providing a range of ASD provision and identified a number of strengths and areas for development. Strengths included parental satisfaction with educational provision and an increasing range of training for teachers. Areas for development included addressing delays in diagnosis and access to early intervention. Areas where there had been progress but which could continue to be enhanced were: ensuring home–school collaboration; individualised support; multi-agency working; staff training; and evidence-based interventions.

1.6 Educational Interventions for Children and Young People with ASD

In addition to understanding the Irish context, the wider context of ASD diagnosis and intervention is important in informing this review. The following sections outline some of the current debates and considerations in relation to diagnostic categories and researching interventions for children and young people with ASD.

1.6.1 Diagnosis and diagnostic terminology

Although ASD has been described since the 1940s, it was not until 1996 that it became viewed as a spectrum condition (Wing, 1996). Wing described ASD as characterised by difficulty in three key areas of development: social understanding, social communication and flexibility of thought and behaviour. These primary features were described as the 'triad of impairments'. However, each individual with ASD can experience the triad of impairments differently and may or may not have additional general or specific learning difficulties. This variation is described as a spectrum with different diagnostic categories for different patterns of ASD or combinations of ASD and learning disability. Until recently, children and young people who have a general learning disability and ASD are likely to have been diagnosed as having autistic disorder, while those children and young people with average or above average IQ who did not exhibit an early language delay were more likely to be diagnosed as having Asperger's syndrome (AS) or high functioning autism (HFA). Although people with AS or HFA do not have a general learning disability they may have specific learning difficulties such as dyslexia or developmental coordination disorder (DCD). The diagnostic category of pervasive developmental disorder – not otherwise specified (PDD-NOS) has been used to describe children who displayed many features of ASD but did not show all the features required for a diagnosis of ASD.

In 2013 the Diagnostic and Statistical Manual 5 (DSM-5) (APA, 2013) substantially revised the diagnostic criteria for ASD. It replaced the subcategories of ASD with one overarching category of ASD, the rationale being that this would allow a more flexible and individual description of a child's ASD in relation to a continuum of impairment rather than trying to fit children into particular subcategories. A further development was to reduce the three features of ASD to two by taking out language impairment. This recognises that language impairments are not specific to ASD and these can now be identified as a co-occurring difficulty instead of a primary feature. Specifiers have been included to describe additional difficulties a child may experience, such as ASD with or without language impairment, ASD with or without learning disability, and ASD with or without a regressive course, in order to provide a more precise and individualised description. The revisions in the DSM-5 have been controversial as they have been perceived as potentially widening the category of ASD, and some groups have been keen to maintain their distinctiveness, for instance some with AS. As much of the research and guidance included in this report pre-dates the DSM-5 revisions, the subcategories used by researchers and guidance writers will be reported when describing individual studies and documents, but the term ASD will be used throughout this report as a global term. (Sub-terms include autistic disorder, high functioning autism, Asperger's syndrome, and pervasive developmental disorder – not otherwise specified).

ASD may also co-occur with other impairments and developmental disorders. Children with ASD can experience hearing, visual or physical impairment and there is a high degree of overlap with other developmental disorders such as attention deficit hyperactivity disorder (ADHD), dyslexia and DCD. Children and young people with ASD are also at higher risk of epilepsy, anxiety and depression, particularly as they grow older. Acquiring life skills can also be a challenge for many young people with ASD due to motor difficulties and lack of social understanding. They may also experience difficulties with eating and sleeping.

The complex individual needs of children and young people with ASD means that a full diagnostic assessment of their individual needs, drawing upon the expertise of a range of professionals and knowledge of parents and carers, is crucial. This is an essential basis for informing planning for the child/young person and their family (NICE, 2011; NICE, 2013). Educational assessment and planning processes can also complement a broader developmental assessment and ensure that a coordinated response is in place.

1.6.2 Prevalence of ASD

A recent systematic review article by Elsabbagh et al. (2012) reviewed over 600 epidemiological surveys and reports of ASD/PDD prevalence worldwide. They identified that globally the prevalence rate for ASD/PDD was 0.62 in 100. Although there were variations between countries, ASD diagnosis did not appear to reflect cultural, geographic or socio-economic factors; however, variation in the data meant it was not possible to explore these relationships fully. They identified that overall prevalence had increased over time, which was most likely to be a reflection of changing diagnostic concepts, service availability and awareness of ASD among professionals and the general public.

The review by Elsabbagh et al. (2012) highlights significant variability in prevalence rates; rates in Europe ranged from 0.3:100 to 1.16:100 (median 0.6:100) and in the US and Canada estimates ranged from 0.3 to 0.9 (median 0.65:100). Within Europe there was substantial variability; for example, a national Danish study identified a rate of 0.3 per 100 for eight year old children (Madsen et al., 2002) while a recent national study in the United Kingdom (UK) identified a rate of 0.94 per 100 in children aged five to nine years (Baron-Cohen et al., 2009). For Ireland the most recent prevalence rate is one per cent (DCU, 2013). Elsabbagh et al. (2012) argue that this variability is likely to reflect differences in samples (whether younger children were included) and methodological issues such as diagnostic criteria used and case identification processes. However, overall their review supports a prevalence rate of 0.6:100.

In relation to learning disabilities and ASD, a prevalence study in London (Baird et al., 2006) identified an overall prevalence rate for seven year olds of 1.16 per 100, of whom 0.38 per 100 were diagnosed as having childhood ASD and 0.77 per 100 with other types of ASDs. This indicates that approximately one third of children with ASD have a learning disability alongside ASD. However, as noted by the US Centres for Disease Control and Prevention (2006), the widening of diagnostic criteria means that many children with ASD are likely to have cognitive impairments indicating a scattered cognitive profile rather than a general learning disability.

1.6.3 Evaluating educational interventions for children with ASD

The previous section has highlighted that children and young people with ASD are a very diverse group. This diversity has resulted in many different interventions to support children and young people with ASD in their education. Since the previous NCSE review in 2009, ASD intervention research has proliferated with a wide range of comprehensive and specific intervention studies being published (Eikeseth and Klintwall, 2014). As will be outlined in the guidance section of this report, there have been a number of attempts to draw together the research evidence to date through systematic reviews in order to provide practitioners and policy makers with an overview of evidence-based practice. It is promising that these reviews have enabled a number of interventions to be identified with an established or emerging evidence base. However, it is important for readers to be aware of the process of evidence development as the way in which research is produced will influence the content and findings of systematic reviews.

The process of developing educational interventions has been strongly influenced by models of evidence from health research. The application of this process within education has been described by many researchers (e.g. Flay et al., 2005; Greenberg, 2004). The process typically begins with carefully controlled trials conducted by research teams, otherwise known as efficacy trials. In ASD research, these trials will usually involve randomised control trials (RCTs) and single case experiments. These trials need to establish for whom the intervention works, what the outcomes are and whether effects are maintained over time. Once efficacy has been established, effectiveness in the 'real world' will be researched to establish for whom the intervention is effective and how the intervention can be delivered by professionals working with children. The process of moving from efficacy to effectiveness is time consuming and is likely to involve the development and trialling of programme manuals and training for practitioners alongside the identification of key implementation factors that are essential pre-requisites for effective delivery in school settings.

However, the application of the traditional research hierarchy for complex interventions has been challenged (Campbell et al., 2000), as many interventions may be in the process of development in 'real world' settings and may require a more iterative, mixed methods approach to establishing efficacy and effectiveness. Within this approach, controlled trials will be undertaken and supplemented with more qualitative methods such as interviews and questionnaires in order to establish utility and identify implementation factors. Fishman et al. (2013) also argue that partnerships between developers and implementers that focus on practice dilemmas are crucial to the development of effective interventions. Kasari and Smith (2013) have made similar arguments specifically in relation to ASD research. They argue that in order for interventions to be successfully delivered in schools: there needs to be awareness of the extent to which evidence-based interventions can be adapted to and implemented in 'real life' school contexts; interventions should focus on meaningful outcomes that are relevant to child and family needs and address core features of ASD; long-term effects need to be evaluated; and research should take place in educational settings. Developing educational interventions in this way would also enable the effects of different interventions occurring simultaneously (as often happens in schools) to be taken into account (Parsons et al., 2009).

In addition to considering the stage of development of an intervention and the setting in which a particular approach or intervention has been developed, more specific limitations in the evidence base should also be considered. A number of factors limit the extent to which research studies can be compared with each other. The children who are selected to participate in studies can vary considerably by age group, type of ASD and co-occurring difficulties. In some studies children participating in research can be from a wide age range, which may mask differential effects for particular age groups. There are also differences across studies in the ways in which a child's ASD is identified, with some researchers relying upon prior diagnosis and others directly assessing the ASD using a standardised measure. Over-reliance upon prior diagnosis is likely to again reduce comparability as different professionals may interpret diagnostic criteria in slightly different ways and over-reliance upon historical diagnoses will not take account of the child's current level of functioning and development or changes in diagnostic processes. A number of studies in the current review also used mixed samples of children, for instance, where some children also had a diagnosis of ADHD.

The cost of undertaking research often means that sample sizes in many studies are small and interventions take place in a limited context such as one school, which limits generalisability to other children and contexts. A further issue is the lack of follow up, which again reduces the strength of evidence for a particular approach, as it is not possible to know whether gains were maintained once an intervention had ceased. The lack of follow up was identified as a feature of many studies included in the current review.

The types of research design used in ASD research can also be a further factor limiting generalisability of research. The most common ASD intervention studies for school-aged children in particular are single case experimental designs. These designs usually involve small samples of children with each participant acting as their own control. Measures taken during a baseline phase, during which the participant receives no intervention, are then compared with measures taken during one or more intervention phase(s). These studies are helpful in identifying strategies that can change behaviour but rarely involve long-term follow up and small samples limit generalisability. Using children as their own controls also does not take account of likely improvements in scores as a result of the natural process of growing older.

There are increasing numbers of studies comparing groups of children receiving comprehensive interventions. These target several developmental areas simultaneously (particularly in the areas of pre-school interventions). Similarly, multi-component social skills interventions address social skills difficulties using more than one intervention simultaneously. These designs are more likely to involve larger samples. They also offer researchers the opportunity to compare children receiving the intervention with those receiving no intervention or treatment as usual or a different intervention. However, a weakness of these studies is that some tend not to focus on how these might be implemented successfully in schools. For instance, multi-component social skills interventions have sought to investigate combined social skills interventions, but these may not be implemented in a school context, making generalisation to real school contexts difficult. Moreover, it can often be difficult to establish which elements of these interventions are responsible for particular outcomes.

In order to establish whether participants identify interventions as being relevant and likely to be continued, researchers are increasingly using social validity ratings. These are helpful in understanding whether or not participants thought the intervention had a meaningful outcome or was easy to implement. However, it is likely that, having invested time and effort in an intervention, participants are more likely to provide a positive report. These ratings are included in the current review where available but should be viewed as a supplement to direct measures of educational utility. Currently, qualitative studies of ASD interventions are very limited (Bolte, 2014); such studies would be helpful in providing a more nuanced view of the perspectives of participants and processes related to implementation in schools.

Some researchers also argue that evidence-based research needs to be supplemented with best practice (Jones et al., 2008; New Zealand Ministries of Health and Education, 2008). The importance of good practice is reflected in the current review through the inclusion of a survey of guidance documents. In addition, the way in which good practice and evidence-based interventions are combined in the policy and practice of different countries will be outlined in the country/jurisdiction case studies.

1.7 Summary

Educational policy and practice for children with ASD in Ireland have been steadily developing. The number of children accessing provision has also increased. Evidence suggests that the number of children with ASD in mainstream schools in Ireland and other countries is rising, which in part reflects the broadening of diagnostic criteria and also an increasing emphasis on inclusion in mainstream education. Interventions for children with ASD have also continued to increase and the way in which interventions are developed and evaluated will influence the data available to inform systematic reviews. The current review reflects these policy practice and research trends during the period 2008–13.

2 Methodology

2.1 Overview

Autism research has grown exponentially in recent years. In response to this changing and evolving field the current research was commissioned to build on the Parsons et al. (2009) review with the addition of country case studies. For the review of literature a systematic review process was adopted in order to ensure rigour in the selection and review of studies. The systematic review process is complemented by two supplementary strands, which explore how educational provision for children and young people is articulated in policy and practice. Illustrative case studies provide an overview of provision, policy and practice in five selected countries and jurisdictions. This strand draws upon web searches and contact with identified experts in each country. The final strand is a review of guidance documents focusing on the integration of policy, research and practice. The guidance documents were sourced during the country case study data collection phase. Any guidance documents referred to in articles highlighted during the systematic review process were also sourced.

The NCSE tender document for this review specified that the systematic literature search should focus on 2009–13. This was extended to 2008–13 to ensure sufficient overlap with the Parsons et al. (2009) report and make certain that no studies were missed between the two reviews. The case studies aim to provide an overview of policy and practice that is as contemporary as possible. For consistency with the literature review strand, the review of guidance documents also covers 2008–13. The tasks of the review were as follows.

1. Locate the study in an overview of provision in this area in Ireland.
2. Scope and define key terms to be used as working definitions for the study.
3. In consultation with NCSE, select a minimum of five countries/jurisdictions as potential best practice case studies to be explored in detail for the study, providing a rationale for this selection.
4. Establish clear parameters for conducting the systematic evidence search, with a rationale for these parameters to be agreed with NCSE.
5. Using the agreed working definitions and parameters for the search, synthesise the evidence from the research and guideline documents on what works best in the provision of education for persons with ASD.
6. Identify key lessons identified from this evidence.
7. Identify the implications arising from this review for the provision of education for persons with ASD in Ireland.

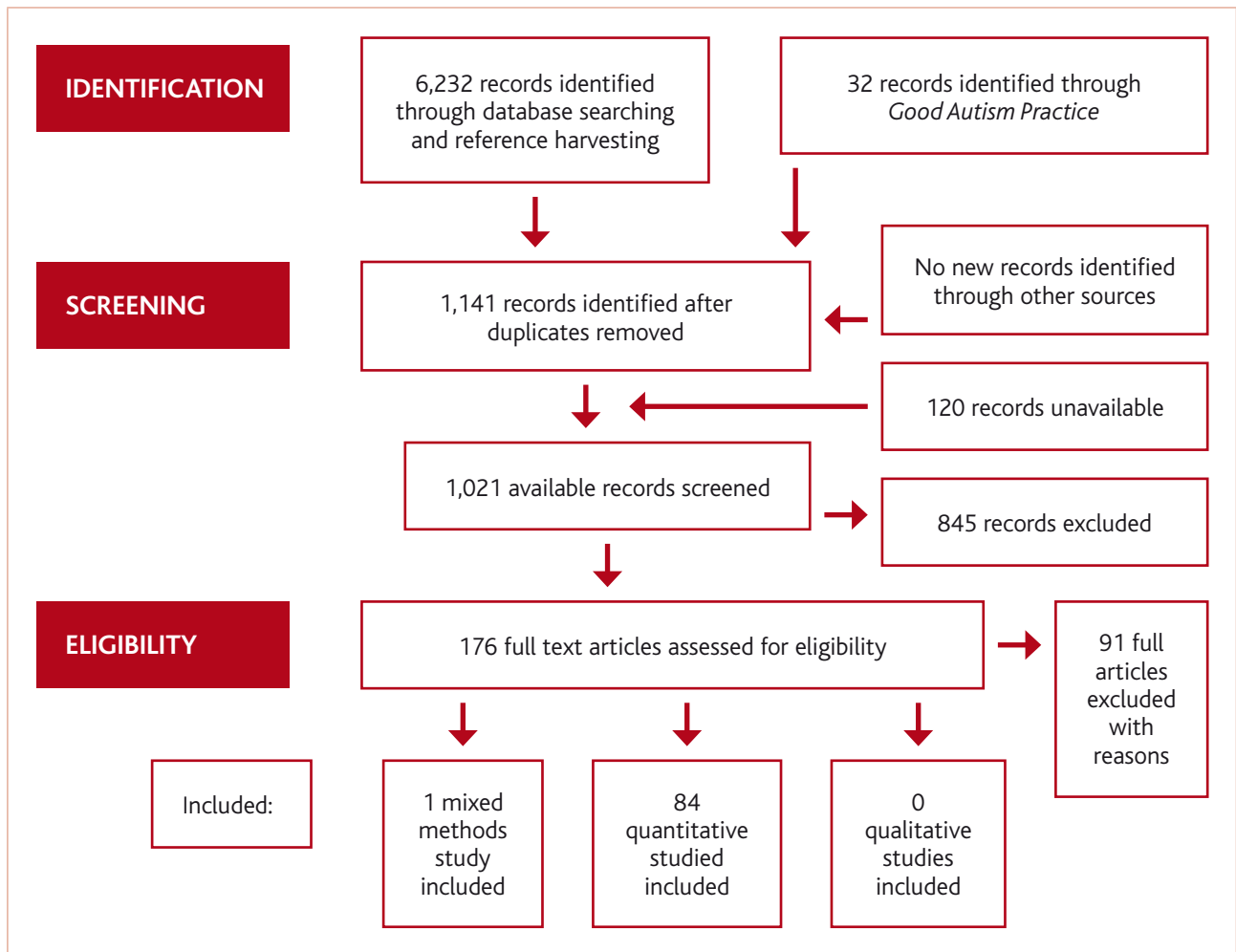
The age ranges outlined within the tender document were broad, encompassing those aged 0–18 years and over, with the consequent potential for a wide range of setting types and interventions to be included. Given the broad remit of the research, review processes and templates were developed for each strand of the research to ensure a systematic, rigorous and manageable process within the specified timescales. The three key strands of the review are now outlined in detail.

2.2 Procedure: Systematic Literature Review Strand

2.2.1 Systematic literature review process

The review was undertaken using a rigorous, systematic six-stage process. The methodology for the review was informed by relevant frameworks such as those proposed by the Evidence for Policy and Practice Information and Co-ordinating Centre (EPPI-Centre) (e.g. Gough, 2007), the Preferred Reporting Items for Systematic Reviews and Meta Analyses (PRISMA) (e.g. Moher et al., 2009), and the authors’ previous systematic review (Bond et al., 2013). Key elements of the systematic review process are outlined in Figure 1.

Figure 1: Systematic review process



2.2.2 Review Stage 1: Literature searching

Before beginning the literature searching, the types of document that should be included in the review and the search terms used to locate them were established. This process took place in June and July 2013. With regard to the former, it was decided that a document could be included if it had been published and was peer reviewed. Journal articles were included but books and book chapters were excluded from the search. Following discussions with the NCSE Advisory Group the journal *Good Autism Practice* was also included as a separate search as it is not indexed in the major databases.

Search terms were then developed to locate the documents identified above. The search terms were divided into seven categories:

- terms relating to ASD
- terms relating to the population under study (children, young people and families)
- terms relating to outcomes
- terms relating to educational provision
- terms relating to age/stage of schooling
- terms relating to type of study
- terms relating to assessment.

A list of words and/or short phrases was then generated by the research team to capture terms in the categories listed above. For consistency, the initial list of terms was drawn from the Parsons et al. (2009) review. The search terms were then revised with the NCSE Advisory Group. Revisions included: the merging of outcomes and assessment into one category; the addition of terms curriculum-based assessment, summative assessment, formative assessment, behaviour and emotional to the outcomes and assessment category; the revision of educational provision to include intervention type and bilingual education; the revision of terms for age/stage of schooling to include, crèche and early years setting/centres; the revision of terms for type of study to include teaching, questionnaire, qualitative research, case studies, reviews, meta-analysis; and the further definition of terms for home, community and school/college-based settings.

The search terms were then trialled across search engines by a member of the research team in consultation with the lead researcher to establish whether they consistently returned a set of pre-identified papers, which ensured that the search terms were fit for purpose. The final list of search terms agreed with the Advisory Group is shown in Table 1. The final search terms for ASD were altered slightly during the database searches in order to permit more efficient searches according to search engines. These changes are shown as 'actual search terms' in Table 1.

Table 1: Search terms for the literature review

Category	Related terms
ASD AND (title and abstract) AND (Actual search terms (OR): Autis*; ASD; ASC; Asperge*; HFA; PDD; PDD-NOS; Rett disorder; Rett syndrome; Rett's disorder; Rett's syndrome; childhood disintegrative; pervasive developmental disorder)	Autistic spectrum disorder/s (ASD/s) OR autistic spectrum conditions (ASC/s); autism spectrum disorders; (classic) autism; autistic; atypical autism; Asperger(s) syndrome (AS); high functioning autism (HFA); pervasive developmental disorders (PDD); pervasive developmental disorder not otherwise specified (PDD-NOS); Rett's/Rett syndrome/disorder; childhood disintegrative syndrome; Kanner's autism/syndrome
Children and young people AND	Infant OR toddler; preschooler; young children; child*; middle childhood; pupil/s; youth; student/s; pre-adolescents; learner/s; adolescent/s; teenager/s; young people; young adults; girl(s); boy(s); individuals
Outcome and assessment AND	Learning; behavior/behaviour OR participation; improvement; gains; outcomes; attainment; progress; development; results; benefits; effectiveness; fail; follow-up; success; achievement; engagement; motivation; attitude; drop-out; confidence; self-esteem; attendance; inclusion; self-care; skill; independence; social; generalisation; generalization; increase; decrease; modification; output; emotion; emotional; curriculum-based assessment; summative assessment; formative assessment; educational assessment; assessment with schools
Terms for educational provision (place/type of provision) AND	Instruction OR pedagogy; multidisciplinary; teaching/classroom methods/ approaches; educational practices OR strategies; curriculum; classroom/ learning environment; home school/ing; educated other than at school (ETOS); educated outside of school; home educated; home tutoring; playgroup; comprehensive; mainstream/ing; ordinary; inclusive education; inclusive education/al (programme/s); integrated; reverse integration; dual enrolment; individual education plan (IEP); ABA school/class; resource teacher; special needs assistant; segregated; special school/class/unit; specialist; teacher/staff/classroom assistant training; outreach; community; bilingual; intervention type; programme type; pupil referral unit; school
Terms for age/stage of schooling AND	Early years setting/centre/center OR early provision; early intervention; foundation; preschool; nursery; infant; reception; kindergarten; elementary; first level; junior; primary; middle school; high school; secondary; second level; college; third level; education; tertiary; further; higher; university; continuing; post-primary; institute of technology; post-school; lifelong; crèche
Terms for type of study AND	Intervention OR evaluation; training; learning; skills; development; tutoring; mentoring; tuition; curriculum program/me; survey; course; teaching; review; meta-analysis; qualitative research; quantitative research; interviews; questionnaires; case study; longitudinal; cross-sectional; trial
Exclusion terms NOT	ALL FIELDS: pharmacology; psychopharmacology; immunisation; MMR; genetics; pesticide; peptide; Cortical; fragile X; XXY; TITLE and ABSTRACT: epidemiology; neural; psychological assessment; clinical; medical; screening; prevalence; eating (disorder); sleep (disorder)

Literature searches were undertaken between July 25th, 2003 and August 26th, 2013, using education, psychology, science and social science databases and web searches. Hand searches of *Good Autism Practice* were also included. The 15 databases searched included the five databases used in the Parsons et al. (2009) review (Psycinfo; Education Resources Information Centre (ERIC); Australian Education Index; British Education Index; ISI Web of Knowledge) plus 10 additional databases (Expanded Academic ASAP; Cochrane Library; Applied Social Sciences Index and Abstracts (ASSIA); Scopus; Science Direct; Education: A Sage full text collection; Psychology: A Sage full text collection; Communication Studies: A SAGE Full-Text Collection; ZETOC; Education Research Abstracts Online). In addition, web searches were undertaken using Google Scholar, Education-line, NCSE's research database, Research Autism's publications database, OECD Education at a Glance, EPPI-Centre and Open Doar.

2.2.3 Review Stage 2: Reference harvesting

From August to October 2013, studies found during the initial searches were used to identify other studies that might be relevant to the review, through a process of reference harvesting. Throughout the review process, stakeholders who had an interest in contributing to the review were invited by NCSE to contact the research team with suggestions for articles for inclusion. Although a large number of references were passed to the research team, no new studies were added, as those studies which met inclusion criteria had already been identified through the database searches. In total, 6,232 hits were identified from across all the databases searched (including Google scholar), or through the process of reference harvesting. Of these, 1,141 records were screened after duplicates were removed. A further 120 studies could not be located despite efforts to source these through the inter-library loan system. Full text copies of articles were obtained. Therefore, 1,021 studies remained for screening in relation to the inclusion criteria.

2.2.4 Review Stage 3: Application of inclusion criteria

Throughout the searching process (August to October 2013), the resulting hits were filtered to select studies to be included in the review. In order for a study to be retained, it had to meet the inclusion criteria outlined in Table 2.

Table 2: Inclusion criteria

Inclusion criteria – studies included met all of the following:		
Scope	IC1	Includes more than one child or young person with ASD (which can include PDD-NOS).
	IC2	Includes a researcher-manipulated intervention.
	IC3	Has educational utility either by a) explicitly considering the educational implications of the intervention or b) has at least one outcome measure about the child/young person in an education context.
	IC4	The intervention takes place in the home, community, clinic or in school/college-based settings.
Study type	IC5	Is empirical, i.e. includes the collection of quantitative or qualitative data.
	IC6	Reports at least one outcome measure about the children or young people with ASD.
Time and place	IC7	Written in English.
	IC8	Published after 2007 (dated 2008–13).

A study was not included within the review if it met the exclusion criteria outlined in Table 3.

Table 3: Exclusion criteria

Exclusion criteria – excluded studies met one or more of the following:		
Scope	EC1	Includes one or no children/young people with ASD.
	EC2	Reports on an intervention that is not researcher-manipulated, or reports on no intervention at all.
	EC3	Does not provide evidence of educational utility of the intervention.
	EC4	Reports no outcomes measures about the children/young people with ASD.
	EC5	Not concerned with educational provision that takes place in the home, community, clinic or in school/college-based settings.
Study type	EC6	Descriptions, development of methodology, commentary or opinion not based on empirical studies or single case studies. Does not involve the collection of quantitative or qualitative data.
Time and place	EC7	Not written in English.
	EC8	Not dated 2008–13.

Further description of the inclusion criteria is provided below.

IC1: To be included in the review, participants had to be between birth and 22 years of age and have a diagnosis of ASD, Asperger(s) syndrome (AS); high functioning autism (HFA); pervasive developmental disorders (PDD) or pervasive developmental disorder not otherwise specified (PDD-NOS). Individuals who had ASD with a co-occurring condition such as ADHD or intellectual disability were also included in this review. To be included, studies needed to include at least two participants with ASD.

IC2: The participants needed to take part in an intervention, which was formally evaluated by the researcher(s). Interventions that were described, perhaps in a practitioner discussion paper, but not evaluated as part of a research study were not included.

IC3: For inclusion in the review, the educational utility of the intervention needed to be considered. This was the most subjective aspect of the inclusion criteria but it was agreed to be important given the educational focus of the review. It was operationalised by evidence of either utility **or** effectiveness in the educational context.

IC3(a) Utility

Explicit consideration of the educational utility of the intervention EITHER through interviews or questionnaires with staff within the child's education setting about the utility of the intervention (which might include social validity measures) OR clear involvement in, or delivery of, intervention by school staff or peers.

IC3(b) Effectiveness in the educational context

The study included at least one outcome measure focusing on the child within the primary education setting, e.g. observations, questionnaires, or interviews with staff and/or peers. (This could include generalisation, but needed to be more than just moving to another physical setting within the child's school: it must involve some engagement in that setting, such as involvement in typical routines, or interactions with peers or staff.)

This criterion resulted in the exclusion of studies that only evaluated medication or did not evaluate the impact of the intervention in the child's education context. Examples of how this criterion was operationalised are presented in Appendix D.

IC4: The intervention needed to take place in the child's home, community, clinic or in educational settings (school or college). As shown in Table 2, this criterion included a wide range of settings where education took place, from early years to tertiary education.

IC5: To be included, a study needed to report primary quantitative or qualitative outcome data. This criterion meant that a wide range of quantitative research designs were included such as RCTs, quasi-experimental studies and single case experimental designs. Types of single case or single subject designs included in this research were multiple baseline, alternating treatment, multiple probe and withdrawal of treatment (see glossary for definitions). The criterion also allowed for the inclusion of qualitative and mixed methods studies, although only one mixed methods study and no qualitative studies met the inclusion criteria.

IC6: This criterion also ensured a wide variety of outcome data were considered, ranging from quantitative frequency counts of observed behaviours or standardised assessment scores through to semi-structured interviews. On this basis, research that used secondary data such as meta-analyses or systematic reviews was excluded from the main review and used for reference. To be included, studies needed to include at least one outcome measure relating to the child with ASD, such as observation of specific behaviours or their score on a test such as the Social Skills Rating System (Gresham and Elliot, 1990). Studies were excluded where outcome measures did not relate to the child, for instance measures of adult competence in delivering an intervention.

IC7 and IC8: The scale of the review meant that included studies were limited to those published in English between 2008 and 2013. The publication date criterion has led to the review focusing on current developments in ASD research but not providing a comprehensive overview of ASD interventions over a longer period of time.

Three members of the research team, excluding the lead investigator, were involved in applying the inclusion criteria to the 1,021 studies. Fifty studies were jointly coded as part of a pilot by three members of the team and any studies where the coders were unsure were discussed with the lead investigator. This process led to revisions of the educational utility criterion and recoding. Fifty new studies were then coded by two of the coders using the revised criteria until agreement on all the studies was achieved. This process resulted in five

per cent of all included studies being coded by two members of the research team. Two members of the research team coded all remaining studies independently, with moderation between them where there was uncertainty. The lead researcher also checked 10 per cent of the included and excluded studies, with 94 per cent agreement with the coders' original assessment. Studies that met the inclusion criteria were transferred and saved into a bibliographic application (Mendeley Desktop, 2008).

From the total of 1,021 studies screened in relation to the inclusion criteria, 176 were retained for inclusion in the review. The 845 excluded studies are listed in Appendix B by exclusion criteria.

2.2.5 Review Stage 4: Development of coding framework

The 176 studies selected for inclusion in the review were coded using the specially designed and trialled framework for this review. The coding framework was devised by the research team with the aim of accurately describing the sample, focus, methods, intervention, quality and findings of each study in a systematic way. The framework collected both descriptive and evaluative information about each included study.

Descriptive information included: the study's author(s); year of publication; methodological approach; aims; sample (including ages of children, details regarding type of ASD diagnosis and whether parents were involved); intervention setting; details of the intervention; details of quantitative and/or qualitative outcome measures used; and changes to the nature of the problem following intervention.

Evaluative information came from coders' assessment of:

- quality of the evidence
- methodological appropriateness of the evidence to the review aims
- effectiveness of the intervention.

The reviewers acknowledge that these evaluations reflect only what was available within the published review study and that the primary research may indeed have contained many features of high quality research. It is also important for readers to bear in mind that studies reported in this review are more likely to report positive results for interventions, as these studies are more likely to be accepted for publication than those reporting negative outcomes. However, quality evaluations of the available evidence are essential to building a sound evidence base for ASD interventions (National Autism Centre, 2009). For example, where an evaluation shows the intervention to be effective, it is important for another practitioner to have sufficient information to be able to replicate that intervention with fidelity. Similarly, an ASD intervention evaluation requires a clear focus on a well-defined problem area and participant sample. 'Community sampling' (e.g. using client groups referred to community services) may mask the effectiveness (or ineffectiveness) of the intervention with certain sub-groups as there is less control over who is included in the research sample. This may mislead the practitioner as to the likely effectiveness of the intervention with particular client subgroups.

Quality of the evidence – quantitative studies

Criteria on which the quality of the evidence from quantitative studies was judged were drawn from the American Psychological Association (APA, 2006) and criteria developed by Reichow, Volkmar and Cicchetti (2008) for evaluating evidence-based practices in ASD. Given the scale of the review, it was decided in consultation with the Advisory Group to use the APA criteria as the basis for the quantitative coding framework. The APA criteria do not have separate criteria for evaluating different types of quantitative research designs such as group designs (where one group receiving an intervention might be compared with another group who do not receive the intervention) and single subject designs (where the child may act as their own control by experiencing different conditions in a systematic way).

Rating systems such as that of Reichow, Volkmar and Cicchetti (2008) are available for evaluating single case experimental designs and group designs and these have been used to rate the quality of group and single case designs separately in some larger scale ASD intervention reviews (Wong et al., 2013). However, using one framework informed by discussion of group and single case evaluation criteria was agreed as appropriate with the Advisory Group for the current review. This approach has also been applied successfully in other reviews (e.g. Bond et al., 2013). The application of the agreed criteria did not preclude particular types of studies from scoring high on quality. Two single case experimental design studies as well as a number of group design studies did achieve ratings of 'high' for quality.

Some quality rating systems also compare effect sizes for outcome measures. This offers a more standardised approach for comparing outcomes, but is also relatively time consuming and has not been routinely undertaken in other recent large scale systematic ASD reviews, such as Wong et al. (2013). Calculation of effect sizes was not undertaken in the current review given its smaller scale.

All six criteria from the APA guidance and three from Reichow et al. (2008) were used in developing the quantitative evaluation criteria. Of the Reichow et al. criteria, one was from their primary group designs criteria, which are deemed essential for demonstrating validity of a study. Two were from their secondary criteria for group designs, criteria that are deemed important but not essential to the validity of a study. The secondary social validity criterion refers to factors such as whether the intervention took place in a natural context or included customer satisfaction measures.

One point was awarded to a study for each of the criteria met. A study could be allocated two points if the intervention group was compared with a control or comparison group that did not receive the intervention, or if more than one outcome measure was used. Studies could achieve a maximum score of 11 points.

Table 4: Quality of evidence criteria (quantitative studies)

Criterion	Maximum number of points
Use of randomised group design	1
Focus on a specific, well-defined disorder or problem	1
Comparison with treatment-as-usual, placebo, or less preferably, standard control	2
Use of manuals and procedures for monitoring and fidelity checks	1
Sample large enough to detect effect (from Cohen, 1992)	1
Use of outcome measure(s) that have demonstrable reliability and validity	2
Study gives details of participant characteristics (Reichow et al., 2008) (primary)	1
Attrition rates did not differ between groups more than 25 per cent (Reichow et al., 2008) (secondary)	1
The study has evidence of social validity (Reichow et al., 2008) (secondary)	1

If a quantitative study scored between 0 and 3 points, it was categorised as 'low quality'. A score of 4–7 was categorised as 'medium quality' while one of 8–11 was categorised as 'high quality'.

Quality of evidence – qualitative studies

Criteria on which the quality of qualitative studies was judged were drawn from Spencer et al. (2003), Henwood and Pidgeon (1992) and Reichow, Volkmar and Cicchetti (2008). One point was awarded to a study for each of the criteria it met, with a maximum score of 13 points. Criteria were:

- appropriateness of the research design
- clear sampling rationale
- well-executed data collection
- analysis close to the data
- emergent theory related to the problem
- evidence of explicit reflectivity
- comprehensiveness of documentation
- negative case analysis
- clarity and coherence of the reporting
- evidence of researcher–participation negotiation
- transferable conclusions
- evidence of attention to ethical issues
- social validity.

If a qualitative study scored between 0 and 5 points, it was categorised as 'low quality'. A score of 6–9 points was categorised as 'medium quality' while a score of 10–13 points was categorised as 'high quality'.

Studies that employed mixed methods were coded on both quantitative and qualitative quality criteria and were awarded the higher quality rating in the case of evaluation disparity.

Methodological appropriateness of evidence

Drawing upon Gough (2007), each study was evaluated as 'high', 'medium' or 'low' quality according to its 'methodological appropriateness' in relation to the review questions. The criteria for these are shown in Table 5.

Table 5: Methodological appropriateness criteria

Methodological appropriateness	Maximum number of points
A clearly defined sample	1
A sound intervention approach Comprised of one point each for: <ul style="list-style-type: none"> • a clear theoretical rationale and/or evidence base for the intervention • sufficient information provided for the intervention to be replicated. 	2
Use of objective measures Comprised of one point each for: <ul style="list-style-type: none"> • Relating to the specific focus concern for the children with ASD, e.g. use of a social skills measure for a social skills intervention • Relating to the educational application of the intervention itself, e.g. teacher questionnaire regarding utility. 	2

If a study scored between 0 and 2 points or 3 points but without scoring on all three aspects it was categorised as 'low appropriateness'. If a study scored 3 points (with at least 1 point per criterion) or 4 points on 2 criteria, it was assessed as 'medium appropriateness'. If a study scored 4 (with at least 1 point per criterion) or 5 points it was categorised as 'high appropriateness'.

Effectiveness of the intervention

Drawing on Gough (2007) again, evaluation of effectiveness took account of the extent to which the intervention was effective.

Table 6: Evaluation of effectiveness

Effectiveness	Score
The intervention had no or a negative effect, or did worse than control/against prediction.	Low
The intervention had a positive effect and no control OR where one intervention was predicted to perform better than another but both interventions performed equally well.	Medium
The intervention was better than control or comparison intervention but only if the finding was as predicted.	High

The trialling of the coding framework included training, moderation and framework modification, followed by an inter-coder reliability check. In total, there were four versions of the coding framework before the final, fifth version was established. The first version was trialled with three papers selected at random from the Mendeley database. As a result of this initial exercise, the quality criteria were refined, and the same three papers were recoded. A further five studies, representing different research designs and foci were then coded, resulting in changes leading to versions three and four of the framework. Changes at this stage focused on ensuring information could be captured accurately, such as the diagnosis of the participants taking part and the focus of the intervention. An inter-coder reliability check was then conducted. Eight new papers were coded by three researchers using the final, fifth version. Across studies, an overall Cohen's kappa inter-coder reliability coefficient of 0.87 was calculated (with even the lowest framework element at kappa value 0.70), indicating very high inter-coder reliability. Following the inter-coder reliability check, final minor clarifications were made to the fifth version of the coding framework to ensure consistency of coding.

2.2.6 Review stage 5: Using the coding framework

All of the 176 studies included in the review were coded between October 2013 and January 2014, using version five of the coding framework. Studies were coded as they were added to the Mendeley database, from which research assistants selected studies to code. To code a study, a research assistant read it thoroughly and sought the information relevant to the review, as outlined in the coding framework. As far as possible, information was recorded verbatim, to minimise the research assistant's own interpretation of the data. Any information that was considered to be potentially significant but that did not fit the categories of the coding framework was placed in a separate 'notes' column at the end of the framework. Any concerns about a study (e.g. whether the study used a clearly defined sample) were recorded in Mendeley and followed up by the research assistant in consultation with other research team members. Regular checks of the coded data were conducted by the lead research assistant to ensure that the framework was being completed correctly, and any discrepancies or inaccuracies were discussed with the coder and amended as necessary. As part of the checking process, the lead research assistant would also check a sample of the coded studies every week to see whether the information coded accurately reflected the content of the journal article. Any discrepancies were discussed

at the fortnightly meetings where the research assistants discussed any issues that had arisen during the coding process.

In this review, a study was included if it was reported as being at least medium in terms of quality of evidence, was at least medium level in terms of methodological appropriateness to the review and at least medium level in relation to the effectiveness of the intervention. These 85 studies are described in Chapter 3.

2.2.7 Review stage 6: Presentation and description of review findings

Once all of the studies included in the review had been coded using the framework, the information from the coding exercise was used to:

- describe the range of quality, methodological appropriateness and effectiveness of studies to the review;
- identify within high, medium and low quality studies, the target sample, research design, intervention approach, measures and outcomes of each study, together with an evaluation of methodological appropriateness and effectiveness to the evaluation of what works best in the provision of education for persons with ASD; and
- identify a pool of studies from which reasonably confident conclusions may be drawn about what works best in the provision of education for persons with ASD.

Appendix B describes the 91 studies that were not assessed as being at least medium in all areas and the basis upon which each study was excluded.

2.3 Procedure: Case Study Strand

2.3.1 Overview

In order to systematically select five countries/jurisdictions to be included as case studies, the research team developed a set of 'best practice' criteria, which included general and ASD specific elements (these are described in more detail in Appendix F). It was planned that these criteria would inform the selection of countries/jurisdictions.

In order to collect data on policy and practice at a country/jurisdiction level, the research team also developed a case study template. The template enabled data to be collected by age group according to a number of categories such as types of educational settings, legislation, teacher education and outcomes (for the full template see Appendix G). The template was trialled with one country (England) and revised accordingly.

Following the initial trial and revisions of the template, a scoping exercise was undertaken of 13 countries. This phase involved web searches of policy and practice in countries/jurisdictions identified by the Advisory Group and research team using an abbreviated template (see Appendix H). This scoping exercise aimed to identify a shortlist of countries for potential selection as case studies and consider them in relation to the best practice criteria. However the scoping exercise highlighted that data were limited for many of the countries/jurisdictions included in the exercise. For instance, in some cases children with ASD were not identified as a discrete group for data collection purposes and in some countries provision was determined at a more local level, thereby restricting data available at the national level. This meant that there were insufficient data to consider countries according to the best practice criteria, and recommendations were made regarding countries that could be included on the basis of best available data, and countries that reflected a range of approaches to provision for pupils with ASD.

2.3.2 Case study data collection

Once the final shortlist of five countries/jurisdictions had been agreed by the Advisory Group, the findings from the scoping exercise were added to the case study template, and searches were made for relevant data to complete the template. This involved:

- (a) identification of policy documentation and 'grey' literature pertaining to each country²
- (b) information and data from national and international websites
- (c) emailing identified contacts
- (d) verification of case studies.

(See Appendix F for a detailed description of this process.)

Although a thorough data collection process was undertaken, limitations identified during the scoping exercise were evident during the data collection for the main case studies. Information was frequently not collected in relation to particular criteria if it could not be located or was not available in a format that could be shared with the research team. Due to the number of gaps in the case study data it was decided with NCSE to include these data in an Appendix (see Appendix F).

2.4 Procedure: Guidance Strand

Given the growing prevalence of ASD, an increasing number of guidance documents have been developed at national and/or local jurisdiction level in recent years in order to inform the development of national or local education policy and provision. However, there is a lack of research regarding the content and purpose of best practice guidance. A survey of best practice guidance was therefore included as part of this review in order to inform understanding of its content and purpose and identify ways in which different types of research evidence and expert opinion inform this documentation. Guidance documents were collated while the research team were undertaking web searches and scoping exercises to inform the case study selection and during the development of the case studies. Evaluation of the research from the systematic literature review strand also assisted in identifying good practice guidance, through sourcing best practice guidance documents referred to in academic articles. A total of 15 guidance documents were found. These documents came from the US, Australia, England, Northern Ireland and Canada.

A framework was developed by the research team to summarise and evaluate the guidance identified during the search processes (see Appendix E). As the best practice guidelines are not primary evidence, may not be grounded in evidence, and may not make recommendations that are 'testable' in the same way as the literature review interventions, they are treated as a separate strand of the research report. Guidance documents were included in the current strand if they were:

- dated 2008–13 only
- focused on, or had specific reference to, children and young people with ASD
- focused on educational provision (broadly defined as home, community or school/college-based settings)
- published/available in English
- stand-alone published documents or downloadable pdfs or word documents.

² 'Grey literature' refers to material that has not been commercially published in books and journals.

Guidance documents were analysed using content analysis (Hsieh and Shannon, 2005). The analysis of the documents focused on key aspects that linked directly to key areas related to the review questions. Each guidance document was screened according to a format agreed with the Advisory Group and included the following headings:

- date of publication
- developer(s)
- guidance given re age range covered and/or setting applicable to
- intervention focus of guidelines
- evidence used to inform guidance
- evaluation of guidance.

This information was tabulated. For each guidance document, evidence was also sought in relation to the following categories, which, where appropriate, mapped onto 'best practice' as described in the case study strand:

- curriculum
- assessment
- teacher/professional education
- professionals involved
- collaboration with parents/carers
- transitions
- communication, including pupil participation
- guiding philosophy e.g. inclusion.

Where this information was present it was summarised within descriptions of each guidance document. Guidance documents were then evaluated according to their overall relevance to the review and categorised as follows.

- Very relevant: wide ranging, well-informed and thorough, includes consideration of policy, research and practice.
- Relevant: thorough and well-informed guidance but may be restricted to one area of policy, research or practice.
- Moderately relevant: guidance may rely on limited evidence or adopt a narrow or less educational focus.
- Least relevant: Unclear sources of evidence and limited focus on education for children and young people with ASD.

Guidance documents varied according to their purpose and scope. Some guidance documents focused on provision for people with ASD across a range of areas of provision while others focused on education or health and some focused on a single issue such as transition. Some guidance documents were informed by a systematic review of intervention evidence, while others were based on primary evidence. These factors meant that the documents covered a wide range of areas and some guidance documents were more relevant to the review than others (which is reflected in the categorisation system).

2.5 Data Synthesis

Each chapter concludes with an implications section, which draws together themes from that chapter. Implications for practitioners, by setting type, and for researchers and policy makers are considered. The final chapter of the report provides a synthesis of the common themes and unique contributions of each of the three strands of this research. Implications are drawn together from the three strands. The report concludes with six key implications for the education of children and young people with ASD in Ireland.

3 Results: Systematic Literature Review

3.1 Overview of Included Studies

3.1.1 Quality and type of studies

As described in the methodology chapter, 176 studies were assessed as being eligible for the review and rated on a scale of high, medium or low on three criteria: quality, methodological appropriateness and effectiveness of the intervention. These criteria are described below.

- The quality of evidence criterion related to the methodology used to conduct and report the research, and was assessed through application of quantitative or qualitative evaluation criteria, or both in the case of mixed method studies.
- The methodological appropriateness criterion related to the extent to which the research was able to address the review questions posed for this research.
- The effectiveness of the intervention criterion assessed the extent to which the intervention was effective.

A total of nine studies scored high on all criteria (these are marked with an asterisk (*) in the tables in this section), and a further 76 studies scored at least medium on all criteria. These two groups of studies are reported as 'best evidence' studies, and are presented in the following sections. Those studies which scored low on one or more criterion are included in Appendix B, along with their scores for each criterion. These scores reflect relevance to the current review and are not necessarily a reflection of the overall quality of the research conducted.

Although qualitative and mixed methods studies were among the 176 studies that were coded for the review, their numbers were small. No qualitative studies and only one mixed methods study are included in the final 85 best evidence studies. The lack of qualitative and mixed methods studies relevant to the review represents a significant gap in the current literature. This has been identified as a gap in ASD research to date (Bolte, 2014). In relation to research design, 54 studies included in the review used single case experimental designs, while 30 studies were RCTs or quasi-experimental studies and one study used mixed methods. The number of participants involved in studies tended to be relatively small. Intervention sample sizes ranged from two to 177 participants and in 55 studies there were four or fewer participants.

3.1.2 Country of origin

As can be seen in Table 7, the majority of studies included in the review took place in the US. Where there were multiple authors from different countries the place where the intervention took place was used to categorise the country of origin.

Table 7: Included studies by country of origin

Country	Number of studies	Country	Number of studies
US	65	Taiwan	1
UK	7	Canada	1
Australia	2	Netherlands	1
Norway	3	South Africa	1
Ireland	2	Israel	1
Italy	1		

3.1.3 Studies by age group and focus of intervention

The research team considered how the data from the 85 best evidence studies could best be reported and it was decided, in consultation with NCSE, to present studies according to focus of intervention throughout this review. Presenting the data in this way enables similar interventions from different theoretical approaches to be grouped together (Stahmer, 2014) in order to provide a clear overview of all of the evidence in each area. Presentation by intervention focus was also used in a recent review by Wong et al. (2013). The current review includes fewer studies as the review period covered fewer years than those in the Wong et al. review. However, the intervention categories used in the current review have been broadly mapped onto those used by Wong et al. (2013) to increase consistency and comparability.

Presentation by age group was also considered as a means of making the review easier to navigate for practitioners. However, as can be seen in Table 8, overlaps between age groups would have made this form of presentation more difficult. An overview of the number of review studies by age group and focus intervention is provided in Table 8.

Table 8: Included studies by focus on intervention and age group

Age group	Focus of intervention											Total
	Joint Attention	Social	Play	Communication	Challenging/ interfering behaviour	Pre-academic/ Academic	School Readiness	Cognitive	Adaptive/ Self-help skills	Motor	Comprehensive	
Pre school	4	1	1	5	2	1	0	0	0	0	9	23
5–8 years	0	8	2	1	7 [^]	4	1	0	2	1	3	29
9–12 years	0	7	1	1	4	1	0	0	0	0	0	14
13–16 years	0	3	0	0	0	2	0	1	0	0	0	6
*5–16 years	0	3	1	2	4	0	0	0	0	0	1	11
16+ years	0	1	0	1	0	0	0	0	0	0	0	2
Total	4	23	5	10	17	8	1	1	2	1	13	85

Note: Studies marked with an asterisk (*) did not fit into the age group categories. One study (marked with the symbol ^), Cale et al. (2009), includes three smaller studies but these are counted here as one piece of research.

Following Wong et al. (2013), the intervention foci in the current review are defined as follows.

- Joint attention: behaviours needed for expressing interests and/or experiences.
- Social: skills needed to interact with others.
- Play: use of toys or leisure materials.
- Communication: the ability to express wants, needs, choices, feelings or ideas.
- Challenging/interfering behaviours: decreasing or eliminating behaviours which interfere with the individual's ability to learn.
- Pre-academic/academic: performance on tasks typically used in school settings.
- School readiness: performance during a task that is not directly related to task content.
- Cognitive: performance on measures of intelligence, executive function, problem solving, information processing, reasoning, theory of mind, memory, creativity, or attention.
- Adaptive/self-help skills: independent living skills and personal care skills
- Motor: movement or motion, including fine and gross motor skills, or related to sensory system/sensory functioning.

In the current review no studies were found for the mental health or vocational categories used by Wong et al. (2013). In addition to the categories used by Wong and colleagues, a group of studies were also included in the current review to reflect the range of comprehensive intervention approaches. Recent documents such as the Missouri Autism Guidelines Initiative (2012) also included a comprehensive interventions category in their review. These can be defined as:

- interventions that address the needs of children and young people across more than one intervention focus area.

As the comprehensive interventions are designed to have an impact across a number of skill areas, these are presented by age group rather than by intervention focus in this chapter of the report.

3.1.4 Intervention type

A wide range of interventions are included in the current review. Table 9 summarises the number of studies within each intervention focus.

Table 9: Studies by intervention focus and type

Intervention	Number of studies	Intervention	Number of studies
Joint attention	4	Communication interventions	
Social interventions		Video modelling	4
Social initiation training	4	PECS	3
Computer-assisted emotional recognition	3	Behavioural communication approaches	2
Peer-mediated interventions	9	Peer mediated	1
Multi-component social interventions	6	Pre-academic/academic skills interventions	
Consultation	1	Discrete skills teaching (behavioural)	4
Play-based interventions		Computer assisted	2
Lego Therapy®	2	Multisensory	2
Play-based interventions	3	Comprehensive interventions	
Challenging/interfering behaviour interventions		Comprehensive pre-school interventions	10
Behavioural interventions	7	Comprehensive school-based interventions	3
Narrative interventions	5	Cognitive	1
Self-monitoring	2	Motor skills	
Computer assisted	2	Aquatic	1
Yoga	1		
School readiness	1		
Adaptive/self-help			
Computer-assisted instruction	1		
Visual cueing	1		

The category of multi-component social skills interventions describes a package that includes more than one intervention to address social skills, such as a child-focused intervention and a parent intervention to assist the child in developing their social networks. One theme, not captured in the above table, is that, across a number of behaviourally based studies, functional analysis of behaviour was used prior to intervention. Computer assisted interventions also took place across different intervention foci; these included a range of techniques such as video modelling, video-self monitoring, specific computer programmes and speech generating devices.

3.2 Presentation of Data and Interpretation

The tables in the next section provide detailed information in relation to each study to assist the reader in making comparisons between them. The tables include author(s) of study and country of origin. To aid interpretation of the studies they have also been rated according to effectiveness of the intervention, as described in Table 10. These ratings correspond directly with the effectiveness criteria described in the methodology section. To be included as best evidence, all studies needed to score at least medium for effectiveness. To assist the reader, studies have been given a rating of + to indicate medium effectiveness or ++ to indicate high levels of effectiveness. These ratings are included in the outcome column for each study.

Table 10: Effectiveness of intervention – ratings

Description of effectiveness of intervention	Rating
The intervention had a positive effect and no control, OR where one intervention was predicted to perform better than another but both interventions performed equally well.	+
The intervention was better than control or comparison intervention, but only if the finding was as predicted.	++

Not all of the studies identified as ++ were also scored as best evidence (*), as the ++ rating only relates to the effectiveness of intervention criterion. Some studies with a ++ rating, whilst scoring high for effectiveness of intervention, did not achieve consistently high scores for quality of evidence or methodological appropriateness in relation to the current review.

The remaining columns of each table are:

- **focus/aim**, which refers to the researcher's identified aims;
- **study design**, which refers to the type of study undertaken such as an experimental design or a single case experimental design (descriptions of study designs reported in the tables are those given by the study authors);
- **setting**, which refers to where the study took place, such as mainstream, special or resourced mainstream school;
- **intervention sample**, which describes the number of participants and the researchers' description of the nature of the children/young people's ASD;
- **intervention**, which describes the intervention which took place and where available includes duration and frequency (duration is not specified in quite a few single case experimental studies as the duration of these interventions often varied for individual children);
- **outcome**, which outlines the researchers' outcome findings in relation to children/young people with ASD and social validity measures, if available; and
- **follow up**, which describes whether any follow up took place after the intervention had finished.

There was substantial variability in the way that information regarding setting type and participants was presented in the individual studies. Regarding setting type, additional detail is provided where available. The term 'resourced mainstream' is used to refer to a small class located within a mainstream school, with access to mainstream classes as appropriate; 'mainstream' refers to pupils included within mainstream classrooms; 'special school' refers to a specialist provision for a particular group of children, which is likely to be delivered in smaller classes.

In order to report participant characteristics as consistently and informatively as possible, studies are described as follows.

- For studies with 2–4 participants, actual ages are provided if available.
- For studies with larger numbers of participants, a mean age is provided.
- Diagnostic descriptions used by the researchers are reported and the basis for the diagnosis, either a prior diagnosis or reassessment as part of the research, is provided.
- Numbers of male and female participants are reported if available.

Where information was not available in the above format, the participant information provided by the researchers is given. The following sections present the individual studies in tables according to intervention focus. If more than one study is included in a category, this is followed by a summary of outcomes for that section. Due to the timeframe for this review, it was not possible to compare intervention effectiveness over time, or to describe interventions using terms such as established or promising, as has been done in previous reviews. For consistency within this review, the terms 'most', 'moderate', 'some' and 'a small amount' regarding evidence are therefore used to consistently describe the amount of evidence for different interventions. The amount of evidence needed to be included in each of these categories is described fully in Section 3.14. Where possible, implications relating to particular age ranges are highlighted if sufficient data are available to draw conclusions.

When interpreting studies, it should be borne in mind that individual child factors and intervention characteristics are likely to make some interventions and particular combinations of interventions more appropriate for a particular child at a particular time.

In the tables in this section, the term 'significance' is also used to refer specifically to statistical significance. This is where statistical tests are used to identify whether outcomes can be attributed to the intervention or to chance. Statistically 'significant' describes those outcomes that are much more likely to be attributable to the intervention than to chance.

The first set of data presented relates to joint attention interventions.

3.3 Studies Focusing on Joint Attention Interventions

Table 11: Joint attention interventions

Research study and country	Focus/Aim	Study Design	Setting	Intervention sample (age, type of ASD, gender)	Intervention (duration, intensity, modality, delivery)	Outcome	Follow up
Goods et al. (2013) US	To test whether an intervention focused on a developmentally based approach for teaching joint engagement, joint attention, and play skills could improve social communication outcomes.	Quasi experimental (control group TAU of 30 hours per week ABA)	Non-public ASD special school	Seven children with a prior diagnosis of ASD. Mean age 4:3 years with less than 10 functional words. Gender not specified.	Joint Attention Symbolic Play Engagement and Regulation (JASPER) 2x30mins with researchers twice a week for 12 weeks alongside regular classroom intervention. Play-based 1:1 intervention to develop social communication skills.	Effectiveness ++ Participants in the treatment group demonstrated greater play diversity on structured play assessment but no changes on early social communication scales (ESCS). Generalised to classroom with observations showing more initiation and less time unengaged. No significant changes on measures for ABA group.	None.
Isaksen and Holth (2009) Norway	To investigate if children with ASD can learn and maintain joint attention skills as a result of an ABA based training protocol.	Single case experimental design	Mainstream kindergarten setting	Four children, with a prior diagnosis of childhood ASD aged 3:8, 4:6, 3:10 and 5:4 years. Two boys and two girls.	Joint attention 1:1 intervention delivered by support staff. One hour daily for 33–61 days until training complete. Intervention focused on teaching the children to respond to joint attention bids (e.g. another person smiling and nodding) and to teach joint attention skills in tasks based on turn taking.	Effectiveness + Increased responding to joint attention (RJA) and initiating joint attention (IJA) scores, respectively, from pre-test to post-test for each of the four children.	One month follow up – results sustained or improved.

Research study and country	Focus/Aim	Study Design	Setting	Intervention sample (age, type of ASD, gender)	Intervention (duration, intensity, modality, delivery)	Outcome	Follow up
* Kaale, Smith, and Sponheim (2012) Norway	To assess the effects of a pre-school joint attention (JA) intervention.	RCT. Intervention group regular pre-school plus JA intervention. Control group pre-school only.	Pre-school classrooms.	61 children (34 in intervention group) with a diagnosis of childhood ASD (confirmed using the ADOS). Aged 3:05 to 5:00 years. 48 boys and 13 girls.	1:1 joint attention delivered by teacher with weekly supervision from counsellors. Intervention for 8 weeks (2x20mins sessions per day) focused on target JA skill and opportunities for generalisation.	Effectiveness ++ Pre-post independent coding of videoed structured play sessions of child with teacher/parent. Significant difference between experimental and control groups post intervention. JA with teachers increased for intervention group and JE (joint engagement) increased with mothers for intervention group children.	None.
Wong (2013) US	To assess changes in the child's engagement, joint attention, and play during and following (i) symbolic play and (ii) joint attention interventions.	Quasi experimental (wait list control group, TAU).	Self-contained special education classrooms with 2-8 children. One lead teacher and 1-3 support assistants.	33 children diagnosed with ASD (validated with CARS). Mean age (4:8 months) 12 boys and two girls. 14 teachers.	Joint attention and symbolic play 8x1 hour weekly teacher training sessions focused on either symbolic play or joint attention intervention. Teacher selected 1:1, group or class intervention plan with researcher.	Effectiveness ++ Children in the intervention groups spent significantly more time in joint engagement compared to wait-list control group. Classroom observation showed significant increases in joint engagement, joint attention responses and initiations, and symbolic play acts. The semi-structured assessments (ESCS and structured play assessment) only showed positive changes in responses to joint attention. Perceived as an acceptable intervention by teachers.	None.

Note: The asterisk symbol (*) indicates a high score for all three dimensions (quality of evidence, methodological appropriateness and effectiveness of intervention).

3.3.1 Findings from the joint attention section

Joint attention (number of studies = 4)

Joint attention interventions with pre-school children represent one form of intervention with the most evidence in the current review. This group of studies provides evidence for joint attention interventions with pre-school children across a range of education settings. The studies by Kaale et al. (2012) and Wong (2013) provide evidence to support joint attention interventions, with Kaale et al. (2012) identified as a best evidence study. There was some evidence to support generalisation of skills across settings and people but follow-up data in this category were limited.

Summary

- Joint attention interventions for pre-school children are one of the interventions with the most evidence in the current review.

3.4 Studies focusing on social interventions

Table 12: Social initiation training (behavioural) programmes

Research study and country	Focus/Aim	Study Design	Setting	Intervention sample (age, type of ASD, gender)	Intervention (duration, intensity, modality, delivery)	Outcome	Follow up
Davis et al. (2009) US	To examine the effects of 'power cards' on the initiation and maintenance of conversational skills in students with Asperger's syndrome.	Single case experimental (multiple-probe across participants).	Conversation skills pre-training phase and data collection were conducted in the child's special education resource room. Conversational skills were introduced to all students in a group instructional format in a resource room.	Three high school students with a diagnosis of Asperger's syndrome. Diagnoses were confirmed by a licensed psychologist at intake. Mean age 17 years. Three boys.	Intervention delivered daily by their teacher (first author) until learnt. Students taught in a 1:1 format to use 'power cards' (adapted to the student's special interest area) with an accompanying script to engage in conversation with their peers. Students were instructed to keep the power card and script with them to refer to when needed.	Effectiveness + The implementation of the power card strategy that incorporated the students' special interest area successfully improved conversational skills for all 3 students.	None.
Ganz et al. (2008) US	To investigate the effectiveness of written social scripts and visual cues with verbal elementary-age children with ASD.	Single case experimental (multiple baseline design).	Special school for children with ASD and cognitive impairments. Two teachers and 10 children.	Three children aged 7, 8 and 12 years with prior diagnosis of ASD or PDD-NOS. Two boys and one girl.	Social scripts Five minute group sessions with teacher. Each phrase and accompanying pictures were typed onto cards. Every 30 seconds, a card was held up behind the participant's partner to prompt the participant to say the phrase on the card. The card was held up until the participant said the scripted statement. For perseverative speech a quiet cue card was used.	Effectiveness + Use of scripted statements increased during intervention but reduced to baseline levels on return to baseline. One student's unscripted comments increased during intervention. All students showed reduction in perseverative speech.	None.

Research study and country	Focus/Aim	Study Design	Setting	Intervention sample (age, type of ASD, gender)	Intervention (duration, intensity, modality, delivery)	Outcome	Follow up
Koegel et al. (2012) US	To assess whether teaching initiations would result in generalisation of socialisation in elementary school children with ASD when an interventionist was not present.	Single case experimental (multiple baseline).	Mainstream kindergarten classes in elementary school settings.	Three children with a prior diagnosis of ASD or Asperger's syndrome. Aged 5 years, 5 years and 6 years. Two boys and one girl.	PRT. Phase one: 'Facilitated social play without initiations training'. Phase two: 'Facilitated social play with initiations training' – this involved experimenter prompting the participant to initiate to the peer(s) they chose to play with.	Effectiveness + Inter observer agreement 94–95 per cent. Phase one unprompted initiations and social engagement rates increased for two of the children, and for all three during phase two. Phase one, affect more positive for two of the children, and for all three children during phase two.	None.
Pollard, Betz and Higbee (2012) US	To examine the use of written scripts to teach children with ASD to initiate bids for joint attention.	Single case experimental (baseline, teaching, adults scripted, multiple scripts).	Two children attended university based pre-school and other a mainstream school class.	Three children aged 4 years, 4 years and 7 years with a prior diagnosis of ASD. Two boys, one girl.	1:1 intervention with researcher in school. Scripted bids for joint attention were used; these script were faded-out to encourage participants to act independently.	Effectiveness + Inter observer agreement 96–98 per cent. All three learned to initiate bids for joint attention. Independent bids were maintained during the adult scripted responses and multiple-script training conditions for all participants. Generalisation was limited and required prompts.	Only one child maintained unscripted bids at six week follow up.

Table 13: Computer-assisted emotion recognition interventions

Research study and country	Focus/aim	Study Design	Setting	Intervention sample (age, type of ASD, gender)	Intervention (duration, intensity, modality, delivery)	Outcome	Follow up
Axe and Evans (2012) US	The purpose of the current study was to extend the research on teaching children with ASD to respond to facial expressions.	Single case experimental.	School (setting not fully described).	Three children with prior diagnosis of PDD-NOS. All aged 5:6 years. Three boys.	Video modelling 1:1 with the researcher. During training sessions, the participants would watch a video on a laptop of adults responding to one of eight facial expressions. Then they would perform that facial expression for the child and ask them how they should respond to it.	Effectiveness + Inter observer agreement 94 per cent. Overall, video modelling was effective in increasing correct responses to eight facial expressions between baseline and intervention, although there were some inconsistencies across participants and expressions. Social validity – rated an acceptable intervention by teacher.	Two participants maintained responding levels at two or six months.
* Hopkins et al. (2011) US	Effect of intervention on facial recognition. Impact of intervention on social behaviours.	Quasi-experimental high functioning autism (HFA) and low functioning autism (LFA) intervention and control groups. Control groups used drawing computer software for equivalent sessions and duration.	Specialised school or after-school centre.	24 children in intervention group. Previous diagnoses checked using CARS and divided into LFA/HFA. Mean 10:07 years. 22 boys and two girls.	Face Say computer programme. Twice a week for approximately 10–25 min per session over a period of six weeks, a total of 12 sessions. 1:1 delivery by researcher.	Effectiveness ++ Children were assessed on emotional recognition test, Benton facial recognition test and social skills rating system (SSRS). Compared to controls, LFA children and HFA children in the intervention groups showed improvements across a number of subscales.	None.
LaCava et al. (2010) US	Investigating if mind reading would help students with ASD improve emotion recognition and social interaction skills.	Single case experimental.	Mainstream elementary school.	Four children aged 7–10 years. Mean age 8:6 years, with prior diagnoses of ASD (two children) PDD-NOS (two children). Four boys.	Each participant used mind reading computer programme for 7–10 weeks (mean = 12.3 hours over the 7–10 week period). Researcher and school staff delivery 1:1.	Effectiveness + On Cambridge Mindreading Face-Voice Battery for Children (CAM-C), three participants increased their scores on all three subscales, but fourth only increased on two. All improvement in emotion recognition and mean levels of positive social interaction. Staff perceived programme as easy to use.	None.

Note: The asterisk symbol (*) indicates a high score for all three dimensions (quality of evidence, methodological appropriateness and effectiveness of intervention).

Table 14: Peer-mediated interventions

Research study and country	Focus/aim	Study Design	Setting	Intervention sample (age, type of ASD, gender)	Intervention (duration, intensity, modality, delivery)	Outcome	Follow up
Bauminger-Zviely, Eden, et al. (2013) Israel	To increase social understanding by teaching basic social constructs and to improve children's social engagement skills with peers.	Quasi-experimental design.	Mainstream school.	22 children. Prior clinical diagnosis of ASD confirmed with ADOS. Mean age 9.8 years. 18 boys, four girls.	12x45 minute lessons (six per intervention). Special education teachers and OT trained by researchers to deliver intervention. Paired intervention with peer. Participants completed both interventions. 'Join-in' involved collaborative problem solving and 'no-problem' taught social conversation. Half started with each intervention.	Effectiveness + Both the direct and indirect social cognitive measures improved significantly. Both 'join-in' and 'no-problem' had significant effects on children's progress in social engagement behaviours, but children receiving 'join-in' first (for collaboration) improved their collaborative skills more than those who received 'no-problem' first.	None.
Harper, Symon and Frea (2008) US	Investigated the use of PRT strategies as a social skills intervention package for elementary aged children with ASD. It was hypothesised that the participants' social interaction would increase as a result of teaching the peers to utilise naturalistic techniques associated with increasing motivation.	Single case experimental (multiple baseline).	Mainstream school.	Two children with a prior diagnosis of ASD. Aged 8:6 years and 9:1 years. Both boys had significant social difficulties. Six peers (two boys, four girls aged 8–9 years).	Baseline rates of playground peer interaction were taken prior to intervention. Peers were then trained in the five component strategies of PRT during 7x 20 minute sessions. Peers then employed individualised strategies to initiate and maintain play with the target participant. Unprompted playground interaction was observed post-intervention.	Effectiveness + Both participants increased the frequency of their social peer interactions. Initiations and turn taking increased during recess and were sustained during generalisation probe observations. The five strategies were learned successfully by the peers.	None.

Research study and country	Focus/aim	Study Design	Setting	Intervention sample (age, type of ASD, gender)	Intervention (duration, intensity, modality, delivery)	Outcome	Follow up
Jung, Sainato and Davis (2008) US	To examine the effects of high-probability request sequences with embedded peer modelling on the compliant responding to social requests in young children with ASD.	Single case experiment (multiple baseline).	Mainstream inclusive private charter school. Intervention in inclusive pre-school/ kindergarten transition classroom.	Three participants aged 5:3, 6:3 and 6:5 years. Diagnoses of ASD (1), and PDD-NOS (2) confirmed using the CARS. Three boys; six mainstream peers.	High probability (high-p) request sequences delivered by researcher. Peer training to enable peers to respond to target child's initiations followed by prompted initiation training with peers then withdrawal of prompts.	Effectiveness + Inter observer agreement 98–100 per cent. Responses of the target children to low-p requests of peers increased with the implementation of the high-p requests with embedded peer modelling. High-p requests with embedded peer modelling resulted in increased unprompted social interactions for the target children. For all children, there was a decrease in the number of general prompts following high-p implementation. Social validity – professionals perceived intervention as useful but only 60 per cent felt easy to implement.	None.
* Kasari et al. (2012) US	To compare two interventions (peer-mediated and child assisted) for improving the social skills of high functioning children with ASD in general education classrooms.	RCT. Children were randomised to receive PEER, CHILD or no intervention (regular inclusion) in rotation.	30 mainstream schools.	60 HFA children (41 aged 5–8 and 19 aged 9–11 years). Diagnosis confirmed with ADOS and ADI-R assessment. 90 per cent boys. In mainstream classes for 80 per cent of day to be included in the study.	Six weeks, 12x20 minute sessions delivered by graduate students trained by researchers. CHILD consisted of the participant meeting with a trained interventionist to develop strategies for social engagement with peers. PEER involved three peers meeting with the interventionist and then helping the participant to develop social strategies.	Effectiveness ++ Significant improvements were found in social network salience, number of friendship nominations, teacher report of social skills in the classroom, and decreased isolation on the playground for children who received PEER intervention.	Changes persisted at three month follow up.

Research study and country	Focus/aim	Study Design	Setting	Intervention sample (age, type of ASD, gender)	Intervention (duration, intensity, modality, delivery)	Outcome	Follow up
Koegel, Fredeen et al. (2012) US	To assess whether scaffolding initiations would result in generalisation of socialisation in elementary school children with ASD when an interventionist was not present.	Single case experimental (repeated measures, multiple baseline).	At participants' mainstream schools, with peers, during lunchtime.	Three participants diagnosed with ASD (prior diagnosis confirmed using DSM-IV by qualified staff). Aged 11–14 years. Three boys. All three had significant social difficulties.	Lunchtime clubs (additional to those offered on offer) were offered with activities relating to each participant's interests. The club activities were briefly announced to all the children. Participation was strictly voluntary for all children, including the target participants. Undergraduate university students acted as 'social facilitators'. They were responsible for introducing the daily club but then faded their presence once the activity began. No direct social skills instruction given.	Effectiveness + Engagement and initiation were observed and coded in vivo or on video. Throughout baseline, none of the children spent any time engaged with their peers, remaining stable at 0 per cent. Engagement increased to between 73.3 per cent and 100 per cent throughout the intervention condition. During baseline, the target children did not make any prompted verbal initiations with their peers; in contrast, all three targeted children increased their number of unprompted verbal initiations following the start of intervention.	None.
Koegel, Vernon et al. (2012) US	To assess whether incorporating the general interests of children with ASD into activities in natural inclusive settings, with no direct social skills training for the child, would result in improved engagement and verbal initiations between children with ASD and their typical peers.	Single case experimental (multiple baseline).	Mainstream elementary school.	Three children with prior diagnoses of ASD. Aged 9, 10 and 12 years. Two boys and one girl.	Voluntary lunchtime club with 5–20 peers per club. Researcher facilitated initially. Clubs set up in the same way as other clubs in school but around interests of pupils with ASD.	Effectiveness + Inter-observer agreement 95–99 per cent. Throughout the baseline, none of the children engaged with their peers or verbally initiated interaction. Engagement increased substantially throughout the intervention condition. All three targeted children increased their number of unprompted verbal initiations following the start of intervention.	None.

Research study and country	Focus/aim	Study Design	Setting	Intervention sample (age, type of ASD, gender)	Intervention (duration, intensity, modality, delivery)	Outcome	Follow up
Laushley et al. (2009) US	The purpose of this study was to determine if concept mastery routines (CMR) could be used effectively to teach, maintain and generalise social skills of children with HFA.	Single case experimental (multiple baseline).	Mainstream school. In general, education classes at least 60 per cent of the day for inclusion in study.	Four boys aged 6–10 years with HFA. Diagnosis confirmed by school psychologist through CARS and VABS assessment.	Concept mastery routines (CMR). Delivered at lunchtime two days per week by researcher with target child and peers. A visual concept map was created with students to teach a particular skill.	Effectiveness + Inter-rater agreement 93 per cent. CMR produced more of the targeted social skills than during the baseline. All of the targeted social skills improved and evidence of generalisation beyond the group. Teacher questionnaires indicated social validity of CMR.	Follow up after three weeks – all participants showed maintenance of skills.
Loftin, Odom and Lantz (2008) US	Effects of an intervention package to increase the social initiations and corresponding social interactions of children with ASD and their typically developing peers.	Single case experimental (multiple baseline).	Mainstream elementary school.	Three children aged 9, 10 and 10 years. Prior diagnosis of ASD confirmed with ADOS and DSM-IV. Three boys.	1:1 and small group. Peers trained in how to initiate social interactions. Also self-monitoring component to promote maintenance of new skills after the teaching phase and pupil independently initiating interactions.	Effectiveness + Inter observer agreement 93–100 per cent. All three participants demonstrated an increase in social initiations and social interaction from baseline to intervention; increases were maintained when the self-monitoring system and reinforcers were removed. Repetitive motor behaviours reduced. Positive social validity evaluations.	Changes in social behaviour and repetitive motor behaviour continued one month post intervention.
Trottier, Kamp and Miranda (2011) Canada	Evaluation of a peer-mediated intervention designed to teach students with ASD to use speech-generating devices (SGDs) to engage in interactions with peers in a social context at school.	Single case experimental (multiple baseline design).	Mainstream school.	Two pupils with prior diagnoses of ASD, aged 11:4 and 11:1 years. Two boys.	Three peers from each student with ASD's general education classroom were taught by the researcher to support SGD use during game activities.	Effectiveness + Inter observer agreement 96 per cent. Results provide evidence that the peers acquired the skills needed to support SGD use by students with ASD. The results also suggest that the intervention was effective in increasing total appropriate communicative acts by students with ASD. Social validity ratings by all of the peers were positive.	None.

Note: The asterisk symbol (*) indicates a high score for all three dimensions (quality of evidence, methodological appropriateness and effectiveness of intervention).

Table 15: Multi-component social interventions

Research study and country	Focus/aim	Study Design	Setting	Intervention sample (age, type of ASD, gender)	Intervention (duration, intensity, modality, delivery)	Outcome	Follow up
* Frankel et al. (2010) US	A randomised controlled study to evaluate Children's Friendship Training (CFT).	RCT (with delayed treatment group).	Clinic. Classes at UCLA children's friendship programme. 10 children per class.	68 children with ASD in elementary schools (5–12 year olds). Diagnosis confirmed using ADI and ADOS. 58 boys, 10 girls. Peers without ASD.	CFT – a 12 week, 60 minute manualised intervention delivered by researchers. Children worked on social skills activities in a group with peers and parents took part in parent group.	Effectiveness ++ 87 per cent of children in the CFT condition showed change on at least one standardised measure. Five out of 13 scores reached significance – significantly improved loneliness scale scores and parent report of self-control on SSRS. Parents also reported more play dates than delayed treatment group. Four out of 13 measures marginally significant.	Three month follow up: 66 per cent of children showing change on at least one measure.
* Laugeson et al. (2009) US	Short-term outcome of a controlled trial of an outpatient social skills program for the education and enrichment of relational skills (PEERS) for teens with ASD.	Quasi experimental (delayed treatment control TAU).	Not specified.	33 participants aged 13–17, mean 14:6 years. All prior diagnoses of HFA, AS or PDD-NOS. 28 boys and five girls.	UCLA PEERS Program. Manualised. 12, 90 minute social skills sessions, delivered once a week by researcher over the course of 12 weeks and concurrent parent group.	Effectiveness ++ Treatment group significantly improved on social skills knowledge and parent-rated social skills. No significant findings on teacher ratings. Treatment group also had an increase in social get-togethers.	None.

Research study and country	Focus/aim	Study Design	Setting	Intervention sample (age, type of ASD, gender)	Intervention (duration, intensity, modality, delivery)	Outcome	Follow up
* Laugeson et al. (2012) US	Treatment outcome of a new sample of teens receiving PEERS social skills intervention.	Experimental Delayed treatment control group (TAU).	Clinic, detail not specified.	28 middle and high school students. Participants aged 12–17, mean age 14:6 years. All participants had prior diagnoses of HFA, AS or PDD-NOS. 23 boys and five girls.	PEERS social skills intervention. 90 minute sessions, delivered once a week over the course of 14 weeks with concurrent parent group.	Effectiveness ++ On SSRS parents of the treatment group reported greater improvement in overall teen social skills in comparison to parents of delayed treatment group. Teachers rated improved overall social functioning between T1 and T3. On Friendship Qualities Scale no significant differences between groups. Test of Adolescent Social Skills Knowledge – The treatment group significantly improved compared to the delayed treatment group.	None.
Lopata et al. (2012) ^a US	Evaluated the feasibility and initial efficacy of a manualised comprehensive school-based intervention (CSBI).	Quasi-experimental. Pre-post measures.	Mainstream school. (Four participants in general education classrooms and eight in special education classrooms with mainstreaming).	12 HFA children, 6–9 years. Diagnosis confirmed using ADI-R. Mean age 7:33 years. Nine boys and three girls.	Multi-component. 10-month CSBI administered by the schools' educational teams. Composed of five active treatment components to address core and associated features of children with HFA (included social skills groups, therapeutic activities, face and voice emotion recognition instruction, an individual daily note and parent training).	Effectiveness + Pre-post comparisons suggested that children significantly improved their knowledge of target social skills on Skill Streaming Knowledge Assessment and ability to identify emotions in facial and vocal expressions on Cambridge Mindreading Face-Voice Battery for Children. According to parent (Behaviour Assessment Rating System 2 – Parent) and teacher ratings (Adapted Skill Streaming Checklist), children displayed gains in their use of target social skills. High ratings of fidelity, acceptability and satisfaction on standardised measures.	None.

Research study and country	Focus/aim	Study Design	Setting	Intervention sample (age, type of ASD, gender)	Intervention (duration, intensity, modality, delivery)	Outcome	Follow up
Lopata et al. (2012b) US	Further pilot of intervention from above study. Aimed to gather data on: (1) feasibility of the comprehensive school-based intervention (CSBI) (fidelity, acceptability, and satisfaction) when administered in a school setting; and (2) preliminary child outcomes.	Quasi experimental design. Pre-post measures.	Mainstream school. 50 per cent in mainstream and 50 per cent special education classrooms.	12 children with HFASD. Diagnosis confirmed using ADI-R. Mean age 7.72 years. 10 boys and two girls.	CSBI Three week summer preparation followed by 10 month intervention (five active treatment components, social skills groups, therapeutic activities, emotion recognition instruction individual daily note and parent training). 1:1 and small group delivery. Teacher, support staff, parents and researchers involved.	Effectiveness + Skill streaming Knowledge Assessment, Cambridge Mind Reading (child measures) Adapted Skill Streaming Checklist; Behaviour Assessment System for Children and Social Responsiveness Scale (parent) all showed significant pre-post increase with moderate change on teacher measures. Social validity – Education teams gave high acceptability and satisfaction ratings on standardised measures.	None.
Parker and Kamps (2011) US	To investigate effects of a multicomponent intervention package to improve the performance of children with ASD in social activities with typical peers.	Single case experimental (multiple baseline).	Mainstream school.	Two children with a prior diagnosis of ASD, aged nine years. One boy, one girl.	Naturalistic social skills intervention. Small group 30 minutes per session, 25–30 sessions. Researcher delivered. Social activities were used to teach functional skills. Social scripts were used to remind the students with ASD to talk and give them examples of appropriate social comments. The scripts were gradually removed.	Effectiveness + Inter observer agreement 80–100 per cent across phases. Task analysis and self-monitoring intervention increased the number of steps that each student was able to perform independently for social activities (2/3 for one student and 3/3 for other). Social scripts helped to improve conversation skills.	None.

Note: The asterisk symbol (*) indicates high score for all three dimensions (quality of evidence, methodological appropriateness and effectiveness of intervention).

Table 16: Consultation-based interventions

Research study and country	Focus/aim	Study Design	Setting	Intervention sample (age, type of ASD, gender)	Intervention (duration, intensity, modality, delivery)	Outcome	Follow up
Mimihan, Kinsella and Honan (2011) Ireland	To examine whether behavioural consultation with teachers could improve the social skills of adolescents with AS.	Mixed methods case study.	Mainstream secondary school.	Five young people aged 15–16 years with prior diagnosis of Asperger's syndrome. Four boys and one girl. Four resource teachers, four peers, five SNAs.	Behavioural Consultation. Teachers received two one-hour sessions in how to deliver the intervention. The social skills programme was delivered by the teacher consultees in both schools; over 10 40-minute sessions with one skill taught per session.	Effectiveness + Positive changes in Social Responsiveness Scale scores for the group. The four teachers reported that the students' social skills (initiating conversation; greeting; eye contact) and confidence with peers had improved as a result of the intervention. Social validity – Staff Intervention Rating Profile scores high and reported that they would 'definitely' run the programme again.	None.

3.4.1 Findings from the social interventions section

The largest number of review studies was within the social interventions category. This category also included the most studies rated high on all dimensions. As can be seen in Table 17, the majority of these studies were with 5–12 year old children and the number of studies significantly reduced with age.

Table 17: Social interventions by age group

	Pre school	5–8 years	9–12 years	13–16 years	5–16 years	16+ years	Total
Number	1	8	7	3	3	1	23

Given the large number of social intervention studies it was possible to break them down into categories according to intervention focus.

Social initiation training (n=4)

This group of studies with children aged 4–17 years is similar to the joint attention training interventions and also took place in mainstream and specialist settings. However, the social initiation training studies were broader and included teaching the child with ASD strategies to initiate interaction themselves, often using scripts or cues and/or prompting the child during peer interaction using PRT procedures. The studies in this section had mixed results in relation to generalisation, particularly when the intervention was not scaffolded by prompts within a social interaction. The study by Koegel et al. (2012) provides an interesting comparison of these two different types of intervention. In this study, initiation training followed by peer-facilitated play showed relatively better outcomes. The study by Davis et al. (2009) also provides some evidence to support the inclusion of a motivational element within the intervention. The studies in this group provide moderate evidence for social initiation training; additional evidence is needed in this area as the included studies all involved small samples, which limits generalisation.

Computer-assisted emotion recognition interventions (n=3)

This group of studies focuses on using computer programmes and video modelling to improve emotion recognition of children with ASD aged 5–10 years attending a variety of settings. It is promising that this group of studies includes one quasi-experimental study with a larger sample, particularly given that previous reviews have commented on small sample sizes being problematic in the area of computer-assisted interventions (Parsons et al., 2009). Hopkins et al. (2011) was assessed as being of high quality of evidence, methodological appropriateness and effectiveness of the intervention in relation to the current review and provides evidence to support the use of an emotion recognition programme. Two studies in this group also provide evidence of social validity. These studies represent promising developments of the moderate but growing evidence base in this area. Further research is needed regarding implementation in order to understand how these interventions can be delivered most effectively and the extent to which learning is generalised.

Peer-mediated interventions (n=9)

These studies include children aged 5–14 years. One of them (Kasari et al., 2012) was assessed as high in all domains. Although most studies in this group were quite small in scale, the study by Kasari et al. (2012) included a sample of 60 high-functioning children with ASD in mainstream schools and provides the strongest evidence in this group. The study by Bauminger-Zviely et al. (2013) also included a sample of 22 participants. All the studies in this group focus on children attending mainstream schools who were diagnosed with HFA or ASD. Although the interventions in this group adopt a variety of different theoretical approaches, including social learning theory or behavioural principles, most of the interventions tend to be more naturalistic and individualised. They focus on developing interventions with peers to support children with ASD and/or teach

peers skills to enable them to interact more successfully with children with ASD. One study in this group was a more structured intervention package (Bauminger-Zviely et al., 2013) but this also emphasised a social, problem-solving approach. The studies in this group provide positive evidence for involving peers in supporting children with ASD, resulting in social skills improvements and in one study, wider improvements in social inclusion (Kasari et al., 2012). Three studies provide positive evidence of maintenance at follow-up. Of the four studies that provide evidence of social validity from peers or teaching staff/professionals, three were very positive. Overall, peer interventions are one of the groups of studies with most evidence in the current review. Further research is needed in order to understand the perceptions of peers and pupils with ASD participating in these interventions.

Multicomponent interventions (n=6)

This group of studies includes children aged 5–17 years, with the majority of the interventions focusing on children attending mainstream schools, although some of the interventions took place elsewhere, such as a clinic or summer school. The studies in this group tended to have larger sample sizes and adopted experimental or quasi-experimental designs. Three of them were rated high on all review criteria. The studies were multi-component in that they either included several interventions, such as social skills training or peer support or involved parents in addition to a child focused programme. The studies by Frankel et al. (2010), Laugeson et al. (2009) and Laugeson et al. (2012) were assessed as high quality regarding evidence, methodological appropriateness and effectiveness of the intervention in relation to the current review. All three studies include samples of over 25 children and used a wide range of measures. Overall, multi-component social interventions are one of the groups of studies with most evidence in the current review. However, these interventions did not take place in schools and changes reported were not consistent across all measures or respondents, perhaps reflecting the wide range of skills being measured. Independent replication of these results is needed in addition to research in order to help establish the active ingredients of these interventions and identify how they can work in school settings.

One additional study is included in the social skills section. This provides a small amount of evidence to support behavioural consultation in relation to the delivery of a social skills intervention for adolescents with AS (Minihan et al., 2011). However, further research is needed to extend the evidence base in this area.

Summary

- Social interventions represented the largest proportion of the available evidence base.
- The available evidence focuses mainly on the primary age group, with some promising studies in the 13–17 years age range.
- A range of approaches (for example, peer-mediated, computer-assisted and multi-component) are used.
- Multi-component interventions are one of the groups of studies with the most evidence in this review; however further independent replication in school settings is needed.
- Peer-mediated interventions are also one of the groups of studies with the most evidence in this review and have been shown to be effective in mainstream settings.

Most evidence in this section points to the effectiveness of naturalistic peer-mediated interventions and multi-component approaches with moderate evidence for more specific computer-assisted emotion recognition packages and social initiation training.

3.5 Studies focusing on play-based interventions

Table 18: Lego therapy®

Research study and country	Focus/aim	Study Design	Setting	Intervention sample (age, type of ASD, gender)	Intervention (duration, intensity, modality, delivery)	Outcome	Follow up
Andras (2012) UK	To evaluate whether a series of 10 weekly, school-based LEGO® therapy sessions, delivered to primary aged pupils with ASD in mainstream schools leads to an increase in the frequency and their nature of social interactions.	Quasi experimental (pupils observation series with pupils providing own baseline).	Three mainstream primary schools.	Eight children with a prior ASD diagnosis aged 8–11 years. One girl, seven boys.	LEGO® Therapy, 45 minutes for 10 weeks in small group. Delivered by school staff.	Effectiveness + Playtime observations showed that at baseline the participants engaged in an average of three self-initiated interactions during a 10 minute observation. After the intervention, this rose to an average of five self-initiated interactions during 10 minute observation. Verbal interaction and engagement in collaborative games also increased and copying decreased.	10 week follow up with gains maintained.
Owens et al. (2008) UK	Comparison of LEGO therapy® or Social Use Programme (SULP) with TAU non-intervention group	Quasi experimental	Clinic, details not specified	31 children aged 6–11 years. Diagnosis of HFA or AS confirmed using ADI. Mean age 8:3 years. Diagnosed with HFA or AS. 30 boys and one girl.	LEGO therapy® – 60 minutes per week for 18 weeks, over a 5.5 month period. SULP – 60 minutes per week for 18 weeks, over a 5.5 month period. Researcher delivered.	Effectiveness + Compared to non-intervention group SULP and LEGO groups improved on maladaptive behaviour and non-significant improvements in communication and socialisation. LEGO group showed significant positive change on GARS social interaction scale compared to other two groups.	None.

Table 19: Play-based interventions

Research study and country	Focus/aim	Study Design	Setting	Intervention sample (age, type of ASD, gender)	Intervention (duration, intensity, modality, delivery)	Outcome	Follow up
Banda and Hart (2010) US	To use direct instruction to train students with ASD and a peer to enhance social skills (initiations, responses and sharing) in students with ASD during play activities.	Single case experimental (multiple baseline).	Self-contained classroom in an elementary school. No indication of percentage of time in mainstream.	Two eight-year-olds diagnosed with ASD/HFA. Scores on CARS/GARS reported but unclear if undertaken by researchers. Two girls. Peer participants from special education class but suggested by teacher as pupils with appropriate social skills.	Direct instruction delivered by researcher. Each training session lasted five minutes. One participant had 18 training sessions, the other had eight. The investigator and the teaching assistant modelled how to initiate joint play, share toys and make conversation during play. Peer also trained. After watching the investigator the participant was prompted to role-play observed skills with investigator then a peer.	Effectiveness + Inter observer agreement 81–87 per cent. There were improvements in some social skills. Initiations increased for both participants. Sharing increased, although minimal change for one participant. Responses did not improve for either. Social validity ratings by staff favourable.	None.
Colozzi et al. (2008) US	This study compared the effectiveness of a simultaneous prompting procedure used in both 1:1 and small group instruction to teach pretend play skills to a group of preschool students.	Single case experimental (multiple probe design).	Self-contained pre-school classroom.	Four children, three with a prior diagnosis of PDD and one diagnosed as having severe developmental disabilities. Mean age 4;1 months. Three boys and one girl.	Simultaneous prompting. Each day, six-minute 1:1 sessions were conducted with each student and one daily 24-minute small group session was conducted with all four students.	Effectiveness + Data across all students indicated that while group instruction required more training sessions and trials, and had more training errors, there were no significant differences in probe errors across verbal and motor responses between 1:1 and group instruction; instructive feedback responses had fewer probe errors in group instruction.	None.

Research study and country	Focus/aim	Study Design	Setting	Intervention sample (age, type of ASD, gender)	Intervention (duration, intensity, modality, delivery)	Outcome	Follow up
Murdock and Hobbs (2011) US	To investigate the use of the Picture Me Playing intervention to increase the participants' ability to provide play dialogue (PD) for characters while participating in pretend play with peers.	Quasi experimental (single treatment counter balanced).	Treatment centre pre-school class.	12 children with a prior diagnosis of ASD or PDD-NOS, aged 4:7 –6:3 years. Two girls, 10 boys.	Picture Me Playing Four, 15-minute group sessions and one five minute individualised session with a typically developing peer. The participants were exposed to a story five times, and given three practice opportunities to role play the story with a typical peer. Researcher delivered.	Effectiveness + After intervention, a significant difference in the ranks of PD scores was observed between the two groups. At baseline, the participants demonstrated 78 total instances of PD. During post-testing, participants exhibited 313 instances of PD. Results indicated a statistically significant increase in PD.	None.

3.5.1 Findings from the play-based interventions section

Five of the review studies were within the play-based interventions category. As can be seen in Table 20, most of these studies were with 4–12 year-old children, as might be anticipated given their emphasis upon play. The studies took place in clinics, pre-schools, self-contained classes and one study was in a mainstream school.

Table 20: Play interventions by age group

	Pre school	5-8 years	9-12 years	13-16 years	5-16 years	16+ years	Total
Number	1	2	1	0	1	0	5

Lego therapy® (n=2)

These two studies included children aged 6–11 years diagnosed with HFA or ASD. They were quasi-experimental or observational studies. The Owens et al. (2008) study provided a comparison between Lego Therapy®, another social skills intervention (SULP) and a group receiving treatment as usual. Both intervention groups showed greater improvement than controls and the Lego Therapy® group showed slightly better outcomes than the SULP group. The study by Andras (2012) also found positive outcomes for Lego Therapy®, which were maintained 10 weeks post intervention. These studies provide some evidence for Lego Therapy®.

Play-based interventions (n=3)

These three studies include children aged 4–8 years diagnosed with HFA, ASD or PDD-NOS. The study by Banda and Hart (2010) showed evidence for a play intervention with a small sample, while Murdock and Hobbs' (2011) sample of 12 children participating in a peer-mediated intervention provides evidence of increased play dialogue. The study by Colozzi et al. (2009) provides evidence for the effectiveness of both group and 1:1 delivery in the teaching of play skills. Overall, these studies provide moderate evidence for play-based interventions with pre-school and early primary school children. Given the small number of studies and the wide range of children in the intervention groups, further research is needed to extend the evidence base in this area.

Summary

- Studies focusing on play represent a relatively small proportion of the current evidence base.
- Play-based interventions have moderate evidence for younger children with a range of diagnoses and attending a variety of educational provisions.
- The available evidence significantly decreased with age.

The included studies provide moderate evidence for play-based approaches and some evidence for Lego Therapy® during the timeframe of 2008–2013.

3.6 Studies focusing on communication interventions

Table 21: Video modelling interventions (communication)

Research study and country	Focus/aim	Study Design	Setting	Intervention sample (age, type of ASD, gender)	Intervention (duration, intensity, modality, delivery)	Outcome	Follow up
Banda et al. (2010) US	To investigate whether individuals with ASD learn to request using a speech generating device (SGD) following a video modelling (VM) intervention. To evaluate if generalisation of trained requesting behaviour would occur post-VM intervention.	Single case experimental (multiple baseline).	Special education classroom.	Two participants with ASD and severe learning and language disabilities aged 17 and 21 years. Two boys.	VM. 10 completed requests or 30 minute session 1:1 with teacher. Video model demonstrated requesting using SGD.	Effectiveness + During baseline, neither of the two participants made communication requests using the SGD. After video modelling both made some requests without prompts or cues but variable and not generalised to second preferred object.	None.
Cihak et al. (2012) US	The use of video modelling (VM) procedures and the picture exchange communication system (PECS) to increase independent communicative initiations.	Single case experimental (alternative treatment design).	Resourced mainstream. Four days per week in specialist classroom (15–18 students with one teacher and one TA) and four hours per week mainstream inclusion for all children.	Two children aged three years with prior diagnoses of ASD. Two other children included with developmental delay. One boy, one girl.	VM and PECS. Students received either PECS instruction only or VM prior to PECS. During the VM plus PECS intervention, the child was shown videos of a peer independently using a picture card to request a desired item from the teacher. This was followed by standard PECS instruction.	Effectiveness + Inter observer agreement 89–95 per cent. During the PECS-only intervention, all students improved independent initiations to a mean of 53.9 per cent. During PECS plus VM intervention, all students improved independent initiations to a mean of 77.6 per cent. The overall mean student performance indicated that PECS plus VM was more effective. Staff social validity questionnaire indicated use of VM before PECS beneficial.	None.

Research study and country	Focus/aim	Study Design	Setting	Intervention sample (age, type of ASD, gender)	Intervention (duration, intensity, modality, delivery)	Outcome	Follow up
Murdock and Hobbs (2011) US	To investigate the use of a visual cueing system (VCS) to assist children with ASD in telling the events of their school day to both school personnel and to family members, thus promoting school-home communication.	Single case experimental (multiple baseline).	Pre-school programme for children with ASD (attended by five children with ASD and five typically developing peers).	Three children with prior diagnoses of PDD-NOS and ASD. Aged 5:1, 5:2 and 5:4 years. Two boys and one girl.	Participants used the VCS to highlight daily events. At first this was completed by the teacher but as the study progressed the participants were encouraged to develop this skill themselves.	Effectiveness+ All three participants were able to generalise the skill; with the complete VCS they told their parents at least four events from their day at school. All three participants provided an average of at least three times as many daily events during generalisation as compared to baseline.	Maintained but slight decrease in number of responses at one month follow up.
Wilson (2013) US	Examines the relative efficacy of video modelling as compared to the more widely used strategy of in vivo modelling in increasing social communication.	Single case experimental design.	Pre-school specialist classrooms in elementary schools. Class for up to nine pupils with disabilities staffed by teacher and aide.	Four pre-school children. Diagnoses of ASD confirmed prior to study using ADOS. Ages 3:9, 4:4, 4:8 and 5:4 years (mean age 4:3). Two boys and two girls.	Video/in vivo modelling, 5–15 sessions, three per week. Duration not specified. Staff working with the child conducted in vivo or video modelling demonstrating the child's target. Tasks matched and delivered 1:1 with the child.	Effectiveness + Inter observer agreement 92–93 per cent. Positive outcomes for three out of four participants in both conditions. Greater visual attention shown for video condition. High levels of intervention acceptability rating from practitioners.	None.

Table 22: Picture Exchange Communication System (PECS) interventions

Research study and country	Focus/aim	Study Design	Setting	Intervention sample (age, type of ASD, gender)	Intervention (duration, intensity, modality, delivery)	Outcome	Follow up
* Gordon et al. (2011) UK	To identify the nature of spontaneous communication and outcome predictors in nonverbal children with ASD following classroom-based PECS intervention.	RCT (immediate, delayed intervention and TAU classes).	17 special school classes (approx. six children and 2-3 staff per class).	59 children with diagnoses of intellectual disability and ASD. ADOS. Aged 4-10 (mean 6:8) years in 12 classes. Total including controls: 73 boys, 10 girls.	Whole class PECS training delivered by teachers. Intervention took place for 18 months in immediate treatment group, nine months delayed group.	Effectiveness ++ Spontaneous communication using picture cards, speech, or both increased significantly following training. Spontaneous communication to request objects significantly increased but spontaneous requesting for social purposes did not.	None.
Ostry and Wolfe (2011) US	Whether children could learn to ask 'What's that?' and whether this would generalise to non-trained settings, people, and stimuli.	Single case experimental. Multiple baseline (baseline, training, PECS, generalisation and maintenance).	Pre-school (special) for children with developmental disabilities. 11 children and 1:1 staffing.	Three children aged 3-5 years with prior diagnoses of ASD/PDD-NOS. Two boys and one girl.	PECS. 20 trials per session, 1x per day for 4-6 days. Delivered by researcher. Participants were taught to use the pictorial prompt, 'What's that?' when presented with a hidden toy.	Effectiveness + Inter-observer agreement 100 per cent. The results showed that all three participants learned to vocally ask 'What's that?' without requiring the communication picture. Training for all participants was completed within one to two days.	At three months, one child responded without prompt and two children did so at six months.
Travis and Geiger (2010) South Africa	The effects of PECS on the frequency of requesting and commenting and the length of verbal utterances of children with limited spoken language.	Single case experimental.	Special school.	Two participants with prior diagnoses of PDD - ASD. Aged 9:10 and 9:6 years. Two boys.	Nine week intervention delivered by researcher, teacher and parent. Intervention including bi-weekly training and ongoing classroom use of PECS.	Effectiveness + PECS intervention resulted in increased requesting for both participants in structured and unstructured settings; commenting only increased in structured settings; mean length utterance increased in both settings for one participant but only in structured setting for other.	None.

Note: The asterisk symbol (*) indicates a high score for all three dimensions (quality of evidence, methodological appropriateness and effectiveness of intervention).

Table 23: Behavioural interventions (communication)

Research study and country	Focus/Aim	Study Design	Setting	Intervention sample (age, type of ASD, gender)	Intervention (duration, intensity, modality, delivery)	Outcome	Follow up
Christensen-Sandfort and Whinnery (2011) US	Examined the effect of teacher-implemented milieu strategies on the communication skills of young children with ASD when incorporated into typically occurring activities throughout the school day.	Single case experimental.	Early child special education classroom.	Three children diagnosed with ASD and limited spoken language. ASD confirmed using CARs. Aged 4;11, 5;4 and 5;6 years. Two boys, one girl.	Milieu strategies implemented 1:1 by teacher for five months. Milieu strategies (behaviourally-based strategies within naturalistic classroom routines) were implemented in a structured and unstructured activity.	Effectiveness + Inter observer agreement 94.5 per cent. All participants began to use their targets spontaneously within four intervention sessions. Spontaneous speech increased for all three children but variable.	Two weeks after spontaneous communication continuing in three settings for all participants.
Guzinski, Cihon and Eshleman (2012) US	The effects of a tact correction procedure on stereotypic vocalisations.	Single case (multiple baseline).	Special school with 1:1 staffing.	Four participants with prior diagnoses of ASD and communication disorder. Aged 6, 11, 13 and 16 years. Four boys.	Tact training, 1:1 by researcher. Tact correction was implemented upon the first instance of stereotypic vocalisations. If pupil imitated experimenter tact social praise was given but not reinforced if tact not imitated and another tact was given.	Effectiveness + Inter observer agreement across participants 92–95 per cent. Decrease in stereotypic vocalisation for all participants. Increased appropriate vocalisations for three participants.	None.

Table 24: Peer-mediated intervention (communication)

Research study and country	Focus/Aim	Study Design	Setting	Intervention sample (age, type of ASD, gender)	Intervention (duration, intensity, modality, delivery)	Outcome	Follow up
Tremblath et al. (2009) Australia	Measure effectiveness of peer-mediated naturalistic teaching with/without a SGD and assess generalisation.	Single case experimental (multiple baseline).	Three inclusive pre-school settings.	Three participants with prior diagnoses of ASD. Aged 3, 4 and 5 years. Three boys. Six typically developing peers.	Peers taught by their teacher to implement naturalistic teaching, with and without a SGD, during play sessions with pupils with ASD. Generalisation assessed during mealtimes at the preschools.	Effectiveness + Peer-mediated naturalistic teaching condition and SGD conditions resulted in an immediate and statistically significant increase in communicative behaviours for all three children with autism. Skills were generalised.	None.

3.6.1 Findings from the communication section

Ten of the review studies primarily focused on communication. As can be seen in Table 25, half of these studies were with pre-school children with the remaining studies spread across the rest of the age range.

Table 25: Communication interventions by age group

	Pre-school	5–8 years	9–12 years	13–16 years	5–16 years	16+ years	Total
Number	5	1	1	0	2	1	10

Given the number of communication skills studies, it was possible to break them down into categories according to intervention focus.

Video modelling interventions (n=4)

The four studies in this group focus predominantly on children aged 4–6 years with one study involving post 16 year-old young people. The interventions took place in either resourced mainstream or special schools with children and young people, some of whom had additional learning needs or language impairment. All of the studies include four or less participants, making generalisation difficult. However, they do provide evidence for video modelling over in vivo modelling (Wilson, 2013), and the addition of video modelling to PECS for children with ASD and developmental delay (Cihak et al., 2012). The intervention with the post 16 year-old young people had mixed outcomes indicating that there is moderate evidence for video modelling to support communication from this review but at present only for 4–6 year-old children.

PECS intervention (n=3)

These studies were undertaken with children aged 3–10 years attending special school settings. All three studies provide positive evidence for PECS. The study by Gordon et al. (2011) included a sample of 59 children and was assessed as high quality, appropriateness and effectiveness in relation to the current review. This study provides evidence to support teacher implementation of PECS as a whole class intervention, while the study by Ostry and Wolfe (2011) provides some evidence of maintenance at follow-up.

Behavioural interventions (n=2)

These studies were undertaken with children aged 5–16 years attending specialist provisions. Both studies had four or fewer participants; however they do provide evidence for the use of behavioural approaches in order to increase spontaneous communication and reduce stereotypical language. The study by Christensen-Sandfort and Whinnery (2011) provides some limited follow-up data. Although these studies are promising, further additional evidence is needed.

One additional study by Tremblath et al. (2009) is included in the communication section. This study provides evidence to support peer-mediated naturalistic teaching using a speech generating device with pre-school-aged children.

Summary

- Communication interventions represented a moderate proportion of the available evidence base.
- The available evidence focuses mainly on the pre-school age group.
- A range of approaches (such as video modelling, PECS and behavioural) are used.
- The majority of studies in this section evaluated the effectiveness of communication interventions for children and young people with higher levels of communication need attending specialist settings.
- There is moderate evidence for the effectiveness of PECS for children attending specialist settings and video modelling for young children. Studies also illustrate how PECS can successfully be implemented by teachers as a classroom intervention and its effectiveness can be improved by the addition of video modelling.

3.7 Studies focusing on challenging/interfering behaviour interventions

Table 26: Behavioural interventions

Research study and country	Focus/aim	Study Design	Setting	Intervention sample (age, type of ASD, gender)	Intervention (duration, intensity, modality, delivery)	Outcome	Follow up
Anson, Todd and Cassaretto (2008) US	To investigate the use of covert tactile prompts (pagers) to alert participants to attend to the teacher or activity.	Single case experimental.	Regular education pre-school classes.	Five children with ASD. Diagnoses confirmed using PDD-Screening Test and Checklist for Autism in Toddlers. Mean age 6:3 years (range 5:4–7 years). Five boys.	Between 15 and 35 daily sessions of 15–30 minutes. 1:1 intervention by researcher. Tutors observed participants in classroom situation and administered the tactile prompt according to criteria.	Effectiveness + The unobtrusive covert tactile prompt was at least as effective for maintaining the desired level of each of the three target responses as overt traditional prompting was. In some of the children, patterns of covert tactile prompting presentation reduced the overall need for prompting.	None.
Cale et al. (2009) ³ US	To examine the impact of environmental modification on problem behaviour.	Single case experiment (multiple base line).	Two children were in regular kindergarten with class room aides. One child was included in a mainstream classroom.	Three children with prior diagnoses of AS or ASD aged 5, 5 and 8 years. Two girls, one boy.	Environmental rearrangement. After contextual assessment of behaviour, staff trained to make environmental modification – visual schedules, warnings of transition and altering environment and cue card.	Effectiveness + Inter observer agreement 84–100 per cent. For all three children, task steps completed and time on task increased and fewer sessions terminated due to challenging behaviour. Significant decrease in behaviour concerns indicated by social validity scale completed by staff.	None.

³ Three studies by Cale et al. (2009) are reported separately in this section. However, as they are all reported in the same journal article they are only counted once in the overall number of studies.

Research study and country	Focus/aim	Study Design	Setting	Intervention sample (age, type of ASD, gender)	Intervention (duration, intensity, modality, delivery)	Outcome	Follow up
Cale et al. (2009) US	To examine the impact of environmental modification on problem behaviour.	Single case experiment (multiple base line).	Two children were in self-contained specialist classes. One child was in regular kindergarten with a classroom aide.	Three children with prior diagnoses of ASD. Aged 6, 6 and 7 years. Three boys.	Baseline assessment then staff implemented strategies (countdown cards) to manage termination of a favoured activity.	Effectiveness + Inter-rater agreement 100 per cent. For all three children, task steps completed and time on task increased and fewer sessions terminated due to challenging behaviour. Social validity ratings from staff high.	None.
Cale et al. (2009) US	To examine the impact of environmental modification on problem behaviour.	Single case experiment (multiple base line).	One child in inclusion class with mainstream peers. Two in mainstream with classroom aides.	Three children with prior diagnoses of ASD. Aged 5, 6 and 7 years. Two girls and one boy.	Contextual assessment followed by training staff to implement choice making strategies with child to help them manage a feared activity.	Effectiveness + Inter observer agreement 88-100 per cent. For all three children task steps completed and time on task increased and fewer sessions terminated due to challenging behaviour. Social validity ratings from staff high.	None.
Devlin et al. (2011) Ireland	To compare the effects of sensory-integration therapy (SIT) and a behavioural intervention on rates of challenging behaviour (including self-injurious behaviour) in children diagnosed with ASD.	Single case experimental (alternating treatments design).	Sessions were primarily conducted in the participants' regular classrooms, or in an occupational therapy room within the school.	Four children aged 6-11 years with a prior diagnosis of ASD. Mean age 9:4 years. Four boys.	Researcher delivered, over 10 days. In the sensory condition, children were provided with SIT activities for 15 minutes 6 times per day. Behavioural interventions based on functional assessments were implemented across the school day.	Effectiveness + Behavioural intervention more effective in reducing levels of challenging behaviour for all participants. Little change in challenging behaviour between baseline and SIT condition. Salivary cortisol samples – very little difference between levels of stress between interventions.	None.

Research study and country	Focus/aim	Study Design	Setting	Intervention sample (age, type of ASD, gender)	Intervention (duration, intensity, modality, delivery)	Outcome	Follow up
Machalicek et al. (2009) US	Interventions in classrooms to reduce challenging behaviour derived from functional analyses and conducted via videoconferencing.	Single case experimental.	Special school for children with ASD. Five other children and four staff were in their class.	Two children with moderate intellectual disability and ASD. Both scored in the severe range on CARS. Aged 7 and 11 years. Two girls.	Functional analysis followed by multi-element treatment. 30 minute 1:1 sessions over eight weeks. Following functional analysis intervention incorporated high levels of attention with academic demands interspersed among preferred activities during classroom instruction.	Effectiveness + Observation of behaviour – inter-rater reliability 89 per cent and 84 per cent. For both girls challenging behaviour was low under adapted instruction and high under typical instruction. Engagement was high under adapted instruction and low during typical instruction.	None.
Mancil, Conroy and Haydon (2009) US	To evaluate the effectiveness of combining milieu therapy and functional communication training (FCT) to replace aberrant behaviour with functional communicative skills.	Single case experiment (multiple baseline).	Home and school (no details re school settings).	Three children with ASD diagnoses confirmed using SCQ and ADI. Aged 4:1, 4:10 and 7:11 years. Three boys.	Milieu therapy and functional communication training. Parent training and functional analysis followed by therapy. (Parent would model social behaviour, such as requesting a toy and they prompted the child to display the modelled behaviour, if they did not respond within five seconds.) 2–3 days per week over 3–4 weeks. Parent delivered.	Effectiveness + Inter observer agreement 94–96 per cent. At baseline, all three participants were engaged in high rates of aberrant behaviour, but this decreased after the implementation of the intervention. At baseline, the three participants were not communicating. After the implementation of the intervention, there was an increase in total percentage communication. Perceived as socially valid by teachers and parents.	None.

Research study and country	Focus/aim	Study Design	Setting	Intervention sample (age, type of ASD, gender)	Intervention (duration, intensity, modality, delivery)	Outcome	Follow up
Reichle et al. (2010) US	To evaluate the effects of explicit and general delay cues when implementing a tolerance for a delay in the delivery of a reinforcement procedure to increase task engagement and decrease escape maintained challenging behaviour.	Single case experimental.	Early child special education settings.	Two participants with moderate to severe intellectual disability and prior diagnoses of ASD. Aged 4 and 4:6 years. Two boys.	1:1 intervention following functional analysis. Intervention delivered by teacher. Participant took part in one task. The teacher would provide general or explicit tolerance delay cues. Non-engagement not reinforced.	Effectiveness + Both demonstrated improved performance with the two intervention strategies. However, each learner's successful work unit completion advanced more quickly with the explicit tolerance for delay procedure.	None.
Strain, Wilson and Dunlap (2011) US	To examine the influence of the Prevent-Teach-Reinforce (PTR) model on academic engagement and problem behaviours of students with ASD. To evaluate the feasibility of PTR implementation.	Single case experimental (multiple baseline).	General education classes. Two children had access to paraprofessional support and one did not.	Three children with prior diagnoses of ASD/AS. Aged 5, 8 and 9 years. Two boys, one girl.	PTR manualised programme. School team followed PTR facilitated by a PTR researcher. The teams conducted the PTR assessment and designing and implementing the PTR intervention.	Effectiveness + Inter observer reliability average 96 per cent. Problem behaviour fell for all three participants. Levels of task engagement rose for all three participants. Social validity ratings indicate intervention positively perceived by teams.	PTR trainer support withdrawn for 3-4 days at end and behaviour change sustained. No longer term follow up.

Table 27: Narrative interventions

Research study and country	Focus/aim	Study Design	Setting	Intervention sample (age, type of ASD, gender)	Intervention (duration, intensity, modality, delivery)	Outcome	Follow up
Campbell and Tincani (2011) US	To evaluate the effectiveness of the power card strategy for three students with ASD in a public school classroom setting.	Single case experimental (multiple base line).	Partially self-contained special class in elementary school.	Three children with prior diagnoses of PDD-NOS or ASD. All aged six years. Two girls and one boy.	Power cards during playtime from 8:45 to 9:05 every morning for eight weeks. Following a functional analysis a scenario was developed for each child, resulting in a student's scenario and power card, which described appropriate responses.	Effectiveness + Inter observer agreement 100 per cent. After the addition of the power card scenario, following directions increased substantially for all three children. Classroom staff reported strategy relatively easy to implement and effective in promoting social skills.	For two students direction following maintained for eight weeks after withdrawal but one needed reintroduction of prompt.
Chan et al. (2011) US	The current study sought to extend the literature on social stories.	Single case experimental (multiple baseline).	Resourced provision. All children in general education classes with access to special education class for part of the day.	Three participants with diagnoses of ASD. Aged eight years. Three boys.	Teachers trained by researchers and implemented social story once per day for each pupil in special education class. Social stories aimed to influence behaviour by providing important information about the social context and the outcomes of behaviour.	Effectiveness + Inter observer agreement 93 per cent. Overall, the intervention produced mild to moderate improvement in target behaviours in mainstream classes (sitting, listening to teacher, use of materials). Social validity – rated acceptable by staff.	None.
Graetz, Mastropieri and Scruggs (2009) US	Investigation of the effectiveness of a modified social stories intervention for improving social skills of adolescents with ASD.	Single case experimental.	School (details not specified).	Three young people with ASD confirmed using GARS. Aged 12:10, 12:2 and 13:1 years. Two boys and one girl.	11 weeks 1:1 intervention with support staff. Individual modified social stories were developed for participants using recommended guidelines.	Effectiveness + Reductions in inappropriate behaviour were observed for all participants.	Positive social validity data from interviews. At 3–4 weeks follow up positive behaviour levels maintained.

Research study and country	Focus/aim	Study Design	Setting	Intervention sample (age, type of ASD, gender)	Intervention (duration, intensity, modality, delivery)	Outcome	Follow up
Iskander and Rosales (2010) US	Evaluate effectiveness of a social story compared to a social story paired with differential reinforcement (DRO) to reduce problematic behaviours.	Single case experimental design.	Special school. ASD specific classroom. Classes of 6–9 pupils and two teachers.	Two participants with prior diagnoses of PDD-NOS and ADHD. Aged 8 years and 11 years. Two boys.	Social stories. 10 minute 1:1 sessions with the researcher 2–4 times per day and 2–4 times per week.	Effectiveness + Decreases in each of the target behaviours following the intervention. However, the levels of improvement varied. When DRO was paired with reading of the story, levels of each target behaviour for both participants decreased further.	None.
Mancil, Haydon and Whitby (2009) US	To analyse the effects of using a social story via PowerPoint™ on aberrant behaviours of children on the ASD spectrum (grabbing, pushing, etc.). In addition, the difference between the effects of a paper format versus the computer format was analysed.	Single case experimental (repeated measures).	Mainstream general education classes.	Three children with diagnoses of ASD confirmed using Social Communication Questionnaire. Aged, 6:5, 7:3 and 8:1 years. Two boys, one girl.	Social stories Two days training for teachers and five minutes daily with pupil. Social stories were developed to address the children's needs (pushing) and presented in two formats. Once taught, the children were directed to read the story on their own every school day.	Effectiveness + Inter observer agreement 94 per cent. Overall a reduction in the frequency of pushing in the classroom across all participants. PowerPoint condition slightly better than paper format. Social validity – teachers reported PowerPoint easy to implement and pupils liked it.	None.

Table 28: Self-monitoring interventions

Research study and country	Focus/aim	Study Design	Setting	Intervention sample (age, type of ASD, gender)	Intervention (duration, intensity, modality, delivery)	Outcome	Follow up
Holifield et al. (2010) US	To evaluate the extent to which a systematic instruction could improve attending to task and acquisition and generalisation of science concepts by students with ASD and an intellectual disability.	Single case experimental (multiple baseline).	Resourced provision – self-contained class in elementary school.	Two children assessed with mild to moderate ASD (confirmed using CARS) and intellectual disability. Aged 9:4 and 10:8 years. Two boys.	Self-monitoring intervention delivered 1:1 by teacher prompted every five minutes for 20 minutes. During independent work participants were given a self-monitoring sheet and verbal and visual cues. Following time cues, the participants circled 'yes' on their forms if they were attending to task or 'no' if they were not attending to task.	Effectiveness + Inter observer agreement 90 per cent. Mean percentage of attending to task increased during intervention and mean academic accuracy increased for both pupils during intervention.	None.
Shogren et al. (2011) US	To evaluate and compare the effectiveness of a token economy and a self-management intervention in an inclusive kindergarten classroom.	Single case experimental (repeated measures).	Specialist school for children with speech and communication difficulties. Eight children in class led by speech pathologist and support from one specialist teacher or behaviour analyst.	Two children with prior diagnoses of AS. Both aged five years old. Two boys.	Self-management and token economy. Class rules taught. Teachers rated how well rules followed by pupils to earn reward. For self-management pupils completed a monitoring chart.	Effectiveness + Increased engagement shown by both pupils in both conditions. No clear pattern of higher engagement with token economy or self-management.	Changes maintained by one pupil at two, four and eight weeks. Other pupil demonstrating higher levels of positive behaviour than at baseline but not as high as the other pupil.

Table 29: Computer-assisted interventions (behaviour)

Research study and country	Focus/aim	Study Design	Setting	Intervention sample (age, type of ASD, gender)	Intervention (duration, intensity, modality, delivery)	Outcome	Follow up
Cihak et al. (2012) US	To combine the use of social stories and video social modelling (VSM) procedures for students with ASD to increase task engagement.	Single case experimental (alternating treatment design).	Resourced mainstream schools (special and general education input).	Four children with diagnoses of ASD or Asperger's Disorder using CARS and GARS. Aged 11, 12, 13 and 14 years. Four boys.	Social stories and VSM. Brief functional assessment to match social stories to the function of the student's off-task behaviours. 17 sessions of 15 minutes intervention delivered by teacher. Student self-modelled in a video social story targeted to reduce off-task behaviours as a function to avoid and to escape their work. Then they watched social stories video to remediate off-task behaviours.	Effectiveness + Inter observer agreement 89–96 per cent across students. Students improved task engagement only after viewing the social stories video that matched their specific function of behaviour. Students and teachers reported favourable social validity.	None.
Cihak, Wright and Ayres (2010) US	To examine the use of a handheld computer to deliver self-model static-picture prompts to facilitate the acquisition of self-monitoring.	Single case experimental design.	Mainstream school. All fully included throughout each day.	Three children assessed as having ASD autistic on the CARS and GARS. Aged 11, 11 and 13 years. Three boys.	Self-modelling intervention delivered by teacher during a 50 minute lesson. Handheld computer including -picture prompt was placed on the corner of the student's desk. When the self-model picture was displayed, the student circled either 'yes' or 'no' if they were demonstrating task engagement.	Effectiveness + Inter observer agreement 95–100 per cent. All students demonstrated an increase in task engagement and decrease in teacher directed prompts. All students generalised the strategy across other general education classrooms. Students and teachers reported favourable social validity on standardised rating scales.	None.

Table 30: Yoga interventions

Research study and country	Focus/aim	Study Design	Setting	Intervention sample (age, type of ASD, gender)	Intervention (duration, intensity, modality, delivery)	Outcome	Follow up
Koenig, Buckley-Reen and Garg (2012) US	To examine the Get Ready to Learn (GRTL) classroom yoga programme among children with ASD.	Quasi experimental pre-test, post-test control group design (control group TAU).	School for children with ASD. Ratio of 6:1:1 for student; teacher; paraprofessional.	24 children diagnosed with ASD in intervention group (22 in control group). Mean age 9:7 years. 19 boys and five girls.	Intervention group participated in the GRTL program every day for 16 weeks (15–20 minutes). Delivered by researcher.	Effectiveness ++ Students in the GRTL programme showed significant decreases in teacher ratings of maladaptive behaviour, as measured with the Aberrant Behaviour Checklist, compared with the control participants.	None.

3.7.1 Findings from the challenging/interfering behaviour interventions section

Seventeen of the review studies primarily focused on challenging/interfering behaviour and coping with change. As can be seen in Table 31, the majority of these studies were with 5–12 year old children and the number of studies reduced with age.

Table 31: Challenging/interfering behaviour interventions by age group

	Pre school	5–8 years	9–12 years	13–16 years	5–16 years	16+ years	Total
Number	2	7	4	0	4	0	17

Given the number of challenging/interfering behaviour intervention studies it was possible to break them down into categories according to intervention focus.

Behavioural interventions (n=7)

These studies were undertaken with children aged 4–11 years attending a range of specialist, mainstream and pre-school educational provisions. All of the studies included five or fewer participants; however they do provide positive evidence for the use of behavioural approaches, often following on from a functional analysis of behaviour. The approaches in this section include a number of different methods drawing upon behavioural principles (for instance, multi-element behaviour plans, environmental modification, functional communication training, covert prompting and milieu therapy). In many of the studies, teachers or parents were successfully trained to deliver the interventions. Although these studies involve small numbers of participants, the number of studies in this section adds weight to the evidence for behavioural interventions having some of the most evidence in the current review, particularly for increasing on-task behaviour, communication and task engagement. The study by Devlin et al. (2011) also provides some comparative evidence for the effectiveness of behavioural over sensory integration approaches to challenging behaviour. Studies in this group report positive social validity from parents and teachers. The range of studies indicates that these interventions can be flexibly adapted to different settings and delivered easily and effectively by school staff.

Narrative interventions (n=5)

These studies were undertaken with children aged 7–13 years attending a range of educational provisions. All of these studies had three or fewer participants. They provide moderate evidence for the application of narrative approaches such as social stories and power cards. They help to extend the current evidence base by demonstrating that: social stories delivered through the medium of power point were more effective than paper format; social stories could be delivered effectively by school staff; combining differential reinforcement of other behaviour with social stories further decreased challenging behaviour; and power cards can be used to increase the following of instructions. Social validity ratings from pupils and teachers were also positive. Further research is needed to extend the positive findings in this section. The evidence suggests that social stories in particular represent a flexible intervention, which can be easily delivered by school staff, adapted to different settings and delivered using different formats.

Self-monitoring interventions (n=2)

The two studies in this group were undertaken with a very small sample of two children in each one. The children attended self-contained classes and were aged 5–10 years. One study (Shogren et al., 2011) found that self-monitoring was as effective as a token economy intervention and the other study found self-monitoring increased task engagement. Additional evidence is needed to extend the small amount of evidence in this section.

Computer-assisted intervention (n=2)

The two studies in this group were undertaken with small samples. The participants were aged 11–14 years and attended resourced or mainstream schools. One study found video modelling increased the effectiveness of social stories in reducing off-task behaviour (Cihak et al., 2012). The second study by the same author found self-modelled picture prompts on a handheld computer increased attention to task. Both interventions were rated favourably by students and teachers. Additional evidence is needed to extend the small amount of evidence in this section.

An additional study is included in the challenging/interfering behaviour section. Koenig et al. (2012) provide positive evidence for a yoga intervention with 24 primary aged special school children. However, further research is needed to extend the evidence base in this area.

Summary

- Challenging/interfering behaviour interventions represented a relatively large proportion of the available evidence base.
- The available evidence significantly decreased with age.
- A range of approaches (such as behavioural approaches, social stories, computer-assisted instruction and self-monitoring) are used.
- There is most evidence for the effectiveness of behavioural interventions for children aged 4–11 years and moderate evidence for narrative interventions for 7–13 year olds who attend a range of provisions. Evidence suggests these are flexible interventions that can be delivered by parents and a range of professionals.

3.8 Studies focusing on pre-academic/academic skills

Table 32: Discrete skills training informed by behavioural principles

Research study and country	Focus/Aim	Study Design	Setting	Intervention sample (age, type of ASD, gender)	Intervention (duration, intensity, modality, delivery)	Outcome	Follow up
Axe and Sainato (2010) US	To evaluate matrix training with children with ASD and to extend the research on the early literacy skills of writing and identifying letters and numbers.	Single case experimental design.	Inclusive pre-school for children with ASD.	Four children with prior diagnoses of ASD. Aged 4–5 years old. Two boys and one girl.	60 sessions 1:1 with researcher. Pre assessment – informal inter-views to identify reinforcers and target skills. Training phase followed by gradually fading prompts.	Effectiveness + Inter observer agreement 86–100 per cent. At the end of the study, three of the four participants performed the trained actions with previously known pictures, letters, and numbers.	None.
Holding et al. (2011) US	To examine whether fluency training (FT) was superior to discrete trial training (DTT) for helping children with ASD achieve important learning outcomes including acquisition, stimulus generalisation, and retention of noun labels.	Single case experimental (alternating treatment design).	In the child's home during regular intervention sessions.	Four participants with a prior diagnosis of ASD. Mean age five years. Three boys and one girl.	Intervention delivered by teachers as part of an intensive behavioural intervention programme. In both intervention conditions, children were presented with pictures of nouns they had incorrectly identified prior to the intervention starting. DTT and then FT were used to help teach the children to correctly identify pictures of nouns. Delivered on a 1:1 basis. The intervention phase lasted four weeks.	Effectiveness + The results of this study showed that FT was superior to DTT for the acquisition, stimulus generalisation, and retention of noun labels.	Six weeks post intervention, the number of nouns retained in the FT condition ranged from two to eight. In the DTT condition, the number of nouns retained ranged from zero to seven. The average effect size across all participants for retention was $d = .84$, indicating a large difference in favour of FT over DTT.

Research study and country	Focus/Aim	Study Design	Setting	Intervention sample (age, type of ASD, gender)	Intervention (duration, intensity, modality, delivery)	Outcome	Follow up
<p>Knight et al. (2012) US</p>	<p>To evaluate the effectiveness of explicit instruction using the model-lead-test strategy on the acquisition of science descriptors for students with ASD.</p>	<p>Single case experimental.</p>	<p>Special education class with a teacher and teacher's assistant.</p>	<p>Three children with prior diagnoses of ASD and learning disability. Aged 5:11, 6:10 and 7:6 years. Three boys.</p>	<p>1:1 instruction by researcher. Used a model-lead-test format. Researcher modelled the correct answers then student and researcher repeated together and then student lead. A test phase included prompts, praise and instructional feedback.</p>	<p>Effectiveness + Inter observer agreement 100 per cent. Mean number of science descriptors independently and correctly identified increased from 0-1 to 2-3 (for sets of 5). Social validity questionnaire – positive student responses. Teachers identified skills as important but there was lack of generalisation.</p>	<p>None.</p>
<p>Van Rie and Heflin (2009) US</p>	<p>To assess functional relations between sensory-based antecedent interventions and academic response.</p>	<p>Single case experimental.</p>	<p>Resourced school. Self-contained class in an elementary school.</p>	<p>Four children with diagnoses of ASD confirmed using CARS. Aged 6:3, 6:3, 6:6 and 7:4 years. Four boys.</p>	<p>Five minutes daily with researcher until 80 per cent correct responses in academic conditions. Two sensory activities (or control) before instructional activity.</p>	<p>Effectiveness + Limited support for sensory intervention to modulate arousal in children with ASD. Responses variable and only one participant seemed to make progress in each condition.</p>	<p>None.</p>

Table 33: Computer-assisted instruction interventions

Research study and country	Focus/aim	Study Design	Setting	Intervention sample (age, type of ASD, gender)	Intervention (duration, intensity, modality, delivery)	Outcome	Follow up
Burton, Anderson, Prater and Dyches (2013) US	To investigate the effects of video self-modelling (VSM) on the mathematics skill acquisition of adolescents with ASD.	Single case experimental (multiple baseline across participants).	Resourced provision. Math instruction in self-contained special education classroom.	Four participants, three with prior diagnoses of ASD. Aged 13, 13, 14 and 15 years. Four boys.	Math instruction via VSM. 20–30 minute sessions, twice daily, four days a week, 1:1 with teacher. Student watched himself complete a problem then solved the same problem on paper. This procedure was followed for each of the five problems presented. The teacher's role was to record student performance, collect treatment fidelity data, and praise appropriate behaviour.	Effectiveness + All students made progress in the VSM condition. When VSM was faded, skills were maintained. Students and paraprofessional questionnaires reported social validity (enjoyment and effectiveness).	Individual differences evident in three immediate follow up sessions.
Smith, Spooner and Wood (2013) US	Assess the effectiveness of embedded, explicit computer aided instruction (CAI) on student acquisition of science terms.	Single case experimental.	Mainstream School, in general education science class.	Three participants with intellectual disability and prior diagnoses of ASD. Aged 11, 12 and 12 years. Three boys.	CAI slideshow 1:1 by teacher or peer. Used three times each 40 minute science period. The iPad delivered instructional information via a model-test explicit instruction format.	Effectiveness + During baseline probes, all three students had low levels of correct responding. Following the intervention, all students' performance showed a change in level or increase in the number of correctly identified science terms and applications. Social validity – pupils and teachers agreed CAI effective.	None.

Table 34: Multi-sensory interventions

Research study and country	Focus/aim	Study Design	Setting	Intervention sample (age, type of ASD, gender)	Intervention (duration, intensity, modality, delivery)	Outcome	Follow up
Fletcher, Boon and Cihak (2010) US	To systematically replicate and extend previous studies of the TOUCHMATH program, a multi-sensory mathematics programme.	Single case experimental (multiple baseline).	Self-contained special education classroom. One teacher and One paraprofessional.	Three participants, all with moderate intellectual disabilities and two with a prior diagnosis of ASD. Aged 13–14 years. Two boys, one girl.	TOUCHMATH delivered 1:1 by teacher. Baseline data was collected for single digit maths problems. TOUCHMATH programme followed during intervention using 'touch points' and a number line to solve problems.	Effectiveness + Inter observer agreement 99–100 per cent. All three of the students across baseline, interventions, and replication phases of the intervention showed significant improvements using the 'touch points' method compared to the number line strategy to solve single-digit addition mathematics problems.	None.
Mucchetti (2013) US	To investigate the effect of shared reading activities adapted with modified text, tactile objects, and visual supports on the story comprehension and activity engagement of minimally verbal students with ASD and significant intellectual disability.	Single case experimental (multiple baseline/ alternating treatment design).	A classroom in a private school for children with ASD.	Four children diagnosed with ASD (diagnosis verified by the ADOS). Mean age 7:5 months. Three teachers. Three boys, one girl.	12–15 sessions delivered by the child's teacher on a 1:1 basis. Teachers conducted adapted shared reading activities and used specific strategies for increasing student engagement. Teachers asked six comprehension questions during reading. Teachers used a least to most prompting protocol to prompt students to the correct response.	Effectiveness+ All four students showed increased story comprehension and engagement during adapted shared reading. Average percentage of session engagement was 87–100 per cent during adapted sessions, compared with 41–52 per cent during baseline. Average correct responses to story comprehension questions was 4.2–4.8 during adapted sessions compared with 1.2–2 during baseline.	None.

3.8.1 Findings from the pre-academic and academic interventions section

Eight of the review studies primarily focused on the development of pre-academic/academic skills. As can be seen in Table 35, the studies addressed the needs of children and young people aged 3–16 years, although the majority of the interventions focus on the 5–8 year age group.

Table 35: Academic interventions by age group

	Pre school	5–8 years	9–12 years	13–16 years	5–16 years	16+ years	Total
Number	1	4	1	2	0	0	8

These interventions have been grouped into behavioural, computer-assisted interventions and multi-sensory interventions.

Discrete skills teaching informed by behavioural principles (n=4)

This group of studies includes children aged 4–7 years with a range of diagnoses and who are receiving their education in special, resourced and mainstream provisions, pre-school and home education. All of the studies include four or less participants; however they do provide moderate evidence for the use of behavioural approaches for skills teaching. Although these studies involve small numbers of participants, the number of studies in this section adds weight to the evidence for the effectiveness of behavioural approaches, such as model–lead–test and fluency training in the acquisition of discrete skills (such as reading single words, learning science vocabulary and recognising letters or numbers). One study in this group provided only limited support for management of sensory antecedents in improving academic engagement. Several studies report positive social validity from parents, teachers and pupils and these discrete skills teaching techniques were reported to be easily implemented during 1:1 teaching sessions. One study provided evidence of maintenance but in another study teachers reported a lack of generalisation when students learnt science vocabulary. Generalisation is an area for further investigation.

Computer aided instruction interventions (n=2)

These two studies were undertaken with young people aged 11–15 years attending a special education or mainstream class. The studies provide evidence of socially valid interventions to improve problem solving in maths and acquisition of science vocabulary. However, given the small samples, additional evidence is needed to extend the small amount of evidence found in the current review.

Multi-sensory interventions (n=2)

These two studies were undertaken with children and young people aged 7–14 years with ASD and intellectual disabilities attending specialist provision for children with ASD. The studies provide evidence for multi-sensory maths and reading comprehension programmes. Further research is needed to extend the small evidence base in this area.

Summary

- Academic interventions represented a moderate proportion of the available evidence base in the current review.
- The available evidence covers relatively broad ages and range of educational provision, although it is mainly focused on the 5–8 year old group.
- A range of approaches (e.g. discrete skills teaching informed by behavioural principles, multi-sensory and computer-assisted instruction) are used.
- There is moderate evidence for the effectiveness of discrete skills teaching informed by behavioural principles.

3.9 Studies focusing on school readiness skills

Only one school readiness study is included in the current review.

Table 36: School readiness interventions

Research study and country	Focus/Aim	Study Design	Setting	Intervention sample (age, type of ASD, gender)	Intervention (duration, intensity, modality, delivery)	Outcome	Follow up
Greer et al. (2011) US	To investigate whether voices as conditioned reinforcers would result in increases in observation of others, accelerate learning of educational goals that require listener responding, and increase choosing to listen to stories in a free play setting.	Single case experimental design.	A pre-school for children with and without developmental delays, which used a behaviour analytic approach.	Three children with prior diagnoses of ASD. Aged 4;7, 5;2 and 5;5 years with limited language skills. Two boys and one girl.	Voice Reinforcement 50 short sessions 1:1 delivered by the teacher.	Effectiveness + Inter observer agreement 96–100 per cent. After voices became conditioned reinforcers, all three children's learning accelerated; two children's observing responses increased in the three settings; and two children selected to listen to stories and also showed decreased stereotypy in the story setting.	None.

3.10 Studies focusing on cognitive skills

Only one cognitive study is included in the current review.

Table 37: Cognitive skills interventions

Research study and country	Focus/aim	Study Design	Setting	Intervention sample (age, type of ASD, gender)	Intervention (duration, intensity, modality, delivery)	Outcome	Follow up
Schaefer-Whitby (2012) US	The purpose of this study was to investigate the use of the Solve It! Problem Solving Routine for students with ASD.	Single case experimental (multiple baseline).	Resourced school with students in general education classes 80–100 per cent of the day.	Three participants with diagnoses of ASD confirmed using the Autism Diagnostic Interview – Revised (ADI-R). Aged 13:7, 13:8, 14:3 years. Three boys.	Solve It! Problem Solving Routine delivered 1:1 by researcher. Scripted lessons on mathematical problems. Instructor presented the strategy, described the processes, and modelled the meta-cognitive processes. Students monitored own data.	Effectiveness + All three participants improved their ability to solve word problems as measured by Montague's Curriculum Based Measure and Florida Comprehension Assessment Test. Intervention rated effective by educators on Intervention Rating Profile 15.	None.

3.11 Studies focusing on adaptive/self-help skills

Table 38: Computer-assisted life skills instruction

Research study and country	Focus/Aim	Study Design	Setting	Intervention sample (age, type of ASD, gender)	Intervention (duration, intensity, modality, delivery)	Outcome	Follow up
Cihak et al. (2010) US	To examine the effects of using video modelling via a video iPod and the system of least prompts to increase independent transitions from place to place for elementary students with ASD.	Single case experimental (withdrawal).	Child's general education classroom and wider general education setting.	Four children diagnosed with ASD (validated with CARS or Gilliam Autism Rating Scale). Mean age seven years. Gender not specified. Four teachers and Four paraprofessionals.	Teacher delivered. Prior to transition, children watched a video of themselves transitioning appropriately. Student then transitioned, supported by prompts if necessary. Video withdrawn. Once acquisition criterion met, the video was reintroduced until the follow up study, approximately nine weeks later.	Effectiveness + In all instances, video modelling and the use of the video iPod resulted in independent transitions, although additional prompts were required at times. Children's inappropriate behaviours decreased to zero levels during transitional situations.	Children maintained a mean level of 98 per cent independent transitions nine weeks after the acquisition criterion had been met.

Table 39: Visual cueing interventions

Research study and country	Focus/aim	Study Design	Setting	Intervention sample (age, type of ASD, gender)	Intervention (duration, intensity, modality, delivery)	Outcome	Follow up
West (2008) US	To examine the effects of verbal cues versus pictorial cues on the transfer of stimulus control from instructor assistance in teaching age-appropriate skills.	Single case experimental (multiple baseline).	Inclusive early education programme.	Four participants with prior diagnoses of ASD. Aged 3;9, 4;10, 5;7 and 6;2 years. Four boys.	Verbal cues and pictorial cues. Two 15-minute sessions five days a week for three weeks (one session a day per task) delivered 1:1 by support staff. Two tasks broken down into components and used for verbal and pictorial cue conditions.	Effectiveness + Inter observer agreement over 90 per cent. One child struggled with both conditions. Three boys met the criterion during the instructional phase using the pictorial cue procedure. When this procedure was extended to the other task being taught with the verbal cue procedure, all three students met the criterion using the pictorial cue, indicating visual cue preference. Instructors reported socially valid.	None.

3.11.1 Findings from the adaptive/self-help skills interventions section

Two of the review studies primarily focused on the development of adaptive/self-help skills. As can be seen in Table 40, the studies addressed the needs of children aged 5–8 years.

Table 40: Adaptive/self-help skills interventions by age group

	Pre school	5–8 years	9–12 years	13–16 years	5–16 years	16+ years	Total
Number	0	2	0	0	0	0	2

Summary

- Adaptive skills interventions represented a very small proportion of the available evidence base in the current review.
- The available evidence covers a limited age range.
- Approaches involving visual prompting were used (picture cues and iPod) to assist skills development and transitions.
- The current review provides a small amount of evidence for the interventions in this section.

3.12 Studies focusing on motor skills interventions

Only one motor skills intervention is included in the review. (A comparative sensory study by Devlin et al., 2011, is discussed in the challenging behaviour section.)

Table 4.1: Aquatic interventions

Research study and country	Focus/aim	Study Design	Setting	Intervention sample (age, type of ASD, gender)	Intervention (duration, intensity, modality, delivery)	Outcome	Follow up
Pan (2010) Taiwan	To investigate the effects of a swimming programme on aquatic skills and social skills.	Quasi-experimental (each participant received swimming or regular activity in a counter-balanced design).	Swimming pool (mainstream school pupils).	16 participants aged 6–8 years with prior diagnoses of HFA or AS. Mean age 7:2 All boys.	Water exercise swimming programme delivered by researcher. 20 sessions (two sessions per week, 90 minutes per session). Each session included social and skills activities.	Effectiveness ++ Pre-post measures showed significant improvement in Humphries Assessment of Aquatic Readiness scores and the academic improvement in antisocial behaviour and the School Social Behaviour Scale 2.	None.

3.13 Studies focusing on comprehensive intervention programmes

Table 42: Pre-school comprehensive intervention programmes

Research study and country	Focus/Aim	Study Design	Setting	Intervention sample (age, type of ASD, gender)	Intervention (duration, intensity, modality, delivery)	Outcome	Follow up
Eldevik et al. (2010) Norway	To describe the key features of the Oslo mainstream pre-school EIBI model and to compare outcome data from children enrolled over a 10-year period with children receiving treatment as usual.	Quasi experimental (control group TAU).	Pre-school general education classroom, and/or a separate unit attached to the classroom.	43 children, 34 with a prior diagnosis of ASD, eight with a diagnosis of PDD-NOS and one with AS. Mean age 3:5 years (intervention group), 3:9 years (control group). 33 boys, 10 girls.	Delivered by preschool staff. First basic task focus, e.g. responding to simple requests from adults. Then more complex as the child mastered more skills. Used EIBI manuals and operant conditioning techniques e.g. differential reinforcement, shaping and prompt fading. Intervention was delivered 1:1 or in small groups, average of 13.6 weekly hours of intervention over two years.	Effectiveness ++ Children receiving EIBI made statistically significant gains in IQ (effect size 1.03) and adaptive behaviour composite scores (effect size 0.73) after two years of intervention, compared to the control group. The differences were also statistically significant for the communication and socialisation subdomains on the VABS, but not the daily living skills subdomain.	None.
Grindle et al. (2012) UK	To evaluate a mainstream school-based model of ABA intervention for children with ASD.	Quasi experimental comparison with 18 children receiving TAU in mainstream schools.	ABA class in a mainstream school. ABA sessions delivered in the classroom.	11 children with ASD confirmed with ADI-R. Mean age 4:9 years (range 3–7 years). Nine boys and two girls.	15 hours per week, 1:1 for two years.	Effectiveness ++ ABA group moderate to large-sized effects on standardized test after one year of intervention. Statistically significant changes on Vineland Adaptive Behaviour Scale (VABS) in favour of the ABA group.	None.

Research study and country	Focus/Aim	Study Design	Setting	Intervention sample (age, type of ASD, gender)	Intervention (duration, intensity, modality, delivery)	Outcome	Follow up
Peters-Scheffer et al. (2010) Netherlands	To assess the effects on developmental age and adaptive skills of low intensity 1:1 behavioural treatment with an environment that informally uses behavioural principles.	Quasi experimental (intervention and TAU comparison group in normal classroom environment).	Specialist pre-school settings.	12 children with prior diagnoses of ASD or PDD-NOS. Aged 3–6 years. Mean age 4:5 years	Eight months ABA intervention in addition to TAU. Intervention 5–10 one hour 1:1 treatment sessions per week. Treatment was supervised by an experienced psychologist or special educator.	Effectiveness ++ During eight months all children made significant progress on developmental age and adaptive skills (VABS). However, the improvement on developmental age and adaptive skills was significantly larger in the children who received behavioural treatment supplementing preschool services. No significant changes were found on severity of ASD and on emotional and behavioural problems.	None.
Reed, Osborne and Corness (2010) UK	To follow, over a period of one year, children in two types of special educational provision (general special nursery for children only with ASDs) and a home-based programme, Parents of Autistic Children Training and Support (PACTS).	Quasi experimental over one year.	Children attended general special nursery, ASD special nursery or PACTS home-based 1:1.	33 children with a prior diagnosis of ASD. Aged 2:6–4:0 years. 30 boys and three girls.	Children allocated to the three interventions on the basis of where they lived. Specialist nursery – one hour, 2–3 times per week sessions in eclectic nursery provision for children with special needs including ASD. Specialist ASD nursery – also eclectic, one hour, 2-3 times per week. PACTS – parent training plus regular supervision and up to four 1:1 sessions for child with a tutor each week. Follow up at 10 months.	Effectiveness + The overall Gilliam Autism Rating Scale score increased slightly for the children in the general special nursery, decreased for the children in the ASD special nursery, and increased in the PACTS group. The general special nursery group showed most improvement on the education measure; the ASD special nursery group showed most change on intellectual functioning and adaptive behaviour measures and the PACTS group educational functioning showed significant change.	None.

Research study and country	Focus/Aim	Study Design	Setting	Intervention sample (age, type of ASD, gender)	Intervention (duration, intensity, modality, delivery)	Outcome	Follow up
Reed and Osborne (2012) UK	To explore relationships between severity of ASD, temporal input of the programme, and the outcome effectiveness for four early interventions.	Quasi experimental – allocated to intervening on local programme offered.	Varied.	66 children with diagnoses of ASD confirmed using the GARS. Aged 2:6–4 years (mean age 5:4 years).	Nine month comparison of ABA (home-based, 30 hours per week with ABA trained professionals); specialist nursery (6–8 children per class, 12 hours per week); portage (home-based 8.5 hours per week, trained portage worker); LA home support (parent training and some 1:1 with trained worker, 12 hours per week).	Effectiveness ++ ABA group had the greatest improvement in their composite score (combined change scores for Psycho Educational Profile Revised, British Ability Scales II and Vineland Adaptive Behaviour Scale), followed by the special nursery group, and then the other two approaches. Adaptive behaviour showed least change across all interventions. ABA appeared to be as effective for children, however severe their ASD but the other interventions seemed less effective when ASD became more severe.	None.
Reed et al. (2013) UK	Evaluation of the effectiveness of the Barnet Early Autism Model (BEAM) intervention.	Quasi experimental.	Home.	16 children under five years diagnosed with ASD and severity confirmed using the Autism Behaviour Checklist. Mean age 5:6 years.	10 month comparison of Portage and BEAM 1:1 home interventions. BEAM: average 6.4 hours per week. Portage: average 8.5. BEAM delivered by trained BEAM facilitators, working under the direction of an advisory teacher in close collaboration with other professionals and parents/ carers.	Effectiveness + Comparison of the two groups revealed a numerical advantage for the children in the BEAM programme in terms of their gains in adaptive behaviour (VABS), and language (Peabody) and reduced parent stress relative to the children in the Portage group. No significant change for either group on ASD (Autism Behaviour Checklist) or intellectual functioning (Leiter). Portage had more impact on behaviour problems (Development Behaviour Checklist).	None.

Research study and country	Focus/Aim	Study Design	Setting	Intervention sample (age, type of ASD, gender)	Intervention (duration, intensity, modality, delivery)	Outcome	Follow up
Roberts et al. (2011) Australia	To evaluate the effectiveness of early intervention delivered to pre-school children with an ASD (Building Blocks programme) by comparing two variations of the programme; a home-based service and a centre-based small group programme.	RCT.	Home-based group (HB), centre based group (CB) and wait list control.	56 Children with ASD/AS or PDD-NOS confirmed using the ADOS. Mean age 3:5 years at start of trial. 90.5 per cent boys.	Children received either home-based or centre based programme for 12 months. CB: 40 weeks, two hours per week playgroup sessions with parent support and training. Skill building towards school transition. HB: two hour visits fortnightly over 40 weeks (max. 20 visits) from member of transdisciplinary team. Individualised programme to develop skills.	Effectiveness ++ Better but non-significant outcomes in the CB group compared to the HB group for Vineland social and communication score on the Reynell Developmental Language Scales III. Expression standard scores showed significant improvement for CB group. CB parents had more gains in perception of confidence and quality of life.	None.
* Strain and Bovey (2011) US	Do differential child outcomes occur across study groups after two years of LEAP implementation? What is the relationship between implementation fidelity and child outcomes? How do teachers rate the social validity of their experience implementing LEAP?	RCT (manuals for teachers not receiving coaching).	Inclusive pre-school classroom.	177 children with ASD, diagnoses confirmed using CARS. Mean age 4:2 years.	LEAP Two years training and coaching for intervention teachers, controls just given LEAP manuals. LEAP involves structured mainstream classroom; inclusion; peer participation; clear goals for children; parent training; EBP approaches (e.g. PRT, PECS).	Effectiveness ++ Implementation significantly higher for coaching classes. At end of two years, coaching intervention children significantly more progress on ASD (CARS), learning (Mullen Scales of Early Learning), language (Preschool Language Scale, 4th ed.) social skills (SSRS). Fidelity was related to outcome. Teachers judged their fidelity to be high in intervention classes and related this to outcomes.	None.

Research study and country	Focus/Aim	Study Design	Setting	Intervention sample (age, type of ASD, gender)	Intervention (duration, intensity, modality, delivery)	Outcome	Follow up
Strauss et al. (2012) Italy	To evaluate the impact of the EIBI model compared to an eclectic intervention on child outcomes after six months of treatment and to monitor the level of parental stress in the two cases. Study also looked at parental progress in delivering the intervention, and examined inter-related factors impacting on child outcomes.	Quasi experimental (intervention compared with an 'eclectic intervention' comparison group).	Clinic and home setting.	44 children diagnosed with ASD or PDD-NOS (assessed independently at intake to confirm diagnosis). Mean age 4:7 years. 41 boys, three girls. 44 parents.	Six months comparison of EIBI and eclectic intervention. Intervention delivered by setting staff and parents. EIBI intervention based on ABA verbal behaviour principles and comprising the systematic use of discrete trial teaching (DTT), incidental teaching (IT), and natural environment teaching (NET). Intervention delivered in clinic setting for 25 hours a week in 1:1 or small group format, and at home for 10 hours per week. Parents received continuous training and supervision.	Effectiveness ++ The intervention group outperformed the eclectic group in measures of ASD severity, developmental and language skills. Parent training and constant provision led to treatment challenging behaviours from the children, increased treatment fidelity and child direct behaviour change as measured by performance in correct responding on behaviour targets.	None.
* Whalen et al. (2010) US	To assess the effectiveness of TeachTown: Basics in a special education programme for young students with ASD.	RCT by classroom (controls TAU).	ASD classrooms in special school classes.	22 children with mild to moderate ASD, confirmed using CARS. Children aged 3–6 years.	Teach Town Basics computer lessons (based on ABA, typically discrete trials) 20 minutes daily over three months and 20 minutes 1:1, small group or class natural environment activities.	Effectiveness ++ The majority of students using the software demonstrated significant progress in the four learning domains of TeachTown Basics. The TeachTown group had larger increases than the control group on standardised assessments (Peabody Picture Vocabulary Test, Expressive Vocabulary Test, Brigance Inventory of Early Development) but these were not statistically significant.	None.

Note: The asterisk symbol (*) indicates high score for all three dimensions (quality of evidence, methodological appropriateness and effectiveness of intervention).

Table 43: School age comprehensive intervention programmes

Research study and country	Focus/aim	Study Design	Setting	Intervention sample (age, type of ASD, gender)	Intervention (duration, intensity, modality, delivery)	Outcome	Follow up
Mandell et al. (2013) US	Randomised trial of a comprehensive classroom-based intervention for children with ASD.	RCT, strategies for teaching based on ASD Research (STAR) versus structured teaching.	ASD support classroom.	60 children with diagnoses of ASD, confirmed using the ADOS. Aged 6–11 years (mean age 6:2 years). 85.9 per cent boys. 18 teachers.	Teachers 28 hours training in STAR (ABA-based) and eight days coaching across academic year. Structured teaching (TEACCH based) offered same intensity and duration as STAR.	Effectiveness + Students in STAR experienced a greater gain in DAS-II score than students in structured teaching. In classrooms with moderate fidelity, students in structured teaching experienced a greater gain than students in STAR. Variability of implementation likely to impact on results.	None.
Ruble, Dalrymple and McGrew (2010) US	To examine the effects of a collaborative teacher consultation and training model referred to as COMPASS – the collaborative model for promoting competence and success.	Quasi experimental (control group TAU).	Special education settings.	18 randomly selected teachers of children with ASD (child diagnoses of ASD confirmed using checklists). Mean child age 6.1 years.	COMPASS Teachers: initial 2.5–3 hour meeting with parents and researchers, then four 1.5 hour coaching sessions over two school terms. The children received the intervention for two school terms.	Effectiveness ++ COMPASS intervention teachers had significantly higher child goal attainment change scores than non-intervention teachers. IEPs assessed as higher quality for COMPASS group. Satisfaction relatively high for most aspects.	None.
Ruble et al. (2013) US	The impact of web-based videoconferencing technology tools in offering sustainability and efficient use of resources.	RCT.	Special education settings.	32 child–teacher dyads. Children diagnosed with ASD and confirmed using ADOS. Children aged 3–9 years. (Mean age six years). 86 per cent male. Special education teachers.	COMPASS. 16 teachers received consultation and face-to-face (FF) coaching. 16 teachers received consultation and web-based (WEB) coaching. Both groups: three hour parent–teacher consultation and four 1.5 hour coaching sessions.	Effectiveness ++ Using an intent-to-treat approach, findings replicated earlier results. Psychometrically Equivalence Tested Goal Attainment Scaling was used to evaluate children’s progress with targets. Results showed similar large effect sizes for FF/WEB. No differences found between FF/WEB for teacher fidelity to plans.	None.

3.13.1 Findings from the comprehensive intervention programmes section

Thirteen of the review studies focused on comprehensive interventions designed to address a number of features of ASD. As can be seen in Table 44, the studies mainly focused on the needs of children and young people aged 3–8 years.

Table 44: Comprehensive ASD interventions by age group

	Pre school	5–8 years	9–12 years	13–16 years	5–16 years	16+ years	Total
Number	10	2	0	0	1	0	13

In contrast to previous sections of the review, these interventions are discussed according to age group. This reflects the broad focus of the interventions, which in most cases aimed to address more than one feature of ASD. This grouping is also similar to the approach taken in other recent reviews and guidelines (Eikeseth and Klintwall, 2014; the Missouri Autism Guidelines Initiative, 2012).

Pre-school comprehensive ASD interventions (n=10)

This group of studies focuses on children aged 3–7 years diagnosed with a range of ASD needs and the interventions sought to address a number of areas including learning, social skills, ASD severity and adaptive functioning. The children received the interventions at home or at school (special or mainstream) and the interventions were delivered by workers trained in the different intervention approaches. It is promising that the studies in this category are all RCTs or quasi-experimental studies with samples of 11–177 children receiving the interventions. Standardised outcome measures were used, focusing on general functioning, cognitive development and ASD. Two of the studies in this group were assessed as high across all three review domains.

In the majority of studies, comparison and intervention groups both made progress on standardised measures; however, ASD specific interventions had better outcomes in most domains. Those receiving the ASD specific interventions were likely to make more progress in particular areas such as adaptive behaviour, language and development.

The studies also provide some evidence to support more intensive interventions of 13 or more hours per week when compared to intervention as usual:

- Children receiving 1:1 and/or group EIBI for 13 or more hours per week made statistically significant gains compared to children receiving intervention as usual (Eldevik et al., 2011; Strauss, et al., 2012).
- Children attending an ABA class and receiving 15 hours 1:1 per week (Grindle et al., 2009) showed substantial gains on standardised measures and in adaptive behaviour when compared to children receiving regular classroom intervention.
- Children receiving an ABA informed programme called Learning Experiences and Alternative Program for Pre-schoolers and Their Parents (Strain and Bovey, 2011) showed significantly more progress than controls in the areas of ASD, learning, language and social skills.
- Children receiving Building Blocks, a 40 hour per week centre-based programme, demonstrated progress, although this did not reach statistical significance when compared to a home-based and less intensive version of the same programme (Roberts et al., 2011).
- Children receiving 30 hours per week ABA-based intervention made marginally significant progress in cognitive and educational skills when compared to children attending a specialist ASD class or receiving less intensive Portage or LA home support (Reed and Osborne, 2012).

In relation to less intensive interventions of 10 or fewer hours per week, intervention groups also made progress compared to controls, although in some cases this did not reach statistical significance:

- Children receiving the Barnet Early Autism Model (BEAM) demonstrated progress in adaptive behaviour and language when compared to controls receiving a generic home intervention, although this did not reach statistical significance (Reed et al. 2013).
- Children receiving a computerised ABA-based programme made more progress than controls receiving their normal classroom intervention on measures of language and development, although this did not reach statistical significance (Whalen et al., 2010).
- Children receiving a low intensity ABA-informed intervention in addition to their regular classroom intervention (Peters-Scheffer et al., 2010) made significantly more progress than the comparison group in developmental age and adaptive skills.

These studies indicate that progress was more likely when the intervention was ASD specific (for instance, ABA or BEAM). There was also some evidence that children did make progress when following less intensive programmes, particularly if they were integrated into the classroom.

Included studies provided evidence for programmes based on or informed by behavioural principles. The study by Strain and Bovey (2011), which was rated as a best evidence study, is an interesting illustration of the increasing eclecticism and breadth within ASD programme development (Stahmer, 2014). Although LEAP is based upon ABA, and includes elements such as PECS, PRT and errorless learning, its delivery is integrated into the classroom setting. It also includes peer-mediated learning and skills training for families.

Although the studies in this section provide evidence for the effectiveness of home-based ASD specific interventions, when home-based and setting-based programmes were compared, setting-based programmes did slightly better (Reed et al., 2010; Roberts et al., 2011). Studies in this section placed a strong emphasis upon parental involvement and parent–professional collaboration. Those interventions that included parent support/training also showed promise (Strain and Bovey, 2011; Strauss et al., 2012). However, the extent to which parents are able to participate in training and the delivery of specific home-based interventions is likely to vary.

Interventions are also likely to have differential effects depending upon their focus. Reed et al. (2010; 2013) identified different strengths within home versus special nursery and ASD specific versus generic programmes, which may need to be considered when planning interventions for children with ASD and their families.

The child's individual profile of need (Reed and Osborne, 2012) may also influence the choice of intervention. Reed and Osborne (2012) conducted an analysis of ASD severity (measured using the GARS) with a composite measure of the child's intellectual, educational and behavioural progress (as measured using the PEP-R, BAS and VABS). They found that for the group receiving ABA-informed interventions, composite change scores increased as ASD severity scores increased, while for the other interventions change scores decreased with ASD severity. This led the authors to conclude that more intensive ABA-informed interventions might be most effectively targeted towards facilitating the learning, intellectual development and behaviour of those children with more severe ASD. Given the relatively small numbers in each group this finding needs further replication; however, the study is helpful in highlighting the need for further research into the interaction of IQ, ASD severity and intervention type. The growth of more eclectic programmes is also likely to increase opportunities for tailoring of approaches and adapting intensity of their delivery according to need.

Multi-component ASD interventions in schools (n=3)

This group of studies focuses on children aged 3–11 years diagnosed with a range of ASD needs attending specialist classes or special schools. The interventions used focus on training staff in evidence-based practices and coaching to develop individualised interventions. It is promising that the studies in this category are quasi-experimental or experimental studies and include samples of 18–60 children receiving the interventions. Measures such as individual education plan quality and goal attainment scaling were used to assess effectiveness. Collaborative planning with parents and coaching had positive effects on pupil goal attainment. However, one study in this group highlights how implementation can significantly affect outcomes. These studies provide some evidence to support multi-component interventions for use in schools. Further research is needed in relation to implementation factors and use of a wider range of child outcome measures to evaluate effectiveness.

Summary

- Comprehensive interventions represented a moderate proportion of the available evidence base in the current review.
- The available evidence significantly decreased with age.
- These interventions adopted a holistic approach, which often included parents and staff, classroom-based intervention and structured teaching.
- In order to tailor early interventions more effectively to child need, further research is required to establish the relationship between ASD severity and effectiveness of intervention according to type, mode of delivery and intensity and whether gains are maintained over time.
- Comprehensive pre-school interventions comprise one of the areas with most evidence in this review, particularly interventions informed by behavioural principles and delivered in education settings. However, the current review only focuses on research undertaken between 2008 and 2013. Given the large amount of comprehensive early intervention research over time, drawing upon this wider body of research would be useful in order to inform decision making. (See Eikeseth and Klintwall, 2014, for a recent overview of the comprehensive interventions evidence base.)

3.14 Summary of evidence

The 85 studies included in this chapter have been evaluated in relation to the evidence they provide for this review. In order to synthesise the data further, ratings of evidence were developed in order to provide an overall summary of the amount of evidence available for each intervention and integrate data from different types of study designs, such as single case or RCT. Establishing the amount of evidence required for each rating involved considering what might be viewed as a reasonable amount of evidence within the restricted timeframe of the current review.

In Table 45, studies are categorised as follows.

4 (Most evidence):	At least four studies providing positive evidence, which either includes a positive RCT, or quasi-experimental study, or six or more single case experimental studies within the 2008–2013 timeframe.
3 (Moderate evidence):	Three or more studies providing positive evidence, which either includes a positive RCT or-quasi experimental study, or four or more single case experimental studies within the 2008–2013 timeframe.
2 (Some evidence):	Two or more studies providing positive evidence, which either includes a positive RCT, or quasi-experimental study, or three or more single case experimental studies within the 2008–2013 timeframe.
1 (Small amount of evidence):	One RCT, or quasi-experimental study, or two single case experimental studies providing positive evidence within the 2008–2013 timeframe.

Age groups are included to show the age range where the positive evidence was found, although this is only tentative given the number of studies that will have informed the age group ratings (this is only provided where there is evidence from more than one study). The final column in Table 45 records whether the findings are limited to any specific type of education setting.

As the current review focuses on the period 2008–2013, it reflects the most recent trends in ASD interventions research rather than providing a definitive review of all interventions to support children and young people with ASD in education settings. For instance, pivotal response training (PRT) has been identified in some reviews (Wong et al., 2013) as a promising intervention; however, due to the limited timeframe of the current review, only two PRT studies were included. This illustrates the importance of considering the evidence from the current review alongside reviews such as that by Wong et al. (2013), which provide a longer-term view of the evidence for different interventions. Similarly, self-monitoring has been identified as having an emerging evidence base in previous reviews (Wong et al. 2013); however this was only rated as having a small amount of evidence in the current review. Readers will therefore need to balance the findings of the current review with previous ones to have a full understanding of the evidence for educational interventions for children and young people with ASD.

Table 45 describes those interventions that were categorised as '1' or above in relation to amount of evidence. Six interventions are not included as these did not meet the threshold for a score of one. These are: consultation to develop social skills; school readiness interventions; cognitive interventions; and computer-assisted and visual cueing interventions to develop adaptive behaviour/life skills.

Table 45: Summary of review evidence (2008–2013)

Intervention	Amount of evidence within the present review				Age group(s) where data gathered					Setting type
	4	3	2	1	Pre school	5–8 years	9–12 years	13–16 years	16+ years	
Joint attention interventions	√				√					Mixed
Social interventions										
Social initiation training		√			√	√	√	√	√	Mixed
Computer-assisted emotion recognition		√				√	√			Mixed
Peer-mediated	√					√	√	√	√	Mainstream
Multi components social	√					√	√	√		Mixed
Play-based interventions										
Lego therapy®			√			√	√			Mixed
Play-based		√			√	√				Mixed
Communication interventions										
Video modelling		√			√					Mixed
PECS		√			√	√	√			Special
Behavioural				√		√	√	√		Unknown
Challenging/interfering behaviour interventions										
Behavioural interventions	√				√	√	√			Mixed
Narrative		√				√	√			Mixed
Self-monitoring				√						Unknown
Computer-assisted				√						Unknown
Yoga				√						Unknown
Pre-academic/academic skills interventions										
Discrete skills teaching informed by behavioural principles		√			√	√				Mixed
Computer-aided instruction				√						Unknown
Multi-sensory				√						Unknown
Motor skills interventions										
Aquatic				√						Unknown
Comprehensive intervention programmes										
Pre-school comprehensive intervention programmes	√				√					Mixed
School age comprehensive intervention programmes			√			√	√			Mixed

Note: 'Unknown' under 'setting type' means that there was insufficient evidence to determine setting type.

3.15 Discussion of systematic review results

3.15.1 Implications for practitioners

The current review highlights a number of promising interventions particularly for use by practitioners working with pre-school and primary age children. Although the primary aim in the majority of studies was not to look at implementation in education settings, the delivery of interventions by school-based practitioners and social validity ratings do provide some helpful insights for practitioners.

Although some interventions were implemented by researchers or took place in less naturalistic educational environments, some were successfully implemented by staff in education settings following some initial training. Interventions with evidence of successful practitioner delivery from more than one study include: joint attention; social initiation training; behavioural interventions to reduce challenging/interfering behaviour; computer-assisted behavioural interventions; video modelling to support communication skills; narrative interventions; self-monitoring of behaviour; computer-assisted academic interventions and multi-sensory academic interventions. Social validity data also indicate that there are some promising interventions that are perceived as easy to use or appropriate for use in school settings (e.g. computer-assisted emotion recognition interventions and peer-mediated interventions, as outlined in Tables 13 and 14).

A number of interventions require more specialist expertise and training to enable delivery by education practitioners. These include multi-component social skills interventions (Lopata et al., 2012; 2012b); PECS; comprehensive pre-school interventions such as those informed by ABA principles and multi-component interventions such as STAR and COMPASS.

Although peer-mediated and multi-component social skills interventions demonstrated relatively strong evidence in the current review they are still at a fairly early stage in their development and have mainly been implemented by researchers. The next phase of their development needs to focus on how these interventions can be delivered by school staff.

3.15.2 Implications by age and setting type

The current review has highlighted a number of gaps in relation to particular age ranges and setting types. It is therefore not possible to comment in detail in relation to each age group/setting type. However, some areas have a higher level of evidence and these areas will be discussed in this section.

The pre-school studies included here provide most evidence to support comprehensive early intervention using holistic packages such as LEAP and Building Blocks, and targeted joint attention interventions. More studies focused on pre-school intervention in education settings, providing evidence for setting-based rather than home-based interventions. However, home-based intervention may be appropriate for some children at particular points in their development; further research is needed in order to tailor intervention effectively to individual child need and family context. In addition to comprehensive interventions the review also provides evidence to support the inclusion of targeted joint attention interventions in provision for pre-school children. The review also found moderate evidence for the effectiveness of other specific interventions for this age group, such as video modelling to develop communication skills and play-based interventions. There was also evidence within the review to indicate that social initiation training to develop social skills, behavioural interventions to reduce challenging/interfering behaviour, discrete skills training informed by behavioural principles and PECS might also be effective with pre-school children as well as with school-aged children.

The majority of research included here is relevant to primary age children. As can be seen in Table 45, interventions in the social development, play, behaviour management and academic skills areas are mostly with primary age children and across setting types. Interventions for primary aged children identified as having most evidence in the current review (rated 4) include: peer-mediated interventions, multi-component social skills interventions and behavioural interventions to address challenging or interfering behaviour. Those with moderate evidence (rated 3) are: social initiation training; computer-assisted emotional recognition; play-based interventions; PECS; narrative interventions; and discrete trial teaching of academic skills. Interventions where there was some evidence (rated 2) include Lego Therapy®, and school age comprehensive interventions.

There is a considerable gap in the research evidence at secondary and tertiary levels. There is some evidence for multi-component social skills interventions delivered outside school and a small amount of evidence in the current review for the effectiveness of computer-assisted academic skills instruction and computer-assisted interventions to support behaviour. However, the small number of studies relevant to this age group means that little is known about effective interventions for this age range of young people with ASD.

The majority of studies in the current review are relevant to pupils attending a range of educational settings, as demonstrated by the number of interventions described as 'mixed' setting type in Table 45. The only exceptions to this are peer-mediated interventions, which relate to pupils attending mainstream settings, and PECS, which relate only to special school settings. Although it is useful to know that many of the interventions can be effective across a range of education settings, further research in specific settings would be helpful in order to understand how interventions can be tailored to particular groups of children or settings and to understand specific issues, such as the extent to which interventions for children with ASD are different from or similar to general interventions for children with learning difficulties.

3.15.3 Implications for policy makers

The current review indicates that a range of intervention options needs to be available that can be matched to the needs of the child, family and education setting. An important theme emerging from this review that relates to all ages is the value of education with peers in order to support the social development of children and young people with ASD. This needs to be taken into consideration when planning educational provision.

Training and support are also required in order to successfully implement interventions for children and young people with ASD. A coherent training strategy is required in order to assist practitioners in the complex task of effectively implementing evidence-based interventions in education contexts and keeping practitioners up to date with developments. Key areas highlighted as having a higher level of evidence need to be included in training, particularly social, behavioural and pre-school interventions. The specific content of training will also need to be adapted according to age range taught and setting type.

The research team suggest that policy makers also need to consider how best they can support setting-based research and sharing of practitioner expertise in the implementation of educational interventions for children and young people with ASD. Multi-disciplinary collaboration in research design can enable the development of knowledge and practice at different levels within the school and across schools rather than focusing more narrowly on single interventions (Fishburn et al., 2013). This has the potential for more embedded and sustained change and will be important in the further development of interventions such as peer-mediated interventions, which are at an earlier stage in their development.

3.15.4 Implications for researchers

There are a number of implications for researchers arising from the current review. These relate to specific aspects of research design and future direction for research.

In relation to research design, this review has highlighted a number of methodological considerations for researchers. Firstly, very few included studies undertook follow up to assess maintenance of gains following intervention. Future research studies should build this into their research design in order to establish whether interventions have a sustained impact. Secondly, the majority of studies included here had four or fewer participants; however, it is promising that larger scale intervention studies are being undertaken in areas such as computer-assisted and peer-mediated interventions. Another important issue to consider is generalisation. For behavioural, academic skills interventions and computer-assisted interventions in particular, researchers need to provide evidence of generalisation to other learning contexts and settings.

It is promising that the current review found that multi-component social skills interventions had a strong evidence base. However, more robust research designs are needed in relation to comprehensive school-based interventions in order to identify the effective components, control for other factors that might be responsible for outcomes, and identify requirements for successful implementation. As many of the multi-component social skills interventions have taken place in clinics or summer schools they also highlight the lack of research regarding implementation of evidence-based interventions in schools. The research team argue that this requires collaboration between practitioners based in schools and researchers to enable greater understanding of the facilitators and barriers to effective implementation of multi-component social skills interventions and how these can be sustained.

In relation to future research the current review has highlighted areas where further research is needed in relation to most interventions. Although it has identified that there is a larger amount of evidence for early intervention, further research is needed in relation to pre-school interventions in order to tailor intervention effectively to individual children's profiles of need and family contexts. Similarly, peer-mediated and multi-component social skills interventions were also identified as having stronger evidence but further research is needed regarding their implementation in education settings. Further research is also needed to enable practitioners to know how best to implement peer-mediated interventions, taking into consideration the needs of both peers and pupils with ASD. Areas highlighted where there is a particular lack of evidence such as older cohorts and vocational and cognitive skills interventions also require further research.

This review has also highlighted a number of significant gaps in relation to research methodology. The lack of qualitative studies in the current review is a significant gap. Qualitative research will enable understanding of the experiences of those delivering and receiving interventions; their perceptions of effectiveness of interventions and the facilitators and barriers to effective implementation. The Parsons et al. (2009) review also highlighted the lack of involvement of children and young people with ASD and this continues to be the case. Researchers need to consider how children and young people with ASD can be more actively engaged in research that goes beyond social validity rating.

A final gap in the research evidence relates to transition. No studies in the current review evaluated effective transition interventions for children and young people with ASD. Given that transition can be particularly challenging for this group of children and young people, further research is needed in this area.

4 Best Practice Guidance

4.1 Introduction

As identified by Parsons et al. (2009), research is only one strand that informs the development of provision and decision making in relation to interventions for children and young people with ASD. This section of the review focuses on the good practice guidance documents relating to the education of children and young people with ASD, which were identified during the research process. A total of 15 best practice guidance documents were identified. These documents came from the US, Australia, England, Northern Ireland and Canada. The documents identified are summarised in Table 46. As can be seen in the table, most documents were general policy documents, which tended not to focus on particular ages or stages of education. Although most documents focused on education or health, a few aimed to provide a comprehensive overview of support for children with ASD across health, education and social care. The comprehensive guidance documents are presented first, followed by education guidance and then guidance relating to specific areas such as transition or policy development. Tables summarising each document are presented first and these are followed by a narrative description of each of the 15 documents.

Table 46: Overview of guidance

Name and date of publication	Developer(s)	Intended audience	General guidance	Specific groups considered				Setting/Funding	Intervention focus	Evidence informing guidance
				0–4	5–8	9–12	13–18			
New Zealand Autistic Spectrum Disorder Guideline Summary (2008)	Ministries of Health and Education	Primary care practitioners; education practitioners; policy makers; funders; parents, carers, specialists and others providing for those with ASD.	√	√	√	√	Continuum of provision to continue to be funded (mainstream; mainstream with support; special). Early intervention 15–25 hours (home; community and early education settings) funding will need further consideration.	Wide ranging guidance to support social care, education and health decision making.	Systematic literature review. Research in each area was reviewed and graded according to the New Zealand Guidelines Group system. Where no evidence was available, best practice recommendations were made based on consultation and views of the development group. Consensus approach was used to develop the final guidance. Also informed by national and international legislation and policy documentation.	
Autism Strategy and Action Plan, Northern Ireland (2013)	Department of Health, Social Services and Public Safety/ Northern Ireland Executive	Sets out government action plan 2013–16	√				The range of settings and funding are not discussed although a commitment is made to continued funding for the Autism Centre.	Action plan for all departments and stakeholders.	The guidance summarises key Northern Ireland and international legislation regarding the rights of people with disabilities and ASD. Data from consultation with stakeholders is used to illustrate key points. A commissioned NI prevalence report is included in an appendix. Limitations of the prevalence data set are acknowledged (data via school census rather than health) but the data are useful in predicting future need.	

Name and date of publication	Developer(s)	Intended audience	General guidance	Specific groups considered					Setting/Funding	Intervention focus	Evidence informing guidance
				0-4	5-8	9-12	13-18	18+			
Interventions for Autism Spectrum Disorders: State of the Evidence (Maine, 2009)	Children's Services Evidence-Based Practice Committee	Families; practitioners; policy makers; researchers.	√						Not focus of report.	Advisory – to assist intended audience in selecting ASD interventions. Systematic literature review coding of evidence according to the Evaluative Method for Determining Evidence-Based Practice in Autism. General contextual research is included regarding prevalence; diagnosis and methodology. Maine prevalence documentation and national/local education policy documentation informed the guidelines.	
Early Intervention for Children with Autism Spectrum Disorders: Guidelines for Good Practice (Australia, 2012)	Prior and Roberts for Department of Health and Ageing	Parents and professionals		√	√				Early years evidence base.	Summary of best evidence and signposting services to access further support across Australia. This document provides a user friendly overview of evidence-based and funded interventions for children up to seven years of age. The interventions included were identified in a previous review by Prior et al. (2011). The review used peer reviews which had applied the Scientific Merit Rating Scale System and new evidence was also rated according to this system. Interventions were classified as evidence-based, emerging, negative or not available. Stakeholder questionnaires informed good practice recommendations regarding implementation of interventions.	

Name and date of publication	Developer(s)	Intended audience	General guidance	Specific groups considered					Setting/Funding	Intervention focus	Evidence informing guidance
				0–4	5–8	9–12	13–18	18+			
US National Standards Report: The National Standards Project – Addressing the Need for Evidence-based Practice Guidelines for Autism Spectrum Disorders (2009)	National Autism Centre	Parents; educators; care givers; service providers	√	√	√	√	√	√	Not focus of report.	Overview of evidence base for educational and behavioural interventions for people with ASD. Systematic literature review of ASD behavioural and education treatments. Studies were systematically identified and evaluated according to agreed frameworks (Scientific Merit Rating Scale and a Treatment Effects Rating). Individual studies were then grouped in order to evaluate effectiveness of treatments by type.	
What is Good Practice in Autism Education? (England, 2011)	Charman et al. for the Autism Education Trust (AET)	Schools	√						Findings amalgamated across setting types (resourced; specialist and specialist ASD).	To inform the development of Autism Education Standards as the basis for training and school/ individual self-assessment. General contextual research is included regarding prevalence and difficulties experienced by those with ASD. Primary data collection through interviews with staff and some pupils and parents in 16 schools. The research reported was designed to address an identified gap in existing UK and international guidance.	

Name and date of publication	Developer(s)	Intended audience	General guidance	Specific groups considered					Setting/Funding	Intervention focus	Evidence informing guidance
				0-4	5-8	9-12	13-18	18+			
Education Options for Children with Autism Spectrum Disorder (South Australia, 2010)	Shearer, for Ministerial Advisory Committee (students with disabilities)	Government for policy planning	√	√					Aim for 'least restrictive' environment and inclusion but recognise that current provision may not be sufficient and supports a recommendation for two ASD specific units.	Provision planning	General contextual research regarding prevalence and diagnosis is included. Research literature drawn upon includes reviews of intervention; a review of empirically supported educational practice and a model for successful inclusion. Informed by guidance and policy documents from Australia, US and Europe.
Educational Provision for Children and Young People on the Autism Spectrum Living in England: A Review of Current Practice, Issues and Challenges (England, 2008)	Jones et al. for the AET	Inform the work of the AET.	√	√					No, focus is on national practice review and recommendations.	Review	A general contextual overview of research regarding ASD and education is included. Primary questionnaire data from parents, pupils and professionals regarding views of education provision is reported. Guidance on education for persons with ASD from pre-school to further education is discussed in relation to questionnaire findings.

Name and date of publication	Developer(s)	Intended audience	General guidance	Specific groups considered					Setting/Funding	Intervention focus	Evidence informing guidance
				0-4	5-8	9-12	13-18	18+			
Evidence-based Practices in Educating Children with Autism (North Carolina, 2011)	Department of Public Instruction	Inform training of school based personnel.	√						Not focus of document.	Guidance for trainers of school staff.	Draws upon National Professional Development Standards Centre recommendations regarding evidence-based practice.
Educational Provision and Outcomes for People on the Autism Spectrum Full Technical Report (England, 2011)	Wittemeyer et al. for the AET	Inform the work of the AET.	√						No, focus is on good outcomes for children with ASD.	Review of educational provision to support good adult outcomes.	The report is informed by a literature review, which identifies gaps in relation to educational outcomes. Primary survey, focus group discussion and individual interview data are reported.
Autism: The Management and Support of Children and Young People on the Autism Spectrum (England and Wales, 2013)	National Institute for Health and Care Excellence (NICE)	Health and social care professionals and service commissioners.	√	√					No, focus is health and social care provision.	Overview of health and social care interventions to inform practice.	General contextual overview of research regarding prevalence intervention and diagnosis. Informed by health and social care guidelines. Includes an extensive systematic review of the literature, which included coding of studies according to Grading of Recommendations Assessment, Development and Evaluation.

Name and date of publication	Developer(s)	Intended audience	General guidance	Specific groups considered					Setting/Funding	Intervention focus	Evidence informing guidance
				0–4	5–8	9–12	13–18	18+			
Education and Autism Spectrum Disorders in Australia: The Provision of Appropriate Educational Services for School-age Students with Autism Spectrum Disorders in Australia (2010)	Australian advisory board on autism spectrum disorders	Government and non-government providers; educated.	√	√					Principles identified: Continuum of provision Equitable funding.	Position paper outlining key principles of good education practice. A brief position paper in which research is referenced in order to support the principles outlined.	
Schools Report 2013: Are Schools Delivering for Young People with Autism? (England, 2013)	Ambitious About Autism	Policy makers	√						No, focus is on outcomes.	Assesses the impact of reforms to education policy for children with ASD. Uses Department for Education statistics to compare trends from 2012 to 2013, or over a longer period, if 2012–13 statistics are not available in a particular area.	

Name and date of publication	Developer(s)	Intended audience	General guidance	Specific groups considered					Setting/Funding	Intervention focus	Evidence informing guidance
				0-4	5-8	9-12	13-18	18+			
Autism Diagnosis in Children and Young People: Recognition, Referral and Diagnosis of Children and Young People on the Autism Spectrum (England and Wales, 2011)	National Institute for Health and Clinical Excellence (NICE)	Health, social care and education professionals involved in the diagnosis of ASD; commissioners and parents/carers and young people.	√						No, focus is health assessment.	Recognition, referral and diagnosis procedures.	Overviews good practice in diagnostic processes. Includes an extensive systematic review of the literature, which included coding of studies according to Grading of Recommendations Assessment, Development and Evaluation (GRADE). Expert opinion and existing guidelines were used where evidence was not available.
Transition Support for Students with Additional or Complex Needs and their Families – Submission to New South Wales Inquiry (2011)	Autism Spectrum Australia (Aspect)	Government	√	√	√	√	√	√	No, specific focus on transition planning.	Transition support. Describes Aspect's transition support packages	General contextual research is included regarding prevalence and difficulties experienced by those with ASD. Research and guidance documents regarding transition generally and transition for pupils with ASD specifically are referenced. Briefly summarises Aspect's current and future research.

4.1.1 Autistic spectrum disorder guideline summary (New Zealand)

Author: Ministries of Health and Education (2008)

This is a wide-ranging and comprehensive guidance document encompassing all ages. Chapters cover:

- diagnosis
- education
- individual, family and carer support
- mental health needs
- community support
- professional learning
- Maori perspectives.

Research is graded and reviewed according to the New Zealand Guidelines Group system. This system classifies evidence as 'good', 'fair', 'expert opinion' or 'insufficient'. The chapters on educational provision and professional learning are most relevant to the current review and are summarised here, with reference to other sections as appropriate.

In relation to ASD assessment, the importance of listening to the views of families; multi-disciplinary assessment across settings and co-ordinated planning across agencies are emphasised.

Education interventions are classified into three types: Discrete Trial Training; approaches drawing on behavioural and developmental research; and developmental approaches. Evidence for different approaches is assessed in the areas of early years education; communication and literacy skills; social development; sensori-motor development; cognitive development and thinking skills; self-management skills; and challenging behaviour and secondary education.

In relation to early years education, good evidence was identified for:

- prioritising spontaneous communication and play
- intervention in normal settings
- interventions being monitored and adapted as needed.

Fair evidence was identified for:

- no single model being more effective
- visual supports
- multiple instructional strategies for literacy teaching
- planning for generalisation and maintenance
- services being available for 15–25 hours per week across settings.

In relation to social skills, good evidence was identified for:

- intervention in natural settings
- interventions with normally developing peers
- the importance of generalisation and maintenance.

No areas of fair evidence were identified.

In relation to sensori-motor development, no evidence was categorised as good, but fair evidence was found for involvement of specialists such as occupational therapists and careful monitoring of programmes.

For cognitive and thinking skills, good evidence was found for using IQ tests with caution and fair evidence for planned and systematic instruction.

In relation to self-management and challenging behaviour, good evidence was identified for:

- positive behaviour support based on understanding the function of behaviour
- not using aversive methods.

Fair evidence was identified for early intervention.

Particular issues for secondary students were highlighted on the basis of expert opinion; these included transition support within the school environment and planned transition for adult life and community activities.

Organisational factors were also acknowledged as important, with fair evidence for:

- systematic instruction
- individualised instruction
- structured environments
- specialised curricula
- a functional approach to problem behaviours
- family involvement
- planned transitions.

The principle of 'least restrictive' environment and the importance of positive staff attitudes and quality training were emphasised in relation to educational provision. Provision available included mainstream, resourced mainstream and special schools.

In relation to professional learning the importance of training for all health, education and social care professionals working with children and adults with ASD was stressed. It was recommended that this should be supported by standards and competencies. No evidence in this section was evaluated as good. Fair evidence was found for basing professional learning on evidence and principles of quality provision, with priority given to those providing specialist services.

Some themes based upon expert opinion were emphasised throughout the sections. These included family involvement, the importance of assessment to inform intervention, and collaborative team work. Advice for practitioners was included throughout the guidance.

Summary

This document is **very relevant** to the current review. It integrates systematic review with best practice in order to make recommendations regarding educational provision and practice at a country level. It also emphasises the importance of coordinated policy, across government departments and the role that education can play as part of a holistic response to meeting the needs of children with ASD.

4.1.2 Autism strategy and action plan (Northern Ireland)

Author: Department of Health, Social Services and Public Safety (2013)

This document is a cross-departmental collaboration with the aim of delivering a coordinated 'whole life' approach for children and adults with ASD. It has been developed in collaboration with a range of stakeholders. The aims of the strategy and current prevalence in Northern Ireland are outlined. The next section outlines the broad legislative context and services provided by health, social care, education, employment and learning, housing, social security and justice. This is followed by the action plan, which includes key themes and strategic priorities (including access to education and planned transitions). The action plan identifies cross governmental actions related to the key themes.

Actions related to education include:

- building capacity in schools
- supporting parents
- improving collaboration between health, education and social care
- expanding trans-disciplinary assessment.

Actions related to transition include transition planning and seamless delivery of services during transition. In relation to education, the Department of Education provides training for the pre-school sector; it published, *The Autistic Spectrum – A Guide to Classroom Practice*, produced DVD resources for parents and schools and set up the Middletown Centre for Autism. The resources have been commented on positively by inspectors but the evidence base for the resources is not discussed. Middletown is also positively reviewed in its training, research and support for more complex young people with ASD.

Summary

This guidance is **relevant** to the review as it details how coordinated policy can be developed across government departments and the role that education can play as part of a holistic response to meeting the needs of children and adults with ASD. Roles of specific education settings and specific interventions and their evidence base are not detailed in this guidance.

4.1.3 Interventions for autism spectrum disorders: State of the evidence (Maine)

Author: Maine Department of Health and Human Services and Maine Department of Education (2009)

This report is the outcome of practitioner, service manager, parent and academic representative collaboration to evaluate the evidence base for a range of ASD interventions. The aim was to identify the most effective and cost-efficient interventions for supporting children with ASD. The committee used an evidence-based systematic review process to select and rate studies according to levels of evidence. Research was categorised as follows: established; promising; preliminary; no evidence; insufficient evidence; and evidence of harm using the Evaluative Method for Determining Evidence-Based Practice in Autism (Riechow, Volkmar and Cichetti, 2008). The report does not describe interventions by age range or type of ASD although this information is specified for a few interventions, where there is clear evidence of an effect for a particular group. The interventions assessed as providing established evidence were:

- behavioural, including ABA for managing challenging behaviour and PECS for developing communication
- pharmacological, including methylphenidate for hyperactivity.

Promising interventions were:

- behavioural, including ABA for adaptive living and
- cognitive, including cognitive behavioural therapy (CBT) for anxiety.

A large number of interventions were evaluated as having some preliminary evidence or insufficient evidence.

The aim of this report was to summarise best evidence and not prescribe which interventions should be used. The best evidence review aimed to inform decision making for individuals in combination with clinical practice and values and in collaboration with parents. The team concluded that there was compelling evidence to support intensive early behavioural intervention but that the evidence for educational and behavioural interventions in schools was lacking. There was also a significant lack of research relating to adolescents and older young people with ASD. They argued that resources were needed in Maine to ensure delivery of evidence-based approaches and highlighted that there were insufficient certified ABA practitioners in the state.

Summary

This document is **very relevant** to the review. It provides a systematic evaluation of best evidence interventions whilst acknowledging an evidence gap in relation to interventions in schools. There is some consideration of implications of the recommendations for local provision.

4.1.4 Early intervention for children with autism spectrum disorders: Guidelines for good practice (Australia)

Authors: Prior and Roberts (2012)

This guidance is an update of a previous review undertaken for the Department of Health and Ageing by Roberts and Prior in 2006. It focuses on developmental/behavioural learning-based interventions for children up to seven years of age. High intensity interventions such as ABA and developmental and combined approaches are identified as effective. Effective early intervention is characterised by a focus on the key aspects of ASD; providing structure and routine; adopting a functional approach to challenging behaviour; enabling successful transitions; using visual supports; and supporting parents. The recommended intensity of intervention is generally 15–25 hours, although quality and individualisation are stressed as important to ensure the programme is individualised to the needs of the child and their family. Good practice principles identified include: assessment; individualised planning; review; and adjustment. Programmes should be planned in collaboration with parents and professionals. Inclusion of typically developing peers and focus on independence are also identified as aspects of good practice. Staff should have a minimum of two years' experience of working with children with ASD and undertake regular professional development. Evaluation of outcomes should be built in.

The guidance outlines the programmes funded under the Helping Children with Autism (HCWA) Package. Evidence-based eligible interventions are:

- ABA
- EIBI.

Emerging evidence-based and eligible interventions are:

- Early Start Denver Model (ESDM)
- Learning Experiences – An Alternative Programme for Pre-schoolers and Parents (LEAP)
- Treatment and Education of Autistic and Related Communication Handicapped Children (TEACCH)

- Pre-school Autism Education Trial (PACT)
- Building Blocks
- Social Communication Emotional Regulation and Transactional Support (SCERTS)
- DIR/Floortime
- Developmental, Social-Pragmatic (DSP) model
- Relationships Development Intervention (RDI) and Play
- Language for Autistic Youngsters (PLAY Project).

Emerging evidence-based parenting programmes include:

- Hanen
- Triple P
- Pre-schoolers with Autism.

Emerging evidence-based therapy approaches include:

- PECS
- Speech Generating Devices (SGD) and Alternative Augmentative Communication (AAC)
- Alert programme for self-regulation.

Other interventions are identified as only being funded when used with other ASD-specific interventions or not having sufficient evidence. It includes an example of a matrix to develop an individual child profile and enable information sharing and collaborative working. The HCWA is described as a mechanism for enabling best practice, early intervention for children and families. Services funded via HCWA include: the early intervention service, which provides funding for interventions; Autism Advisors; ASD playgroups; a website; ASD workshops for parents and carers; ASD-specific early learning centres; and some Medicare items such as diagnostic assessment and medical professional intervention. Positive partnerships are also funded; these provide training for teachers and workshops for parents of school-aged children.

Summary

This document is **very relevant** to the current review. It is accessible to a range of stakeholders and integrates information from systematic reviews with stakeholder views in order to make recommendations regarding educational provision and practice for children aged up to seven years of age at a country level.

4.1.5 National standards report: The national standards project – Addressing the need for evidence-based practice (US)

Author: National Autism Centre (2009)

These guidelines aim to provide an overview of effective interventions and are based on a systematic review of ASD behavioural and education treatment between 1957 and 2007. Identified articles were screened according to the Scientific Merit Rating Scale (SMRS). The scoring enabled an overall SMRS score to be calculated and research to be classified as: sufficiently rigorous; initial evidence; and insufficient evidence. This was then combined with a Treatment Effects Rating (TER) of effective, ineffective, adverse or unknown response to evaluate treatments.

Research articles were combined to form treatment groups and used to derive an overall strength of evidence score (established, emerging, unestablished, ineffective/harmful). In order to evaluate when and for whom an intervention might be most effective, a grid helpfully summarises the skills for which the intervention

had been identified as effective; behaviours that had decreased; the age range it had been found to be effective with; and diagnostic classification for which the intervention was most effective. Skills areas for effectiveness ratings were: academic; cognitive; communication; interpersonal; learning readiness; motor; personal responsibility; placement (this was coded if placement type restricted general participation); play; and self-regulation. Behaviour decreases were classified as: general; problem; repetitive; and sensory/emotional regulation. Age ranges used were; 0–2 years; 3–5 years; 6–9 years; 10–14 years; 15–18 years; and 19–21 years. The following diagnostic classifications were used: autistic disorder; Asperger's syndrome; and PDD-NOS.

This process identified 11 effective treatments:

- antecedent package
- behavioural package
- comprehensive behavioural treatment of young children
- joint attention intervention
- modelling
- naturalistic teaching strategies
- peer training package
- pivotal response treatment
- schedules
- self-management
- story-based intervention package.

Treatments categorised as emerging, unestablished and ineffective are also reported.

The function of this document was to inform local decision-making processes regarding particular interventions by local funders, education providers and parents and carers. Recommendations were made regarding best evidence, but how this should be translated into local policy and provision is beyond the scope of the report. The authors also emphasise that identified effective treatments will not be effective for all children and young people with ASD and emphasise the need for further research to improve understanding of what works for whom and when. They conclude that interventions should be selected for individuals using a team-based approach and based upon knowledge of the person; parental preference and sufficient capacity to deliver the intervention effectively need to be ensured.

Summary

This document is **relevant** to the review. It provides comprehensive evaluation of interventions by skills targeted, age group and diagnostic classification. However, recommendations regarding development of local provision were beyond the scope of this report.

4.1.6 What is good practice in autism education? (UK)

Authors: Charman et al. (2011)

This primary research report presents findings from a survey of good practice in ASD provision in schools. The survey was undertaken with 16 mainstream resourced provisions, specialist ASD and special schools, for pupils aged 2–19 years, that were identified as demonstrating good practice. Although participating schools illustrated a diverse range of settings, a number of shared key themes were identified. These included: high aspirations; good relationships with pupils and listening to pupil's views; individualising the curriculum; a range of assessments to inform individual planning; trained and motivated staff; multi-agency working;

strong leadership; broader participation; good communication; and partnership with parents. The report aims to summarise good practice and therefore does not report results according to age ranges, particular setting types or types of ASD. Elements of school-based good practice identified in the research subsequently informed the development of ASD standards. These standards were then used to develop the AET's three levels of training and self-assessment forms for individual and school use. The report concludes that in order to develop the evidence base for good practice in ASD education, further research is needed in relation to multi-agency working, implementing interventions and eliciting children's views.

Summary

This document is **relevant** to the review as it identifies aspects of best practice in schools. However, this is based on a relatively small sample of more specialised provisions. Further work is needed to integrate best evidence research, including best practice in mainstream schools.

4.1.7 Education options for children with autism spectrum disorder (Australia, South)

Author: Shearer (2010)

This relatively short advisory report aims to assist the Minister for Education in planning state-level provision for children and young people with ASD. The scope of the document is broad. The diagnosis and prevalence of ASD is discussed at national and state level, drawing upon published research studies and government data. Current provision in South Australia is outlined and data are provided on numbers of children with ASD and their placements. However, discrepancies between databases and potential limitations of the data set are acknowledged. The current range of provision is outlined and identified as supporting a continuum of provision as articulated in government policy. Australian policy is compared with US and European policy and similarities are identified in relation to the importance of early intervention and a range of provision for pupils with ASD. Key principles for education and inclusion of pupils with ASD in national policy documentation are also outlined. The report recommends increasing the range of ASD provision and supports the establishment of two ASD-specific units to complement existing provision. It recommends that these units also have an outreach role in order to provide training and support implementation of ASD interventions. Early years provision is discussed and recommendations made to base teaching on explicit, direct teaching with scaffolding and access to visual supports to enable curriculum access. However, it is not clear how this will be delivered. Alongside this, recommendations are made for a coordinated training strategy, which includes training on evidence-based practice and practical classroom strategies to be included in initial training and continuing professional development. The development of quality indicators and improvements in data collection systems are also recommended.

An appendix is included, offering a selection of findings from recent research studies. This draws upon intervention reviews such as:

- the US National Professional Development Centre's review of ASD interventions (2009);
- a review by Roberts and Prior (2006);
- a review by Parsons et al. (2009);
- a review of empirically supported educational practice by Rose, Dunlap and Kincaid (2003);
- a model for successful inclusion by Simpson, Boer-Ott and Smith-Myles (2003); and
- research on the importance of positive school climate.

The authors highlight that there is insufficient evidence for favouring one intervention programme over another and that different children will respond differently to each intervention. They also highlight the importance of mainstream inclusion for learning, partnership with parents and personalised planning.

Summary

This guidance is **relevant** to the review. It is informed by previous systematic reviews and best practice research. However, the rationale for including certain research studies is unclear. The document makes policy recommendations regarding provision and staff training.

4.1.8 Educational provision for children and young people on the autism spectrum living in England: A review of current practice, issues and challenges (UK)

Authors: Jones et al. (2008)

This report provides an overview of educational provision for children and young people with ASD in England. A general overview of the literature in relation to ASD and provision within the English context is followed by the findings from a questionnaire survey of experiences of education provision completed by 173 parents of children and young people with ASD, 88 professionals and the views of young people themselves, collated from previous research. The findings from the questionnaires emphasise the importance of listening to and engaging with parents and young people with ASD and highlights gaps in services and provision. The final section of the report links policy and literature to the interview data.

Recommendations are made regarding the following: access to specialist outreach support for all schools; increasing capacity of existing early intervention initiatives to support pupils with ASD; communicating the range of school-age provision to parents and building capacity to meet the needs of more complex children locally; improving data collection for provision planning; ensuring access to speech therapy, occupational therapy and physiotherapy; ensuring planned transitions; careful analysis of exclusion data; improving options post 16 years, such as further education; development of out-of-school hours, extended school and short break provision; and an audit of available training for parents/carers and professionals and development of national standards.

Summary

This document is **relevant** to the review as it makes recommendations regarding specific educational provision and identifies aspects of provision that need to be co-ordinated at a local planning level. However, this is based on a relatively small data set and so further work is needed to identify best provision at local level.

4.1.9 Evidence-based practices in educating children with autism (North Carolina)

Author: Department of Public Instruction (2011)

This document is for trainers of school-based personnel and provides a brief overview of evidence-based practice in relation to ASD. A definition of evidence-based practice is provided by the National Professional Development Centre (NPDC) and the interventions they recommend are outlined. A brief paragraph summarises each of the following interventions:

- prompting
- time delay
- reinforcement

- chaining
- shaping
- fading
- task analysis
- computer-assisted instruction
- differential reinforcement
- discrete trial teaching
- extinction
- functional behaviour assessment
- functional communication training
- independent work systems
- naturalistic interventions
- parent training
- peer-mediated instruction
- PECS
- Pivotal response training
- Positive Behaviour Intervention and Support
- response interruption and redirection
- self-management
- social skills groups
- social stories
- stimulus control and environmental modification
- video modelling
- visual supports
- speech generating devices.

A training strategy was being developed by the Department in collaboration with other partners such as TEACCH that would provide training for school-based personnel in the NPDC strategies. Three levels of training are discussed:

1. Exceptional Training Division to provide 'train the trainers';
2. Trainers to deliver training and support to schools; and
3. Schools to proactively develop own training plans, individually or in collaboration with other schools.

Summary

This document is **relevant** to the review as it outlines how national development work informs jurisdiction-level provision. A training strategy is outlined. However, training in evidence-based practice is assumed to translate directly into effective provision; how such strategies can be effectively transferred to classroom settings is not discussed.

4.1.10 Educational provision and outcomes for people on the autism spectrum – Full technical report (UK)

Authors: Wittemeyer et al. (2011)

This report explores the area of good outcomes for people with ASD. It is informed by reviews of key literature, surveys, focus groups and interviews. The literature review section draws upon previous systematic reviews and government policy and guidelines. Three key sections use these different sources to explore what 'good adult outcomes' can be understood to be, educational planning for good adult outcomes, and the role of assessment in good adult outcomes.

In relation to good adult outcomes, the literature review highlights gaps in the research relating to adult outcomes. It finds that although stakeholders had a broad consensus regarding outcomes, these varied between stakeholders and actual good outcomes were likely to vary between individuals, with parents tending to prioritise social relationships and independence. In relation to educational planning for good adult outcomes, there was a lack of policy and guidance to support practitioners in working towards these outcomes and in keeping these goals in mind. Data collected highlighted that parents valued communication and were keen to be involved in decision making, while pupils wanted greater consideration of their preferences and for school staff to ensure that concerns about bullying were addressed. In relation to assessment, practitioners highlighted that although extensive data were often collected, national curriculum reporting procedures often limited the extent to which pupil progress could be demonstrated, for instance in social areas.

Summary

This document is **moderately relevant** to the review as it focuses on specific factors related to achieving good outcomes for young people with ASD. There has been little previous research in relation to long-term outcomes for young people with ASD, so the report provides a useful starting point by highlighting this important area. However, further work is needed to identify good practice and support policy development in this area.

4.1.11 Autism: The management and support of children and young people on the autism spectrum (England and Wales)

Author: National Institute for Health and Care Excellence (2013)

This guidance document reviews interventions to support children and young people with ASD, primarily to inform health and social care practice. A thorough review framework is adopted in order to evaluate and synthesise research. Evidence was collected using systematic searches and was then reviewed by a panel and graded high, low or very low according to the Grading of Recommendations Assessment, Development and Evaluation (GRADE) approach. A consensus approach was used where evidence was not found. Although the guidelines do not primarily focus on education, they do consider pre-school intervention and recommend the use of social–communication interventions, which focus on the core difficulties of ASD (such as joint attention training through play). Further research into comprehensive programmes such as LEAP (Learning Experiences – An Alternative Programme for Pre-schoolers and their Parents) is also recommended in order to extend the evidence base.

Summary

This document is **moderately relevant** to the review. It provides useful contextual information regarding other services working jointly with educational professionals to support children with ASD and their families. However, educational recommendations are generally beyond the scope of this document.

4.1.12 Education and autism spectrum disorders in Australia: The provision of appropriate educational services for school-age students with autism spectrum disorders in Australia (Australia)

Author: Australian Advisory Board on Autism Spectrum Disorders (2010)

This brief document outlines key principles in education provision for children and young people with ASD. Research evidence is cited to support each principle. Key principles include: better co-ordination and collaboration between agencies; more equitable funding and provision across states for children with ASD and their families; a continuum of provision with an emphasis upon inclusion; a comprehensive planning approach to meeting needs; consideration of evidence-based approaches and training in order to increase capacity of school staff.

Summary

This document is **moderately relevant** to the review. It provides a statement of key provision principles with evidence to support them. However, it is very brief and context specific, making generalisation to other countries difficult.

4.1.13 Schools report 2013: Are schools delivering for young people with autism? (England)

Author: Ambitious About Autism (2013)

This brief overview document assesses the impact of reforms to education policy for children with ASD. Department for Education data are used to identify trends for children with ASD in the areas of support in school, exclusions, bullying, achievement and outcomes. The report identifies concerning trends in most areas and particularly highlights a lack of training for teachers.

Summary

This document is **moderately relevant** to the review by highlighting the importance of using data to identify areas for policy and intervention. However, it is very brief and quite context specific, making generalisation to other countries difficult.

4.1.14 Autism diagnosis in children and young people: Recognition, referral and diagnosis of children and young people on the autism spectrum (England and Wales)

Author: National Institute for Health and Care Excellence (2011)

This guidance reviews best evidence in relation to ASD referral and diagnosis. A thorough review framework is adopted in order to evaluate and synthesise research. Evidence was collected using systematic searches and was then reviewed by a panel and graded high, low or very low according to the Grading of Recommendations Assessment, Development and Evaluation (GRADE) approach. The guidelines were written by a team adopting a consensus approach. The guidelines consider health rather than educational policy and practice.

Summary

This document is **moderately relevant** to the review. It provides useful contextual information regarding the roles, responsibilities and practice of other services working with children and young people with ASD and their families. However, educational recommendations are beyond the scope of this document.

4.1.15 Transition support for students with additional or complex needs and their families' submission to New South Wales inquiry (Australia)

Author: Autism Spectrum Australia (Aspect) (2011)

This guidance document draws upon research that describes key aspects of ASD and transition and places this within the wider state and national legislative context. The document focuses on the need for transition planning for pupils with ASD. It describes the support provided by Aspect at key transition points and provides evidence to support the practices described. Current research in relation to transition being undertaken by Aspect is also outlined.

Summary

This document has **limited relevance** to the review. Although as it draws attention to the importance of transition, the document is a submission by one organisation, and does not represent independent guidance.

4.2 Summary of Findings

4.2.1 Overview

The aim of the guidance strand was to identify content, purpose and utilisation of research evidence in current guideline documents. In relation to the overall aims of the documentation, two documents were very broad and focused on policy and practice for children and adults (New Zealand, 2008; Northern Ireland, 2013). All of the remaining documents focused on children and young people specifically. Eight of the guidelines aimed to inform decision-making processes regarding provision and practice for children and young people with ASD, while five had a slightly narrower remit, focusing on a specific issue such as transition, adult outcomes or educational risk factors. Of the 15 documents, two did not primarily focus on education (NICE, 2011; 2013). It is pleasing to note that seven of the guidelines included or drew upon a thorough systematic review process, although only five of these focused on education: Ministries of Health and Education (New Zealand), 2008; National Autism Centre (US) 2009; Maine Department of Health and Human Services (Maine), 2009; Department of Public Instruction (North Carolina), 2011; and Prior and Roberts (Australia), 2012.

Several reports also included commissioned research, which explored good practice or policy in key aspects of educational provision for children with ASD (Jones et al., 2008; Charman et al., 2011; Wittermeyer et al., 2011). However, these were relatively small scale or survey-based pieces of research that highlighted the need for more extensive and in-depth evaluation of good practice.

4.2.2 Sources of evidence

The majority of the guidance included evaluation of literature and/or primary data, on the basis of which recommendations were made regarding provision. Although some of the documents only reported evaluation of specific interventions on the basis of a systematic review, others adopted a broader approach and utilised systematic review processes alongside expert opinion or research regarding good practice.

4.2.3 The role of research in informing policy

The guidance documents included in this section of the report are mainly from North America, Australasia and England. It is interesting to note that the majority of research reported in the systematic literature review strand of this report also originated in these areas. The guidance may reflect the priority given to ASD research and practice in these countries and the accessibility of research to guidance teams.

The way in which these guidance documents utilised research is also likely to reflect the conceptualisation of policy development processes in the countries concerned. In the US in particular, evidence-based practice is reflected in legislation, with the No Child Left Behind Act (NCLB) (2002) creating a mandate for the use of evidence-based interventions. Historically in England, by contrast, legislation has been less specific and practice-based evidence has been valued alongside evidence-based practice (DCSF, 2008). The guidelines are therefore likely to reflect these different emphases at the time when they were written.

Although it is pleasing to note that systematic reviews have informed some of the guidelines, it is interesting that they do not consistently recommend the same approaches despite much overlap. This is likely to reflect the different review methodologies adopted, the evidence available at the time, and the balance between research evidence, expert opinion and good practice in the development of the guidelines. Table 47 summarises the interventions recommended in the five documents that endorsed specific interventions following a systematic review. For consistency, the interventions have been clustered according to the six key categories used in the systematic review chapter of this report and some specific interventions have been merged into broader categories such as 'other behavioural', which includes specific techniques including reinforcement, prompting and extinction. It was not possible to exactly match the categories used in the previous chapter as different reviews named and grouped interventions in slightly different ways. Those marked with an asterisk indicate interventions that the relevant review identified as having an evidence base and those without an asterisk are emerging interventions. EY indicates interventions specific to early years; G indicates a more general intervention that is not restricted to a specific age group and 'Sec' indicates intervention for secondary aged pupils.

Table 47: Recommended interventions from guidance documents

Intervention Type	New Zealand (2008)	Maine (2009)	Australia (2012)	National Standards Project (2009)	North Carolina (2011)
Joint attention interventions					
Joint attention	EY			EY*	
Social interventions					
Spontaneous communication	EY*				
Naturalistic	G*			G*	G*
Peer-mediated	G*		EY	G*	G*
Social skills groups	G			G	G*
Modelling (including video modelling)	G			G*	G*
Play-based interventions					
Play	EY*				
Communication interventions					
PECS	G	G*	EY	G	G*
Speech generating devices (Alternative Augmentative Communication)	G	G	EY	G	G*
Schedules/visual supports	G		EY	G*	G*
Behavioural communication training/ABA		G*			
Challenging/interfering behaviour interventions					
Positive behaviour approaches	G*			G*	G*
Functional behaviour assessment	G*		EY*	G*	G*
Other behavioural approaches (such as prompting, reinforcement)		G*		G*	G*
Environmental/task modification	G			G*	G*
Transition support/planning	EY/Sec		EY		
Pivotal Response Training	G			G*	G*
Self-management				G*	G*
Narrative (e.g. social stories)	G			G*	G*
Cognitive		G			
Music therapy			EY		
Academic interventions					
Alert Programme			EY		
Discrete trial teaching		G*		G*	G*
Computer-assisted instruction				G	G*

Intervention Type	New Zealand (2008)	Maine (2009)	Australia (2012)	National Standards Project (2009)	North Carolina (2011)
Life skills interventions					
ABA		G			
Task analysis				G*	G*
Comprehensive interventions					
EIBI	EY	EY*	EY*	EY*	
ABA	EY		EY*		
Developmental (e.g. Floortime, RDI, PLAY)	EY	EY	EY	EY	
Combined (e.g. ESDM, SCERTS, PACT)	EY		EY		
Parent programmes (e.g. Hanen, Triple P)			EY		G*

Notes: G= all age; EY= early years specifically; Sec = secondary age specifically. Asterisk (*) = best evidence; No asterisk = emerging interventions.

It is interesting to note that in some of the older documents, such as Maine (2009), a number of interventions are listed as not having any evidence to support them, such as social stories, SCERTS and PLAY. However, since then further evidence has become available.

4.2.4 The role of practice-based evidence

The guidance documents based upon a systematic review of intervention literature are helpful, but as highlighted in the Maine (2009) document, there is a lack of evidence regarding the application of educational and behavioural interventions in schools. Although this gap continues, several of the documents included in this section of the review provide another perspective by researching current good practice in schools or including a good practice strand alongside a systematic review. These are helpful in highlighting wider organisational structures and attitudinal factors that have been identified as important for successful inclusion of children and young people with ASD (Morewood, Humphrey and Symes, 2011; Sewall and Campbell, 2012). Although this research is helpful in highlighting best practice there continues to be a gap in relation to how evidence-based practices can be effectively implemented and sustained within the wider school environment.

4.2.5 Interventions according to age

Although the guidance documents are helpful, the broad approach adopted in most of them means that many recommendations tend to focus on the education of children and young people with ASD in general, rather than identifying issues and practices relevant to specific age groups. Although many similar difficulties are experienced by children and young people with ASD in education, some groups do have specific needs, which may be missed when guidance focuses primarily on inclusion in mainstream schooling. Several documents identify early years provision as an area requiring separate consideration: Ministries of Health and Education (New Zealand), 2008; National Autism Centre (US), 2009; Shearer (South Australia), 2010; Prior and Roberts (Australia), 2012; Jones et al., 2008, NICE, 2013; and Aspect (Australia), 2011. Several of these recommend that a range of behavioural, developmental and combined approaches need to be available that can be individualised to the needs of the child for 15–25 hours per week: Prior and Roberts (Australia), 2012; and Ministries of Health and Education (New Zealand), 2008).

Specific considerations for secondary age pupils were also highlighted (Ministries of Health and Education New Zealand, 2008, National Autism Centre, 2009, and Jones et al., 2008). Several authors identified significant gaps in relation to provision and interventions for young people aged 16 years and older (Maine Departments of Health and Human Services; and Education, 2009, and Jones et al., 2008). It is promising that two of the guidance documents emphasised the need for collaboration between agencies with regard to supporting young people in secondary school for employment and community participation (Ministries of Health and Education, New Zealand, 2008; Department of Health, Social Services and Public Safety, Northern Ireland, 2013). However, consideration of interventions to meet the needs of both of these groups is limited. The National Standards Project (National Autism Centre, 2009) document provides the most thorough and detailed evaluation of the effectiveness of particular interventions by age group and type of ASD.

4.2.6 Educational interventions beyond the school

In all of the documents there was very limited consideration of out-of-school provision, holiday provision and short breaks. Although these areas are mentioned by Jones et al. (2008) and Prior and Roberts (Australia, 2012), the evidence in relation to these areas was not discussed in any of the documents. However, these are important fields for families and children and young people with ASD. Further consideration of these aspects, in policy and research, is needed.

4.2.7 Interventions according to setting types

Reference to specific setting types was very limited in the guidance. In 10 of the documents consideration of provision was beyond their scope. Where settings or funding were discussed this tended to be more general and was usually related to a wider context of inclusion and/or a continuum of provision. The delivery of pre-school services was discussed in two documents (Ministries of Health and Education, New Zealand, 2008; Prior and Roberts, Australia, 2012) and briefly in a third (NICE, 2013). Prior and Roberts (2012) provided detailed guidance on which pre-school interventions should be funded and the mechanism for this.

For school-aged children, documents referred to a continuum of provision and types of schools, but specific details were not included regarding which children should attend particular settings, admission criteria and what this provision should offer. This may be beyond the scope of the guidance documents but it would be helpful to practitioners to highlight who would have responsibility for guidance regarding this level of policy implementation.

4.2.8 Professionals involved

The majority of the documents emphasised the importance of inter-agency collaboration to support children and families with ASD. Collaboration between health and education was mentioned most frequently. Collaboration with speech and language therapists was mentioned in five documents and collaboration with occupational therapists in four documents. Other professionals identified included educational psychologists, mental health professionals, ABA specialists, physiotherapists and home visitors. Evidence to support the effectiveness of inter-agency collaboration was not considered in any of the documents.

4.2.9 Working in collaboration with families and young people

Collaboration and active partnership with families in selecting and reviewing interventions was another key principle in almost all of the guidance documents. Listening to children and young people with ASD was also highlighted, particularly by Charman et al. (2011) and Wittemeyer et al. (2011), as an aspect of good practice.

4.2.10 Professional education

Professional education was another major theme in the guidance documents and was discussed in 14 of them. Three of the systematic review documents highlighted the importance of training to ensure sufficiently skilled professionals deliver specific interventions such as ABA (Maine Departments of Health and Human Services; and Education, 2009; National Autism Centre, 2009; North Carolina, 2011). One document (Prior and Roberts, Australia, 2012) outlined the minimum experience required to work with children with ASD. The NICE documents (NICE, 2011; 2013) highlighted the importance of awareness training for health professionals and health professionals delivering training to others. The remaining guidance documents focused on the training of education staff in particular. These highlighted the need for training in specific area such as general ASD awareness raising; evidence-based practice and intervention strategies; the need for national standards and competency frameworks; and the planning and resourcing of strategic delivery of training, often through outreach teams. Several of the guidance documents also highlighted that although there is a need for training, further evidence for the effectiveness of training is also required.

4.2.11 Transition

Transition between settings for those with ASD was highlighted as an important area to consider in many of the documents but only the Aspect (2011) document considered in detail specific transitions and how they should be managed. Transitions included here were those: from early years to school; from specialist to mainstream; and from school to employment or training (Aspect, 2011). Prior and Roberts (Australia, 2012) also discussed transition and provided a framework for information sharing for pre-school children.

4.2.12 Data management

Several documents, such as Ambitious About Autism (2013); Jones et al. (2008); Department of Health, Social Services and Public Safety (Northern Ireland, 2013); and Shearer (South Australia, 2010) also highlighted the importance of accurate data collection and regular interrogation of data in order to predict future needs and respond to emerging concerns.

4.3 Implications

4.3.1 Implications for practitioners

Although the range of guidance documents is limited to a relatively small group of countries, it is encouraging to note that there are a growing number of guidance documents available for education practitioners. These provide helpful guidance regarding evidence-based interventions and good practice. Table 47 summarises the interventions recommended in the guidance documents that were based upon the findings from a systematic review. Although there are some differences in the interventions recommended in the guidance documents, this is likely to reflect available research at that time and the way in which the systematic reviews were undertaken. It is pleasing to note that there are many similarities between the interventions recommended in the guidance documents and the systematic review strand of the current research. Established interventions for pre-school children recommended in more than one guidance document include EIBI and ABA. Emerging

pre-school interventions recommended in more than one document include a number of behavioural, developmental and combined comprehensive interventions and targeted interventions such as joint attention and transition support.

General interventions identified as having an established evidence base in more than one guidance document include the following:

- naturalistic, peer-mediated and social modelling (including video modelling) interventions for social skills;
- PECS and visual supports for communication;
- positive behaviour approaches, functional assessment, other behavioural approaches;
- environmental modification, PRT, self-management and narrative approaches for challenging/interfering behaviour; and
- discrete trial teaching for the development of academic skill and task analysis for life skills.

Emerging general approaches include social skills groups, AAC and cognitive approaches for challenging/interfering behaviour, computer-assisted instruction for academic skills and ABA-based approaches for life skills.

Although there are some differences between these reviews and the current review, such as the smaller amount of evidence for PRT and visual supports in the current review, this is likely to reflect its more limited timescale, such as evidence for PRT and visual supports only being identified as having a small amount of evidence, this is likely to reflect the limited timescale of the current review. Recent trends in ASD research, such as the increase in research conducted on computer-assisted and multi-component interventions, are also reflected in the current review. Overall, the findings in this section support practitioners in confidently adopting the interventions recommended in this report.

For practitioners, the guidance documents add to the systematic review strand of the current report by highlighting aspects of good practice. There is general consensus within the guidelines that the following features are key aspects of good practice in relation to ASD education: multi-agency working; ongoing assessment, collaboration with children and young people with ASD; active collaboration with parents; and personalised planning. Practitioners have a key role in demonstrating how these can be translated into practice in different educational settings.

A gap in the guidance also relates to how evidence-based interventions and good practice can be implemented and sustained effectively within school contexts. Transferring evidence-based approaches into school settings was also highlighted as a gap in the systematic review strand. The authors of this review argue that these are important areas for practitioner–researcher collaboration.

Training for education practitioners is another key area highlighted in the guidance documents. Schools need to provide time for staff to engage in ASD awareness training (Charman et al., 2011). In addition, staff working directly with children with ASD need to ensure that they have sufficient training and ongoing CPD so that they have the necessary skills and competencies to support children with ASD and implement evidence-based interventions in education settings.

4.3.2 Implications by age range and setting type

The guidance documents included in this section are limited in their consideration of age ranges and setting types. This has the potential to limit the applicability of the guidelines. It is positive that research in pre-school education is reflected in some of the guidance documents with established evidence for ABA and EIBI being demonstrated over time and emerging evidence for newer interventions also being identified. However gaps are particularly evident in relation to effective provision for pupils attending specialist settings and for older groups such as secondary age pupils and post-primary pupils. Further evidence is much needed regarding what works, for whom and how this can be delivered.

4.3.3 Implications for policy makers

There are a number of implications for policy makers arising from this research strand.

The diverse range of documents included within this strand illustrate the need for national/jurisdiction level documents that provide a balance of practice-based evidence, best practice and expert opinion, appropriate to the national/jurisdiction context. Data also need to be regularly collected in order to inform future policy development and provision so that it is relevant and responsive to the national/jurisdiction level context. A process for the development and review of policy in collaboration with local stakeholders will also help to ensure that policy documents continue to address current needs. Policies that adopt a 'whole of life approach' will ensure that education is part of coordinated planning to support children and young people with ASD and their families.

Many of the guidance documents included in the current review adopt a broad approach, neglecting more detailed considerations. The extent to which detail is included in guidance documents warrants further consideration. Areas that could usefully be included in future guidance documents include: setting types; placement criteria; the needs of specific age groups; transition; out-of-school provision; and holiday provision and short breaks. Given the increase in multi-agency working, this could also be reflected in guidance by outlining which professionals should be involved in supporting children with ASD in different education settings and how multi-agency planning can work most effectively.

Given the strength of the current evidence base in relation to pre-school education, guidance can be produced to describe which evidence-based pre-school interventions should be offered and the mechanisms for funding these. In order to evaluate the evidence for these interventions fully, it will be important to collate information about effective interventions over a more extended timeframe than was possible in the current review.

Professional education is another key aspect for inclusion in guidelines, in relation to both content and strategic delivery. A framework for professional training at different levels, from basic awareness to higher level accreditation for specialist practitioners, will assist in ensuring that sufficient training is available to meet a range of practitioner needs. Training needs to include evidence-based practice, good practice and implementation in education settings. Standards and quality indicator frameworks should also be considered in order to assist practitioners in evidencing quality skills and provision.

4.3.4 Implications for research

The guidelines have highlighted many avenues for further research.

Limited consideration of the effectiveness of interventions by age and severity of ASD have been highlighted in this strand and limitations in this aspect of the evidence base were identified in the systematic review strand of the current report. Further research is needed regarding which interventions work best for which pupils, in which settings. This will support the development of more specific guidance for practitioners.

Although the guidance documents include some consideration of good practice, further investigation of how good practice can be implemented in different education settings and how it links to educational outcomes also requires further exploration. Related to this, further work is needed to explore how evidence-based practice can be successfully implemented and sustained within school contexts.

Although joint planning between parents and professionals is discussed in almost all of the guidance documents, there is limited evidence regarding how this can work most effectively. Further research is needed regarding models of effective multi-agency collaboration and support for children with ASD and their families in different educational settings. It is also interesting to note that guidance is also ahead of research in relation to transition, which was identified as a gap in the research literature in the systematic review strand. In order to inform the development of guidance documents in future, further research is also needed in relation to wider aspects of good practice such as the effectiveness of out-of-school provision, holiday provision and short breaks.

Several documents discuss how guidance will be evaluated. However, evaluation of the impact of guidance on practice at a local level requires further investigation. Linked to this, the guidance documents provide limited consideration of how the views of children and young people will inform service delivery at an individual and local level. Further research is needed regarding pupil participation in the development and evaluation of guidance.

5 Discussion and Implications

5.1 Introduction

The current review included a number of strands. The primary strand is a systematic review of the literature relating to educational interventions for persons with ASD from 2008 to 2013. In addition, case studies of five countries/jurisdictions were conducted and a review of good practice guidance is also provided. The following section provides a summary of key findings in relation to the six research questions posed at the start of this research.

5.2 Policies and models underpinning education for people with ASD

As discussed in Section 2.3, a number of difficulties were encountered in gaining data for the country case studies. Given these limitations, this section addresses both of the initial research questions relating to the case studies:

- What policies underpin the education for persons with ASD in a number of countries/jurisdictions?
- What are the models of provision and services that espouse the policies in these countries/jurisdictions?

The five case study country/jurisdictions included in the review broadly advocate inclusive approaches in the education of children and young people with ASD. These tended to favour the child or young person receiving education in a mainstream school wherever possible. In all of the case study countries, there appeared to be an emerging continuum of provision for children with ASD. However, policies tended to provide general principles rather than specific guidance, and the amount of information available was strongly influenced by the ways in which special education, disability and ASD were defined in legislation.

In most countries/jurisdictions, decisions about specific provision, funding, staffing and training tended to be delegated to a more local level, thereby limiting the information available for the current review. It was therefore not possible to describe good practice by age range, setting type, funding mechanisms, professionals involved, staff-to-pupil ratios, or support services available for each country. However, the case studies did provide illustrative examples in some of these areas.

In all countries/jurisdictions, a multi-agency diagnostic assessment approach was employed, with the DSM-IV and ICD-10 criteria most commonly used. However, a diagnosis of ASD would not be sufficient to access additional educational support or specialist provision. A process of assessment and decision making according to criteria usually took place; however, details of these processes were not available for all countries/jurisdictions. The majority of children were likely to receive their education in mainstream provision and placement in a special school was only likely to be the case where: the child had a co-occurring intellectual disability; where the child's difficulties may impact negatively on the education of those around them; or when inclusion in mainstream was considered too costly. Queensland provided a helpful and detailed example of how assessment of need linked to a funded process for accessing evidence-based interventions for pre-school children. In all countries/jurisdictions, the collection of outcome data was also limited. This limits the extent to which the effectiveness of these policies can be evaluated.

5.3 International research evidence on best practice

This section concerns the question: What does the international evidence tell us about what works best in the provision of education for persons with ASD?

5.3.1 Findings from the current review

The current systematic review includes 85 research studies that were assessed as being of at least medium standard for the following criteria: quality of evidence; methodological appropriateness; and effectiveness of the intervention. These interventions were clustered into focus areas and evidence for specific interventions in each area was rated as follows: 4 for those with the most evidence; 3 for those with moderate evidence; 2 for those with some evidence; and 1 for those with a small amount of evidence. Due to time limitations, it was decided not to use evidence categorisations such as 'established' evidence as the terms of the current review did not allow the long-term evidence-based interventions to be taken into account.

Given the timescale of the current review, specific information regarding the ages and groups for which interventions might be most appropriate was limited. Where this information was found it is indicated in the following sections. However, for many interventions the evidence for specific age groups or appropriateness for children attending particular types of provision was less clear. It will be important for practitioners to be fully informed regarding the long-term evidence base in relation to specific interventions in order to ensure that they are used most effectively. When interpreting studies, it should be borne in mind that individual child factors and intervention characteristics are likely to make some interventions and particular combinations of interventions more appropriate for a particular child at a particular time.

5.3.1.1 Interventions with a 4 rating (most evidence)

Interventions met the criteria for most evidence if there were at least four studies providing positive evidence, which either included a positive RCT or quasi-experimental study or six or more single case experimental studies within the 2008–2013 timeframe.

5.3.1.2 Pre-school

Two interventions were identified as having most evidence for pre-school children: joint attention and comprehensive pre-school interventions.

Joint attention interventions were illustrated by four studies, one of which was a best evidence study. These interventions usually involved 1:1 delivery of a play-based/turn-taking intervention by a teacher or parent. Children in the intervention groups were more likely to demonstrate significant change in joint attention and joint engagement compared to controls.

Comprehensive pre-school interventions formed one of the larger evidence groups, with ten studies. All of the studies in this group were experimental or quasi-experimental research with samples of 11–177 children. It included two best evidence studies. These ASD-specific interventions offered a comprehensive educational experience for the child, with the intervention targeting a number of areas of development such as behaviour, social skills, communication, life skills and learning. Most of the interventions in this group were informed by or based upon behavioural principles, such as interventions based on ABA. The current review also identified relatively new interventions, which adopt a developmental or combined approach, such as Building Blocks and BEAM. On standardised outcome measures children receiving ASD-specific interventions for 10 hours or more demonstrated greater progress, particularly in adaptive behaviour and language development, when compared to controls receiving other interventions. Some studies also showed that children receiving interventions delivered in an education setting also appeared to make more progress than those receiving a home-based

intervention. The studies included in the pre-school comprehensive interventions group only represent a small proportion of the wider early intervention evidence base. They also illustrate the complex issues relating to comparing and evaluating interventions taking place in different settings and of different duration, intensity and focus. However, overall they provide evidence that supports offering targeted, ASD-specific pre-school interventions that can be personalised to the needs of the child and family.

5.3.1.3 School age

Three interventions were identified as having most evidence for school-aged children: peer-mediated interventions to develop social skills and promote inclusion for children attending mainstream schools; multi-component social skills interventions to develop social skills; and behavioural interventions to decrease challenging/interfering behaviour. The behavioural interventions category also includes several studies involving pre-school children, indicating that these interventions are likely to be effective for pre-school children, although for pre-school children these interventions are often likely to be part of a comprehensive package as discussed above.

Nine peer-mediated interventions are included in the review, making this one of the larger categories; one study in this group was assessed as best evidence. All the studies in this group focus on children aged 5–14 years attending mainstream schools. Although the interventions in this group adopt a variety of different theoretical approaches, including social learning theory or behavioural principles, most of the interventions tend to be more naturalistic and individualised. They focus on developing interventions with peers to support children with ASD and/or teach peers skills to enable them to interact more successfully with children with ASD. Outcomes for children receiving these interventions included: increased peer interaction; improvements in social skills; and the potential for increased social inclusion. These interventions demonstrate that peers can make an important contribution to facilitating the social development and inclusion of children and young people with ASD.

Six studies in the review provide evidence for multi-component social skills interventions. This is one of the strongest groups of studies in the review as it includes three studies rated high on all review criteria. The studies were multi-component in that they either included several interventions, such as social skills training or peer support, or they involved parents in addition to a child-focused programme. Studies in this group tended to measure a wide range of outcomes in relation to social skills and other social outcomes such as emotional recognition and friendships. Although they provide positive evidence, changes reported were not consistent across all measures/respondents, perhaps reflecting the wide range of skills measured and respondents sampled.

Seven studies in the review provide evidence for behavioural interventions to reduce challenging/interfering behaviours. Many of these interventions were based upon an initial functional assessment. These 1:1 interventions illustrate a number of different methods based upon behavioural principles, for instance, multi-element behaviour plans, environmental modification, functional communication training and covert prompting. In many of the studies, teachers or parents were successfully trained to deliver the interventions. The studies in this group demonstrate decreases in challenging behaviour following intervention, and social validity measures indicate that these behavioural interventions can be adapted to a range of education settings and effectively delivered by school staff.

5.3.1.4 Interventions with a 3 rating (moderate evidence)

Interventions met criteria for moderate evidence if three or more studies provided positive evidence, including either a positive RCT, or quasi-experimental study, or four or more single case experimental studies within the 2008–2013 timeframe.

5.3.1.5 Pre-school

Two interventions were identified in the current review as having a moderate level of evidence, particularly for pre-school children; these were play-based interventions and video modelling to develop communication.

Three studies in the review provide evidence for play-based interventions with children aged 4–8 years. These interventions included a play dialogue intervention with peers and teaching of play skills in 1:1 and group situations. Two out of the three studies showed positive changes in play skills.

Three out of the four studies on video modelling to develop communication skills focus on pre-school children. These individualised interventions included the use of video modelling to increase the effectiveness of PECS or use of video modelling or in vivo modelling to prompt other target behaviours. All studies showed an increase in target behaviours.

There was also evidence within the review to indicate that the following might be effective with pre-school children as well as with school-aged children: social initiation training to develop social skills; discrete skills training based on behavioural principles; and PECS. As these interventions are also beneficial for school-age children, they will be discussed in the next section.

5.3.1.6 School age

Five interventions were identified in the current review as having a moderate level of evidence for school-aged children. These include: social initiation training; computer-assisted emotion recognition interventions to develop social understanding; PECS to develop the communication skills of children in special schools; narrative approaches to reduce challenging/interfering behaviour; and discrete skills teaching informed by behavioural principles.

Four studies focus on social initiation training. Participants were aged 4–17 years and attended a range of school settings. These 1:1 and group interventions with peers included PRT and other interventions involving the use of social scripts and prompts to teach social initiation. Outcomes included increased social initiation and engagement, although gains were not maintained for some children post intervention.

Three studies used computer programmes to develop emotion recognition with 5–10 year olds. One study in this group was identified as best evidence. Outcome measures showed improvement in the ability to identify emotions and the programmes were rated positively by staff.

Three studies evaluated the effectiveness of PECS for children in special education settings. One study in this group was evaluated as best evidence. These individualised interventions used pictures and symbols to assist children in their communication. Outcomes included increase in spontaneous requesting for objects and some increases in commenting and questioning although these were less consistent. Studies showed that the intervention could be delivered by teachers.

Five studies focused on the use of narrative interventions to reduce challenging/interfering behaviour. These individualised interventions included the use of power cards and social stories to prompt particular behaviours. Outcome measures showed an increase in both target behaviours and ease of implementation across a range of settings.

Four studies focused on the use of discrete skills teaching informed by behavioural principles with children aged 4–7 years. These 1:1 interventions used approaches such as model–lead–test and direct instruction to teach discrete skills such as reading single words and recognising letters or numbers. Parents and teachers reported positive social validity, although generalisation of skills was limited in some studies.

5.3.1.7 Interventions with a 2 rating (some evidence)

Interventions met criteria for some evidence if there were two or more studies providing positive evidence which either included a positive RCT or quasi-experimental study, or three or more single case experimental studies within the 2008–2013 timeframe.

Due to the relatively small number of studies required to achieve this rating there is insufficient evidence to enable discussion of these interventions by age range.

Two interventions were identified as having some evidence in the current review: Lego Therapy®; and school age comprehensive interventions.

Two studies in the review focused on Lego Therapy® with children aged 7–11 years. This group intervention uses a structured approach to constructing models to develop social skills. Both studies reported improvements in social interaction.

Three studies in the review evaluated school age comprehensive interventions with 3–11 year olds attending special classes or special schools. These interventions focus on training staff in evidence-based practices and coaching to develop individualised interventions. Evaluations showed positive outcomes for collaboration with parents and staff coaching. However, further research is needed regarding implementation and evaluation of pupil progress using standardised measures.

5.3.1.8 Interventions with a 1 rating (small amount of evidence) or with insufficient evidence

Interventions met criteria for a small amount of evidence if there was one positive RCT or quasi-experimental study, or two or more single case experimental studies within the 2008–2013 timeframe.

Seven interventions were identified in this category, which included: self-monitoring/computer-assisted and yoga interventions to reduce challenging behaviour; behavioural interventions to improve communication; computer-assisted instruction and multi-sensory intervention to develop academic skills; and aquatic intervention to develop motor skills.

A further six interventions did not have sufficient evidence to meet criteria to be rated 1. These were: consultation to develop social skills; peer-mediated interventions to develop social skills; school-readiness interventions; cognitive interventions and computer-assisted and visual cueing interventions to develop adaptive/life skills.

Although there was only a small amount or insufficient evidence to support these interventions in the current review, this may be due to factors such as the limited timeframe or the intervention being relatively new; technology-assisted instruction for example is beginning to be used across a wider range of areas. The evidence base for some of these interventions is discussed further in Section 5.3.2.

5.3.1.9 Limitations of the current review

Limitations of this systematic review should also be taken into consideration, as general issues relating to the evidence base, which were outlined in the introduction to this report, were also evident in this systematic review. Limitations identified in this review included how children's ASD was identified and diversity within samples. For example, severity of ASD sometimes varied within studies, making it difficult to draw conclusions about whether a particular intervention worked better for particular children according to severity of ASD. Ensuring greater sample homogeneity and assessing ASD at baseline will enable a more accurate description of samples and strengthen the conclusions that can be drawn regarding the effectiveness of particular interventions for particular groups of children and young people. A further limitation was diversity of age

ranges within samples, which made it difficult to identify whether a specific intervention was more effective with a particular age range. Again, having more clearly defined samples will assist in clearly identifying what works best and for whom.

A further limitation identified by Kasari and Smith (2013) and Parsons et al. (2009) is the lack of longitudinal research. In the current review only 10 per cent of studies evaluated maintenance at least 3–4 weeks post intervention and follow up measures were often quite limited. This represents a significant gap in the research as it is not possible to establish whether interventions resulted in long-term change and to what extent any gains made meaningfully addressed the primary needs of the child/young person over time.

As outlined previously, 64 per cent of best evidence studies in the current review involved samples of four or fewer participants. This again represents a significant gap in the evidence base and reduces the generalisability of findings. However, despite this limitation, the majority of studies utilised more robust methods such as single case experimental designs, RCTs and comparison group designs. Within the review, an assessment of interventions by category also sought to take into consideration the number of small scale single case experimental studies when making judgements about the amount of review evidence available to support a particular intervention.

This review also acknowledges the difficulties and limitations of researching comprehensive school-based and multi-component social skills interventions. In order to strengthen the evidence base in these areas, the authors recommend the use of more rigorous research designs for comprehensive school-based interventions and direct research with schools for evaluating multi-component social skills intervention research. As previously discussed, translating individual interventions into educational settings, in a way that is meaningful and relevant to practitioners, remains a challenge for researchers.

No qualitative studies were included in the review. This again represents a significant gap in the evidence base, and to date there remains limited evidence regarding the perceptions of those receiving and delivering interventions. Gaining the views of staff implementing interventions and the views of parents and young people themselves regarding why particular interventions are chosen and why they are perceived as having a meaningful and/or significant impact are important areas to address. The extent to which interventions are perceived as effective, easy to implement and relevant will also have a significant impact upon their future use and sustainability.

5.3.2 Previous literature reviews

5.3.2.1 Introduction

The current review was commissioned to build on the Parsons et al. (2009) review and therefore only focuses on the period 2008–2013. When making comparisons between reviews it is important to bear in mind methodological differences, which may result in subtle or more significant differences between the two reviews. Factors to consider include timescale, review process, and categorisation of interventions. For example, in Parsons et al. (2009), play-based approaches comprised a broader category and included the studies categorised as play, joint attention and social initiation in the current review. Some reviews also adopt systematic review processes, which make their results more comparable (Wong et al. 2013; NSP, 2009), while others such as Parsons et al. (2009) adopt a more bespoke process. In relation to timescale, many reviews such as Wong et al. (2013) cover a longer period making them more extensive than the current review. The emergence of evidence to support new interventions over time is also likely to result in some changes in interventions that are judged to be evidence-based.

As the current review was commissioned to build on Parsons et al. (2009), a number of comparisons can be made. Their report highlights a number of promising interventions, which are similar to those rated as having most or moderate evidence in this review. These include peer-mediated interventions, PECS in special school settings, discrete skills training to support learning and early intervention. However, there were differences between the reviews; for example, behavioural interventions were not identified as a discrete category by Parsons et al. (2009), and less evidence was available to support computer-assisted interventions at that time. As the previous review adopted a less systematic review process it is helpful to compare the current review with other reviews that have followed an established systematic review process.

5.3.2.2 Comparison with previous systematic reviews

Table 48 summarises the comprehensive reviews of education for children and young people with ASD. It follows a similar format to Table 47 from the guidance strand, with interventions clustered according to outcome type, although the authors acknowledge that some interventions will address more than one outcome (e.g. computer-assisted interventions). However, this approach may be helpful to practitioners by explicitly highlighting the needs that might be addressed by a particular type of intervention. The interventions listed are those discussed in the five different reviews as having good (Ministries of Health and Education, New Zealand, 2008) or established evidence (National Standards Project, 2009), as being evidence-based (National Professional Development Centre, Odom et al., 2010; Wong et al. 2013) or as providing most/moderate evidence (this review). However, interventions with only an emerging literature are not included.

Table 48: Comparison of best evidence interventions identified in SLRs

	New Zealand (2008)	National Standards Project (2009)	National Professional Development Centre (Odom et al. 2010)	Wong et al. (2013)	Current review (rating 4 or 3)
Number of included studies	Not specified	775	175	456	85
Date range of studies	1998–2004	1957–2007	1997–2007	1990–2011	2008–2013
Intervention type					
Joint attention		X			X
Social					
Spontaneous communication	X				
Naturalistic	X	X	X	X	
Peer-mediated	X	X	X	X	X
Social skills groups			X	X	
Modelling/Prompting (including video)		X	X	X	
Computer-assisted					X
Social initiation/skills training				X	X
Multi-component social					X
Play	X			X	X

	New Zealand (2008)	National Standards Project (2009)	National Professional Development Centre (Odom et al. 2010)	Wong et al. (2013)	Current review (rating 4 or 3)
Communication					
PECS			X	X	X
Speech generating devices (Alternative Augmentative Communication)			X		
Schedules/visual supports		X	X	X	
Behavioural/functional communication training			X	X	
Video modelling				X	X
Challenging behaviour					
Behavioural approaches*	X	X	X	X	X
Functional behaviour assessment	X	X	X	X	X
Environmental/task modification	X	X	X	X	
Transition support/planning	X				
Pivotal Response Training	X	X	X	X	
Self-management		X	X	X	
Narrative		X	X	X	X
Cognitive behavioural				X	
Exercise				X	
Scripting				X	
Academic					
Discrete trial teaching			X	X	X
Computer-assisted instruction				X	
Life skills					
Task analysis		X	X	X	
Comprehensive					
Pre-school comprehensive	X	X			X
Parent implemented programmes		X		X	

Note: Those marked with an asterisk (*) include a number of categories used by Wong et al. (2013), the NPDC (Odom et al. 2010), NSP (2009), such as prompting; antecedent-based intervention; reinforcement; response interruption/redirection; time delay; differential reinforcement and extinction.

As can be seen in Table 48, the five reviews differed in timescale and size. For instance, Wong et al. (2013) was a much larger review covering research from 1990 to 2011, which resulted in the inclusion of 456 studies compared with 85 in this review. This difference in size had an impact particularly on the studies relating to challenging/interfering behaviour. In Wong et al. (2013), the NPDC (Odom et al. 2010) and NSP (2009), particular behavioural interventions were specified in more detail, for instance, prompting, extinction or reinforcement, a level of detail not possible within the scope of the current review. However, the broad behavioural approaches category did enable the strength of evidence for studies in this area to be reflected. Another difference between the reviews relates to attention interventions as the NPDC (Odom et al. 2010) and Wong et al. (2013) classify attention as an outcome rather than an intervention.

The size of each review has also influenced whether some studies are included or not. For instance, some interventions such as exercise and self-management were identified by Wong et al. (2013) as having sufficient evidence and although they were present in the current review there were insufficient studies to reach the threshold for most/moderate evidence. Changes over time are also evident; for instance, the evidence for computer-assisted (or technology-aided) instruction appears to have strengthened over time. Wong et al. (2013) describe this category as technology-aided instruction, which perhaps more helpfully reflects developments in the range of devices being used such as speech generation devices and tablets as well as computers.

There are also differences in included interventions between reviews. For instance, parent-implemented interventions were included in Wong et al. (2013) and NSP (2009) but are not included in the current review as a discrete category. Moreover, comprehensive early interventions are included in the current review, that of Ministries of Health and Education, New Zealand (2008) and NSP (2009) but are not included in Wong et al. (2013) or those of the National Professional Development Centre (NPDC) (Odom et al., 2010).

As the structure of the current review was informed by the outcome categories developed by Wong et al. (2013) and this is the other most recent review of educational interventions for ASD, it is useful to compare these two reviews. However, comparisons will also be made with other reviews where appropriate.

Wong et al. (2013) found that the majority of ASD intervention research for children has focused on children in the 3–11 year age group and few studies focus on children over 12 years. This pattern is evident across reviews and in the current review, only nine per cent of studies focused specifically on the post-primary age group. The post-primary group is under-researched and this is particularly the case for young people in post-compulsory education, with only two per cent of studies in the current review focusing on this age group.

In relation to outcome categories, the current review along with the NSP review (2009) identified joint attention interventions as having an evidence base, particularly in relation to young children. However, NPDC (Odom et al. 2010) and Wong et al. (2013) classify attention as an outcome rather than an intervention.

In relation to social outcomes, Wong et al. (2013) and the current review identify peer-mediated interventions and social initiation training as effective social interventions. In the current review, peer-mediated interventions were social intervention with the most evidence. A concern identified by Parsons et al. (2009) relates to the ethics of peers taking responsibility for supporting another child. They suggested that changing the attitudes of peers might be more effective than peer training. Approximately half of the peer-mediated interventions in the current review adopted a collaborative problem-solving approach rather than or in addition to peer training, which is perhaps more likely to facilitate attitudinal change. Researching the views of peers and pupils with ASD participating in such interventions is an important gap to address.

In the current review, social initiation training demonstrated a growing evidence base in special and mainstream settings. However, overall the evidence was not as strong as it was for peer-mediated interventions, though this pattern is not replicated in Wong et al. (2013). Another difference between Wong et al. (2013) and the current review relates to multi-component interventions targeting social skills: these were not mentioned in Wong et al. (2013) but three studies in this group were among the seven studies identified as scoring high on all three assessment dimensions in the current review. This difference between the reviews may reflect the importance of educational utility in the coding framework of the two reviews and Wong et al.'s (2013) focus on more discrete interventions.

In the current review there was moderate support for interventions addressing play skills for younger children. This supports the findings of Wong et al. (2013) whose larger scale review found more evidence to support the development of play.

In relation to communication outcomes, the current review found evidence to support the use of PECS in special school settings, behavioural approaches and video modelling interventions across settings. The findings regarding PECS are similar to those of Parsons et al. (2009) who also identified that PECS might be more effective for children with lower levels of intentional communication and who cautioned against widespread use of this approach. The updated review by Wong et al. (2013) did not differentiate intervention effectiveness in relation to ASD severity but did identify PECS, video modelling and functional communication training (classified as a behavioural approach in the current review) as effective interventions. Wong et al. (2013) also found evidence for visual supports, but there was insufficient evidence for these approaches in the current review.

In common with Wong et al. (2013), the current review includes a category of interventions to address challenging/interfering behaviour. The studies in this section indicate that behavioural interventions, often underpinned by a functional analysis, had most evidence for the management of children and young people's behaviour. These interventions can also be used successfully by school staff. In Wong et al. (2013), NPDC (Odom et al. 2010) and NSP (2009), specific behavioural interventions are evaluated; however, this was not possible here given the scale and parameters of the current review. In addition to behavioural approaches, the current review and Wong et al. (2013) also support the use of narrative approaches for challenging/interfering behaviour.

Probably due to its size, the current review only found a small amount of evidence for task or environment modification, self-management and Pivotal Response Training (PRT) as discrete interventions, although these interventions are supported by Wong et al. (2013) NPDC (Odom et al. 2010) and NSP (2009). In the Wong et al. (2009) review, these interventions only had about eight studies each to support them; this might account for why they did not feature so strongly in the current review, which took place over a more limited timeframe. This may also account for why Wong et al. (2013) found sufficient evidence to support cognitive behavioural approaches, exercise and scripting, while the current review only found a small amount of evidence for these interventions. Reviews prior to Wong et al. (2013) did not find sufficient evidence to support these interventions, but some exercise and scripting studies were included in the current review. It may be that the evidence to support them has emerged relatively recently in a relatively small number of studies.

In relation to academic outcomes, Wong et al. (2013) and this review found positive evidence for the use of behavioural principles to support the acquisition of discrete skills such as letter recognition or spelling. However, further research focusing on generalisation of skills would add to the evidence base in this area. Wong et al. (2013) also found evidence for technology-aided instruction, but there was less evidence for this as it related specifically to academic learning in the current review, although there was more evidence for computer-assisted learning in other outcome categories. Another outcome category where Wong et al.

(2013) found substantially more evidence than in the current review related to adaptive/self-help skills but the reasons for this difference are unclear.

Wong et al. (2013) found relatively small numbers of studies in their cognitive, motor, vocational and mental health outcome categories, which is mirrored in the current review. However, Wong et al. (2013) did find more evidence in the school readiness intervention categories than was found in this review, which may be due to differences in coding between the school readiness interventions based on behavioural principles to support skill acquisition categories, as there was evidence to support behavioural skills teaching for pre-school children in the current review.

Comprehensive and multi-components interventions were not categories in Wong et al. (2013). However, Parsons et al. (2009) did consider these types of studies and identified the inherent difficulties related to implementation and measurement of comprehensive interventions. This was also identified in the current review, particularly for school-aged children; further strengthening of research design in this area is needed.

In relation to comprehensive pre-school intervention, the studies included in the current review provide evidence to support ASD-specific interventions in early education settings, which draw upon behavioural principles. However, the timescale of the current review means that this section of the review is unlikely to provide a comprehensive picture of the extensive ASD early intervention research. Although the evidence base in this area is relatively large, the current review agrees with Parsons et al. (2009) in identifying the need for further research to explore how the intensity of intervention and balance of behavioural and developmental approaches can be matched to individual needs.

Parsons et al. (2009) also highlighted the 'voice' of children and young people as a significant gap in the literature. In the current review some studies included consultation with young people about the social validity of interventions but there continues to be a significant gap in relation to the active participation of children and young people with ASD in evaluating interventions and their wider experiences of schooling.

5.4 Evidence available from best practice guidelines documents

The best practice guidelines provide helpful examples of how research is translated into guidance for practitioners, professionals and parents. The majority of the guidelines focused on education but two documents adopted a broader focus and integrated recommendations across a range of services.

The guidelines, which drew upon systematic reviews of evidence-based interventions, reflected the available evidence at the time of their publication. However, it is promising that there is considerable overlap between the guidance documents and the current systematic review in relation to the interventions recommended. Interventions identified as having an established evidence base in the guidance documents included:

- naturalistic, peer-mediated and social modelling (including video modelling) interventions for social skills;
- PECS and visual supports for communication;
- positive behaviour approaches, functional assessment, other behavioural approaches, environmental modification, PRT, self-management and narrative approaches for challenging/interfering behaviour;
- discrete trial teaching for the development of academic skill; and
- task analysis for life skills.

Emerging interventions included social skills groups, augmentative and alternative communication (AAC) and cognitive approaches for challenging/interfering behaviour, computer-assisted instruction for academic skills and ABA-based approaches for life skills. For pre-school children established interventions included EIBI and ABA. Emerging pre-school interventions included a number of behavioural, developmental and combined comprehensive interventions and targeted interventions such as joint attention and transition support.

Many of the guidelines were also informed by best practice and expert opinion. These sources highlight a number of other important considerations for practitioners, including collaboration and active partnership with parents and carers; multi-agency working; listening to the views of children and young people with ASD; and provision of structured training, drawing upon good practice and evidence-based practice for practitioners working at different levels of specialism.

The guidance documents also appear to reflect gaps in the existing evidence, such as highlighting limited consideration of: interventions for young people in secondary and tertiary education; processes for accessing special education; special education provision; transition planning; and provision beyond the school such as holiday provision and short breaks.

5.5 Lessons that can be identified from this evidence

All strands of the review indicate that a number of approaches can be effective for children with ASD. The case studies and guidance documents supported the view that ASD is a spectrum disorder for which a continuum of educational provision and range of interventions are needed. This is supported by the findings from the systematic review, which indicates that there is evidence for a number of individual and combined interventions, some of which may be specific to particular groups, profiles of need, age ranges or intervention foci while others have potentially broader applications. Although some interventions showed promise for very specific problems, interventions that address core areas of difficulty related to ASD are important in order to meet the range of primary needs of children.

The case studies and guidance documents indicate that the needs of many children and young people with ASD can be met in mainstream education settings. This is also reinforced by the systematic review strand, which demonstrated the importance of opportunities for social learning with peers. This was mainly in relation to social needs but there was some evidence of the importance of social learning alongside peers in a number of other included studies. Although some children may need access to specialist provision for part or all of their education, clear criteria for accessing this provision needs to be available for all stakeholders and opportunities for social learning should be explicitly considered across the curriculum and learning environments.

All sections of the review have highlighted that there are significant gaps in our knowledge of interventions for supporting children and young people with ASD at different ages and in different educational settings. The country case studies and guidance documents were relatively general, with limited consideration of the needs of children and young people at different ages. These gaps are likely to reflect the current research evidence base. In both the systematic review and case study sections, significant knowledge gaps were highlighted regarding the needs of those aged over 16 years. Only 10 per cent of studies in the current review focused on post-primary pupils and two per cent addressed the needs of young people attending post-compulsory education.

Consideration of the needs of children and young people attending special school was also somewhat limited. Further research is needed in these areas in order to assist practitioners in most effectively meeting the needs of children and young people at different stages of their education and with different profiles of need.

There can sometimes be a gap between research evidence and practice. The guidance section illustrated that practitioners can be assisted by providing national/jurisdiction level documents, which offer a balance of research evidence, practice-based evidence and expert opinion that is appropriate to the national/jurisdiction level context. Where possible guidance should include detail in areas such as placement criteria; the needs of specific age groups; transition; which professionals should be involved in supporting the education of children and young people with ASD; individualised planning; collaboration with parents/carers and professionals; out-of-school provision; and holiday provision and short breaks. Although some of these aspects may require decision making at a local level it would be helpful for policy makers to provide principles or frameworks to support decision making in these areas.

The guidance and case study strands recognised the importance of professional education for practitioners. The interventions discussed in the systematic review strand also required differing amounts of training in order for them to be used effectively by practitioners. A framework for professional education at different levels, from basic awareness to higher level accreditation, for specialist practitioners will assist in ensuring that sufficient and appropriate professional development is available to meet a range of practitioner needs. Professional education needs to include evidence-based practice, good practice and implementation in schools. Standards and quality indicator frameworks should also be considered in order to assist practitioners in evidencing quality skills and developing provision.

Monitoring the effectiveness of policy and provision is also important. The case study and guidance strands identified the potential for collecting data as a means of mapping current provision and future need. However, this was underutilised in many case study countries/jurisdictions. Collecting a range of social, academic and wellbeing outcome data are also important for evaluating the effectiveness of policies.

5.6 Implications of this review

As indicated in Chapter 1, the number of children with ASD in Ireland and in other countries is rising. There are also some important developments taking place in Ireland that are likely to facilitate the implementation of recommendations from the current review. As in many other countries a range of early years and school age provisions are available in Ireland, including special school provision, mainstream with ASD-specific classes and mainstream with support. This flexible range of provision and an increased emphasis upon funding according to need (NCSE, 2013) will help to ensure that alongside a commitment to inclusion for pupils with ASD, a range of provision exists, which can be adjusted to suit a child's needs over time. The Free Pre-School Year also provides an opportunity for flexibly funding early years provision in a similar way to other successful pre-school programmes (such as the HCWA programme in Queensland).

Flexible approaches to funding and provision also offer more potential for social inclusion. As highlighted in the current review, social inclusion with peers provides many opportunities for the development of children's social skills. A range of social opportunities, at an appropriate developmental level for the child need to be available for children attending mainstream and specialist provision.

Guidance documents can also be an important reference point for parents and professionals. These documents can play an important role in translating research into practice, highlighting good practice and establishing processes for future planning and development.

The following six implications for education of children and young people with ASD in Ireland have resulted from the review.

5.6.1 Pre-school provision and interventions

The evidence provided in the systematic review and guidance strands indicates that in the current review there is most evidence for comprehensive pre-school ASD-specific intervention informed by behavioural principles and specific interventions focusing on core skills such as attention.

- Comprehensive ASD-specific interventions offer a comprehensive educational experience for the child, with the intervention targeting a number of areas of development such as behaviour, social skills, communication, life skills and learning. Most of the interventions in this group were informed by or based upon behavioural principles, such as interventions based on ABA. Some adopted a more eclectic approach, such as Building Blocks.
- Joint attention interventions aimed to develop children's joint attention and joint engagement and usually involved 1:1 delivery of a play-based/turn-taking intervention by a teacher or parent.

Moderate evidence was also found for play-based interventions and video modelling to develop communication.

- Play interventions included a play dialogue intervention with peers and teaching of play skills in 1:1 and group situations.
- Video modelling to develop communication skills was an individualised intervention such as the use of video modelling or in vivo modelling to prompt target behaviours.

Within the review as a whole there was some positive evidence in relation to social initiation training, discrete skills training informed by behavioural principles and PECS to indicate that these interventions may also be effective with pre-school children. No interventions specific to pre-school were identified as being of some or a small amount of evidence in relation to the current review. Evidence for the interventions from the current systematic literature review should also be considered alongside evidence over a longer timescale.

Evidence from the guidance section also supports the development and/or funding of a continuum of pre-school provision that adopts interventions addressing the core features of ASD and can be matched to the needs of individual children with ASD and their families. Evidence from the current review supports programmes delivered in education settings that can also provide support such as training for parents and are planned in collaboration with parents and carers.

Further research/development is needed in order to establish:

- which particular interventions should be funded and the mechanisms for this;
- the relationship between ASD severity and adapting the type, mode of delivery and intensity of the intervention and whether gains are maintained over time; and
- how intervention can be tailored effectively to meet child and family needs.

5.6.2 School age ASD provision and interventions

The evidence provided in the systematic review and guidance strands indicates that a range of provision types and intervention strategies are needed. Interventions need to focus on key features of ASD, particularly social interaction and flexibility of thought with access to supplementary learning, communication and life skills interventions, as needed. These interventions can be delivered using different formats and some can be delivered effectively by teaching staff and parents.

Three interventions were identified as having most evidence for school-aged children in the current review: peer-mediated interventions to develop social skills and promote inclusion for children attending mainstream schools; multi-component social skills interventions to develop social skills; and behavioural interventions to reduce challenging/interfering behaviours.

- Peer-mediated interventions focus on developing interventions with peers to support children with ASD and/or teach peers skills to enable them to interact more successfully with children with ASD.
- Multi-component social skills interventions included several interventions, such as social skills training or peer support, or involved parents in addition to a child-focused programme.
- Behavioural interventions to reduce challenging/interfering behaviours were generally 1:1 interventions, which were often underpinned by a functional analysis of behaviour. They illustrated a number of different methods based upon behavioural principles, for instance, multi-element behaviour plans, environmental modification, functional communication training and covert prompting.

Five interventions were identified as having a moderate amount of evidence in the current review: social initiation training; computer-assisted emotion recognition interventions to develop social understanding; PECS to develop the communication skills of children in special schools; narrative approaches to reduce challenging/interfering behaviour; and discrete skills teaching informed by behavioural principles.

- Social initiation training was delivered as a 1:1 or group intervention with peers and included PRT and other interventions involving the use of social scripts and prompts to teach social initiation.
- Computer-assisted emotional recognition interventions used computer programmes to develop emotion recognition.
- PECS is an individualised intervention that uses pictures and symbols to assist children in their communication.
- Narrative interventions are individualised such as power cards and social stories, which prompt children to use particular behaviours.
- Skills teaching using behavioural approaches consisted of 1:1 interventions such as model–lead–test and direct instruction to teach discrete skills such as reading single words and recognising letters or numbers.

Two interventions were also identified as having some evidence in the current review: Lego Therapy® and school-age comprehensive interventions. Several interventions were identified as having only a small amount of evidence. However, this may reflect the fact that these interventions are relatively new and only have a small evidence base or have not been the focus of research during the current time frame. Evidence for the interventions from the current systematic literature review should therefore be considered alongside evidence over a longer timescale.

Further research is needed in order to establish:

- interventions that are most effective for young people attending secondary, tertiary or post compulsory education;
- interventions that are most effective for children and young people attending specialist settings; and
- effective interventions to support transition between phases of education.

5.6.3 Guidance

The evidence from the guidance strand in particular indicates that guidance documents relating to the education of children and young people with ASD can provide a helpful framework for practitioners and parents.

Guidance developers need to consider:

- the extent to which guidance is holistic or education specific;
- key stakeholders who will contribute to guidance development;
- the balance between evidence based practice, good practice and professional expertise;
- the level of specificity to be included in guidelines regarding setting types, placement criteria, professional involvement, out-of-school provision, holiday provision and short breaks;
- the inclusion of a professional development structure;
- data that will be collected in relation to the guidance, who will collate it and how this will be used; and
- the processes for review of guidance and participation of key stakeholders.

5.6.4 Professional development

The evidence from the guidance and case study strands indicates that there is a need for a framework for ASD professional development at different levels, from basic awareness to higher level accreditation for specialist practitioners. This will ensure that sufficient professional education is available to meet a range of practitioner needs.

Given the recent extension of early years provision in Ireland it will be particularly important to ensure that a range of professional education opportunities specific to the early years and matched to the training needs of the wide range of practitioners working in these settings is available. Standards and quality indicator frameworks should also be considered in order to assist practitioners in evidencing quality skills and provision. The development of local networks will also facilitate ongoing development and sharing of good practice.

Further research is needed in order to establish:

- professional development needs at different levels;
- optimal delivery of training, for instance which staff should receive which levels of training;
- evaluation of the impact of training upon practice; and
- ongoing review and development of training content.

5.6.5 Collaborative research partnerships

The evidence from the systematic review and guidance strands indicates that the development of interventions can become disconnected from practice in education settings. The authors argue that in order to bridge this gap, structures need to be in place to support school-based practitioners to be actively engaged in multi-agency research collaborations focused around professional practice. Such collaborations will support the development of effective interventions based in education settings.

Further research is needed in order to establish:

- how individual evidence-based interventions can be implemented in schools;
- the structures and systems within schools that enable multiple interventions to be integrated, managed and implemented effectively in school contexts;
- the integration of evidence-based practice and good practice in school settings; and
- the perspectives of those delivering and receiving interventions.

5.6.6 Developing the evidence base for ASD interventions

The current review has highlighted gaps in the evidence base, particularly in relation to: the effectiveness of types of provision; effective interventions for different groups of children and young people with ASD; whether gains are sustained over time; and best practice in schools.

Further research is needed to establish:

- the effectiveness of different types of provision for pre-school and school-aged children and young people with ASD;
- the effectiveness of interventions for particular age groups and ASD sub-groups;
- the relative contribution of aspects of best practice (such as multi-agency working, collaborative partnerships with parents, assessment and individualised planning) to outcomes;
- the long-term effectiveness of interventions;
- the generalisation of interventions that focus on learning specific skills to other contexts;
- the effectiveness of multi-component social skills interventions and comprehensive interventions in education settings; and
- the perceptions of children and young people receiving interventions.

References

Ambitious About Autism (2013) Schools report 2013: Are schools delivering for children and young people with autism? Ambitious About Autism.

American Psychiatric Association (1994) *Diagnostic and statistical manual of mental disorders*, 4th ed., Arlington, VA: American Psychiatric Publishing.

American Psychiatric Association (2013) *Diagnostic and statistical manual of mental disorders*, 5th ed., Arlington, VA: American Psychiatric Publishing.

American Psychological Association (APA) (2006) Evidence based practice in psychology, in *American Psychologist*, May–June, 271–285.

Australian Advisory Board on Autism Spectrum Disorders (2010) *Education and autism spectrum disorders in Australia: The provision of appropriate educational services for school-age students with autism spectrum disorders in Australia*, Forestville: Australian Advisory Board on Autism Spectrum Disorders.

Australian Bureau of Statistics (2009) Autism and education, in *Autism in education, 2009*, retrieved from <http://www.abs.gov.au/ausstats/abs@.nsf/Lookup/4428.0main+features62009>.

Autism Commission (2013) *Report from the Governor's Special Commission Relative to Autism*, retrieved from: <http://www.mass.gov/anf/docs/mddc/autism-commission-report-full.pdf>.

Autism Spectrum Australia (2011) *Inquiry into transition support for students with additional or complex needs and their families*, New South Wales: Autism Spectrum Australia.

Baron-Cohen, S., Scott, F.J., Allison, C., Williams, J., Bolton, P., Matthews, F.E, et al. (2009) Prevalence of autism-spectrum conditions: UK school-based population study, in *The British Journal of Psychiatry*, 194, 500–509.

Batten, A., Corbett, C., Rosenblatt, M., Withers, L. and Yuille, R. (2006) *Make school make sense. Autism and education: the reality for families today*, London: National Autistic Society.

Batten, A. and Daly, J. (2006) *Make school make sense: Autism and education in Scotland: the reality for families today*, London: The National Autistic Society.

Bolte, S. (2014) The power of words: Is qualitative research as important as quantitative research in the study of autism? in *Autism*, 18: 2, 67–68.

Bond, C., Woods, K., Humphrey, N. Symes, W. and Green. L. (2013) The effectiveness of SFBT with children, schools and families: a systematic and critical review of the literature from 1990–2010, in *Journal of Child Psychology and Psychiatry*, 54:7, 707–723.

Bondy, A. and Frost, I. (1994) The Picture Exchange Communication System, in *Focus on Autistic Behaviour*, 9:3, 1–19.

Campbell, M., Fitzpatrick, R., Haines, A., Kinmonth, A.L, Sandercock, P., Spiegelhalter, D. and Tyrer, P. (2000) Framework for design and evaluation of complex interventions to improve health, *British Medical Journal*, 321, 694–696.

Centers for Disease Control and Prevention (2006) *Prevalence of autism spectrum disorders – Autism and developmental disabilities: Surveillance summaries*, MMWR 2009m 58 (No. SS–10).

- Centers for Disease Control and Prevention (2012) Prevalence of autism spectrum disorders – Autism and developmental disabilities monitoring network, 14 sites, United States, 2008, in *Morbidity and Mortality Weekly Report, Surveillance Summaries*, 61:3, retrieved from: <http://www.cdc.gov/mmwr/pdf/ss/ss6103.pdf>.
- Centers for Disease Control and Prevention (2014) Prevalence of autism spectrum disorder among children aged 8 years, in *Autism and Developmental Disabilities Monitoring Network*, March 28, 1–21.
- Charman, T., Pellicano, L., Peacey, L.V., Peacey, N., Forward, K. and Dockrell, J. (2011) *What is good practice in autism education?* London: Autism Education Trust.
- Cooper, J.O., Heron, T.E. and Heward, W.L. (2007) *Applied behaviour analysis*, 2nd ed., Upper Saddle River, NJ: Pearson.
- Deninger, M. and O'Donnell, R. (2009) Special education placement and costs in Massachusetts, in *Education Research Brief*, March.
- DCSF (2008). Targeted Mental Health in Schools Project. Using the evidence to inform your approach: A practical guide for headteachers and commissioners. Nottingham: DCSF Publications.
- Department of Health, Social Services and Public Safety (2013) *Autism Strategy and Action Plan*, Belfast.
- Department of Education and Science (1999) *Ready to learn – White paper on early childhood education*, Dublin: The Stationery Office.
- Department of Education and Science (2004) *A brief description of the Irish education system*, Dublin: Department of Education and Science.
- Department of Education and Science (2005) *Circular special education 02/05: Organisation of teaching resources for pupils who need additional support in mainstream primary schools*, Dublin: Department of Education and Science.
- Department of Education and Science (2006) *An evaluation of educational provision for children with autistic spectrum disorders*, Dublin: Stationary Office.
- Department of Education and Science (2008) Circular Home Tuition Scheme 075/2008, Dublin: Department of Education and Science.
- Department of Education and Science (2013a) *Circular 002/2013: Post-graduate certificate/diploma programme of continuing professional development for teachers working with students with special educational needs (autistic spectrum disorders)*, Dublin: Department of Education and Science.
- Department of Education and Science (2013b) *Circular 003/2013: Graduate certificate in the education of students with autistic spectrum disorder (ASDs) for teachers working with students with ASDs in special schools, special classes or as resource teachers in mainstream primary and post-primary schools – 2013/2014*, Dublin: Department of Education and Science.
- Department of Public Instruction Exceptional Children Division (2011) *Evidence-based practices in educating children with autism*, North Carolina Department of Public Instruction Exceptional Children Division.
- Donabedian, A. (2003) *An introduction to quality assurance in health care*, Oxford: Oxford University Press.
- Dublin City University (2013) 'Autism counts' – an Irish autism action-funded research project, retrieved on 4th August 2014 from <http://www4.dcu.ie/marketing/staffnews/2013/jul/irishautism.shtml>.

- Eikeseth, S. and Klintwall, L. (2014) Educational interventions for young children with autism spectrum disorders, in V.B. Patel, V.R. Preedy and C.R. Martin (eds.), *Comprehensive guide to Autism*, New York: Springer.
- Elsbbagh, M., Divan, G., Koh, Y.J., Kim, Y.S., Kauchali, S., Marcín, C. et al. (2012) Global prevalence of autism and other pervasive developmental disorders, *Autism Research*, 5, 160–179.
- Exceptional Children Division (n.d.). *Per child allocations: Exceptional Children Division state and federal per child allocation for children with disabilities and 2012–2013*.
- Exceptional Children Division (n.d.). *Per child allocations: Exceptional Children Division state and federal per child allocation for children with disabilities and 2012–2013*.
- Fishman, B.J., Penuel, W.R., Allen, A-R., Cheng, B.H. and Sabelli, N. (2013) Design-based implementation research: An emerging model for transforming the relationship of research and practice, *National Society for the Study of Education*, 112: 2, 136–156.
- Flay, B.R., Biglan, A., Boruch, R.F., Castro, F.G., Gottfredson, D., Kellam, S et al. (2005) Standards of evidence: Criteria for efficacy, effectiveness and dissemination, *Prevention Science*, 6:3, 151–175.
- Gough, D. (2007) Weight of evidence: A framework for the appraisal of the quality and relevance of evidence, in J. Furlong and A. Oancea (eds.), *Applied and practice-based research: Special edition of research papers in education*, 22:2, 213–228.
- Greenberg, M.T. (2004) Current and future challenges in school based prevention: The researcher perspective, *Prevention Science*, 5:1, 5–13.
- Government of Ireland (2004) Education for Persons with Special Educational Needs Act 2004, Dublin: Government Publications.
- Government of Ireland (2005) *Disability Act 2005*, Dublin: Government Publications.
- Gresham, F.M. and Elliot, S.N. (1990) *Social skills rating system manual*, Circle Pines, MN: American Guidance Service.
- Henwood, K.L. and Pidgeon, N.F. (1992) Qualitative research and psychological theorising, in *British Journal of Psychology*, 83:1, 97–111.
- Hsieh, H-F. and Shannon, S.E. (2005) Three approaches to qualitative content analysis, in *Qualitative Health Research*, 15:9, 1277–1288.
- Idring, S., Rai, D., Dal, H., Dalman, C., Sturm, H., Zander, E. et al. (2012) Autism spectrum disorders in the Stockholm Youth Cohort: Design, prevalence and validity, in *PLoS ONE*, 7:7, e41280.
- Jones, G., English, A., Guldberg, K., Jordan, R., Richardson, P. and Walzt, M. (2008) *Educational provision for children and young people on the autism spectrum living in England: A review of current practice, issues and challenges*, Autism Education Trust: London.
- Kasari, C. and Smith, T. (2013) Interventions in schools for children with autism spectrum disorder: Methods and recommendations, in *Autism : The International Journal of Research and Practice*, 17:3, 254–67.
- Lovaas, O.I. (1987) Behavioral treatment and normal intellectual and educational functioning in autistic children, in *Journal of Consulting and Clinical Psychology*, 55, 3–9.

- Lord, C., Rutter, M., Goode, S., Heemsbergen, J., Jordan, H., Mawhood, L. and Schopler, E. (1989) Autism Diagnostic Observation Schedule: A standardised observation schedule of communicative and social behaviour, in *Journal of Autism and Developmental Disorders*, 19, 185-212.
- MacDermott, S., Williams, K., Ridley, G., Glasson, E. and Wray J. (2007) *The prevalence of autism in Australia. Can it be established from existing data?* Australian Advisory Board on Autism Spectrum Disorders: Sydney.
- Madsen, K.M., Hviid, A., Vestergaard, M., Schendel, D., Wholfahrt, T., Thorsen, P. et al. (2002) A population based study of measles, mumps and rubella vaccination and autism, in *New England Journal of Medicine*, 347, 1477–1482.
- Maine Department of Health and Human Services and Maine Department of Education (2009) Interventions for autism spectrum disorders: State of evidence. Maine.
- Meikle, L. and Watt, D. (2013) Autism and Scottish education: Information from data, in *Good Autism Practice*, 4:1, 105–109.
- Ministries of Health and Education (2008) *New Zealand autism spectrum disorder guidelines*, Ministry of Health: Wellington.
- Missouri Autism Guidelines Initiative (2012) *Autism spectrum disorders: Guide to evidence-based interventions*, Thompson Foundation for Autism, the Division of Developmental Disabilities, the Office of Special Education, and Mercy Children's Hospital: St. Louis and Springfield.
- Moher, D., Liberati, A., Tetzlaff, J., Altman, D.G. and the PRISMA Group (2009) Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement, in *PLoS Med*, 6: 7, e1000097.
- Morewood, G. D., Humphrey, N. and Symes, W. (2011) Mainstreaming autism : making it work, in *Good Autism Practice*, 12:2, 62–68.
- National Autism Center (2009), *National standards report*, National Autism Center: Massachusetts.
- National Council for Special Education (2006) Implementation report: Plan for the phased implementation of the EPSEN Act, 2004, Trim: NCSE.
- National Council for Special Education (2013) Supporting students with special educational needs in schools, Trim: NCSE.
- National Research Council (2001) *Educating students with autism*, Canada.
- National Institute for Health and Care Excellence (2011) *Autism diagnosis in children and young people: Recognition, referral and diagnosis of children and young people on the autism spectrum*, National Institute for Health and Care Excellence.
- National Institute for Health and Care Excellence (2013) *Autism: The management and support of children and young people on the autism spectrum*, National Institute for Health and Care Excellence.
- Parsons, S., Guldberg, K., Macleod, A., Jones, G., Prunty, A. and Balfe, T. (2009) *International review of the literature of evidence of best practice provision in the education of persons with autistic spectrum disorders*, Research Report 2, Trim: National Council for Special Education.
- Prior, M. and Roberts, J. (2012) Early intervention for children with autism spectrum disorders: 'Guidelines for good practice', Australia.

- Public Schools of North Carolina (n.d.). *Reports of disaggregated state, school system (LEA) and school performance data for 2010–2012*, retrieved from: <http://www.ncpublicschools.org/accountability/reporting/leaperformancearchive/>.
- Reichow, B., Volkmar, F. R., and Cicchetti, D. V. (2008) Development of the evaluative method for evaluating and determining evidence-based practices in autism, in *Journal of autism and developmental disorders*, 38:7, 1311–9.
- Roberts, J. and Prior, M. (2006) A review of the research to identify the most effective practice in early intervention of children with autism spectrum disorders, Canberra: Australian Government Department of Health and Ageing.
- Rose, I., Dunlap, G. and Kincaid, D. (2003) Effective educational practices for students with autism spectrum disorders, in *Focus on Autism and other Developmental Disorders*, 18, 150–168.
- Scottish Government (2010). Supporting children's learning code of practice (revised edition), retrieved from: <http://www.scotland.gov.uk/Resource/Doc/348208/0116022.pdf>.
- Scottish Government (2011) *Attendance and absence 2010/11*, retrieved from <http://www.scotland.gov.uk/Topics/Statistics/Browse/School-Education/attab2011>.
- Scottish Government (2013). *Attainment and leaver destinations supplementary data, 2011/12*, retrieved from: <http://www.scotland.gov.uk/Topics/Statistics/Browse/School-Education/leavedestla/follleavedestat>.
- Scottish Government (2014) *Pupil census 2012 supplementary data*, <http://www.scotland.gov.uk/Topics/Statistics/Browse/School-Education/dspupcensus>.
- Schopler, E., Reichler, J. and Renner, B. (1988) *The Childhood Autism Rating Schedule (C.A.R.S)*, Los Angeles: Western Psychological Services.
- Segall, M. J. and Campbell, J. M. (2012). Factors relating to education professionals' classroom practices for the inclusion of students with autism spectrum disorders, in *Research in Autism Spectrum Disorders*, 6:3, 1156–1167.
- Simpson, R. L., Boer-Ott, S.R.D. and Smith-Myles, B. (2003) Inclusion of learners with autistic spectrum disorders in general education settings, in *Topics in Language Disorders*, 23:2, 116–133.
- Shearer, J. (2010) Education options for children and students with autism spectrum disorder, Ministerial Advisory Committee: Students with Disabilities: South Australia.
- Sparrow, S.S., Balla, D. A. and Cichetti, D.V. (1984) *Vineland Adaptive Behaviour Scales*, Circle Pines, MN: American Guidance Service.
- Spencer, L., Ritchie, J., Lewis, J. and Dillon, L. (2003) *Quality in qualitative evaluation: A framework for assessing research evidence*, London: Strategy Unit (Cabinet Office).
- Stahmer, A.C. (2014) Effective strategies by any other name, in *Autism*, 18:3, 211–212.
- Task Force on Autism (2001) *Educational provision and support for persons with autistic spectrum disorders: The report of the Task Force on Autism*, Dublin.
- UNESCO (1994) *The Salamanca statement and framework for action on special needs education*, Salamanca, Spain: United Nations Educational, Scientific and Cultural Organization.

US Department of Health and Human Services (1999) *Mental health: A report of the surgeon general*, Rockville, MD: U.S. Department of Health and Human Services, Substance Abuse and Mental Health Services Administration, Center for Mental Health Services, National Institutes of Health, National Institute of Mental Health.

Wing, L. (1996) *Autistic disorders*, London: Constable.

Wittemeyer, K., Charman, T., Cusak, J., Gulberg, K., Hastings, R., Howlin, P., Macnab, Parsons, S., Pellicano, L. and Slonims., V. (2011) *Educational provision and outcomes for people on the autism spectrum: Full technical report*, London: Autism Education Trust.

Wong, C., Odom, S.L., Hume, K., Cox, A.W., Fetting, A., Kucharczyk, S. and Schultz, T.R. (2013) *Evidence-based practices for children, youth and young adults with autism spectrum disorder*, Chapel Hill: The University of North Carolina, Frank Porter Graham Child Development Institute, Autism Evidence Base Practice Review Group.

World Health Organization (1994) *International statistical classification of diseases and related health problems – 10th revision*, Geneva, Division of Mental Health: World Health Organization.

World Health Organization (1978) *International statistical classification of diseases and related health problems – 9th revision*, Geneva, Division of Mental Health: World Health Organization.

Zander, E. (2004) *Introduktion om autism [An introduction to autism]*, Autism Forum, retrieved from: http://www.autismforum.se/gn/export/download/af_oversattningar/Introduktion_om_autism_engelska.pdf.

International statutes

US: Individuals with Disabilities Education Act (2004).

US: No Child Left Behind (NCLB) Act of 2001, Pub. L. No. 107-110, § 115, Stat. 1425 (2002).

Appendices

Appendix A: Best evidence studies

- Andras, M. (2012) The value of LEGO ® therapy in promoting social interaction in primary-aged children with autism, in *Good Autism Practice*, 13:2, 18–25.
- Anson, H. M., Todd, J. T. and Cassaretto, K. J. (2008) Replacing overt verbal and gestural prompts with unobtrusive covert tactile prompting for students with autism, in *Behavior research methods*, 40:4, 1106–1110.
- Axe, J. B., and Evans, C. J. (2012) Using video modeling to teach children with PDD-NOS to respond to facial expressions, in *Research in Autism Spectrum Disorders*, 6:3, 1176–1185.
- Axe, J. B., and Sainato, D. M. (2010) Matrix training of preliteracy skills with preschoolers with autism, in *Journal of applied behavior analysis*, 43:4, 635–652.
- Banda, D. R., Copple, K. S., Koul, R. K., Sancibrian, S. L. and Bogschutz, R. J. (2010) Video modelling interventions to teach spontaneous requesting using AAC devices to individuals with autism: a preliminary investigation, in *Disability and rehabilitation*, 32:16, 1364–1372.
- Banda, D. R. and Hart, S. L. (2010) Increasing peer-to-peer social skills through direct instruction of two elementary school girls with autism, in *Journal of Research in Special Educational Needs*, 10:2, 124–132.
- Bauminger-Zviely, N., Eden, S., Zancanaro, M., Weiss, P. L. and Gal, E. (2013) Increasing social engagement in children with high-functioning autism spectrum disorder using collaborative technologies in the school environment, in *Autism : The International Journal of Research and Practice*, 17:3, 317–39.
- Burton, C. E., Anderson, D. H., Prater, M. A. and Dyches, T. T. (2013) Video self-modeling on an iPad to teach functional math skills to adolescents with autism and intellectual disability, in *Focus on Autism and Other Developmental Disabilities*, 28:2, 67–77.
- Cale, S. I., Carr, E. G., Blakeley-Smith, A. and Owen-DeSchryver, J. S. (2009) Context-based assessment and intervention for problem behavior in children with autism spectrum disorder, in *Behavior modification*, 33:6, 707–742.
- Campbell, A., and Tincani, M. (2011) The power card strategy: Strength-based intervention to increase direction following of children with autism spectrum disorder, in *Journal of Positive Behavior Interventions*, 13:4, 240–249.
- Chan, J. M., O'Reilly, M. F., Lang, R. B., Boutot, E. A., White, P. J., Pierce, N. and Baker, S. (2011) Evaluation of a Social Stories™ intervention implemented by pre-service teachers for students with autism in general education settings, in *Research in Autism Spectrum Disorders*, 5:2, 715–721.
- Christensen-Sandfort, R. J. and Whinnery, S. B. (2011) Impact of milieu teaching on communication skills of young children with autism spectrum disorder, in *Topics in Early Childhood Special Education*, 32:4, 211–222.
- Cihak, D., Fahrenkrog, C., Ayres, K. M. and Smith, C. (2010). The use of video modeling via a video ipod and a system of least prompts to improve transitional behaviors for students with autism spectrum disorders in the general education classroom, in *Journal of Positive Behavior Interventions*, 12:2, 103–115.

- Cihak, David F, Kildare, L. K., Smith, C. C., McMahon, D. D. and Quinn-Brown, L. (2012) Using video Social Stories™ to increase task engagement for middle school students with autism spectrum disorders, in *Behavior modification*, 36(3), 399–425.
- Cihak, D. F., Smith, C. C., Cornett, A. and Coleman, M. B. (2012). The use of video modeling with the picture exchange communication system to increase independent communicative initiations in preschoolers with autism and developmental delays, in *Focus on Autism and Other Developmental Disabilities*, 27:1, 3–11.
- Cihak, D., Wright, R. and Ayres, K. (2010) Use of self-modeling static-picture prompts via a handheld computer to facilitate self-monitoring in the general education classroom, in *Education and Training in Autism and Developmental Disabilities*, 45:1, 136–149.
- Colozzi, G., Ward, L. and Crotty, K. (2008) Comparison of simultaneous prompting procedure in 1:1 and small group instruction to teach play skills to preschool students with pervasive developmental, in *Education and Training in Developmental Disabilities*, 43(2), 226–248.
- Davis, K. M., Boon, R. T., Cihak, D. F. and Fore, C. (2009). Power cards to improve conversational skills in adolescents with Asperger syndrome. *Focus on Autism and Other Developmental Disabilities*, 25:1, 12–22.
- Devlin, S., Healy, O., Leader, G. and Hughes, B. M. (2011) Comparison of behavioral intervention and sensory-integration therapy in the treatment of challenging behavior, in *Journal of Autism and Developmental Disorders*, 41:10, 1303–1320.
- Eldevik, S., Hastings, R. P., Jahr, E. and Hughes, J. C. (2012) Outcomes of behavioral intervention for children with autism in mainstream pre-school settings, in *Journal of Autism and Developmental Disorders*, 42:2, 210–220.
- Fletcher, D., Boon, R. and Cihak, D. (2010) Effects of the TOUCHMATH program compared to a number line strategy to teach addition facts to middle school students with moderate intellectual disabilities, in *Education and Training in Developmental Disabilities*, 45:3, 449–458.
- Frankel, F., Myatt, R., Sugar, C., Whitham, C., Gorospe, C. M. and Laugeson, E. (2010) A randomized controlled study of parent-assisted Children's Friendship Training with children having autism spectrum disorders, in *Journal of autism and developmental disorders*, 40:7, 827–842.
- Ganz, J. B., Kaylor, M., Bourgeois, B. and Hadden, K. (2008) The impact of social scripts and visual cues on verbal communication in three children with autism spectrum disorders, *Focus on Autism and Other Developmental Disabilities*, 23(2), 79–94.
- Goods, K. S., Ishijima, E., Chang, Y.-C. and Kasari, C. (2013) Preschool-based JASPER Intervention in minimally verbal children with autism: Pilot RCT, in *Journal of autism and developmental disorders*, 43:5, 1050–1056.
- Gordon, K., Pasco, G., McElduff, F., Wade, A., Howlin, P. and Charman, T. (2011) A communication-based intervention for nonverbal children with autism: What changes? Who benefits? in *Journal of consulting and clinical psychology*, 79(4), 447–457.
- Graetz, J., Mastropieri, M. and Scruggs, T. (2009) Decreasing inappropriate behaviors for adolescents with autism spectrum disorders using modified Social Stories, in *Education and Training in Developmental Disabilities*, 44:1, 91–104.
- Greer, R. D., Pistoljevic, N., Cahill, C., and Du, L. (2011). Effects of conditioning voices as reinforcers for listener responses on rate of learning, awareness, and preferences for listening to stories in preschoolers with autism, in *The Analysis of verbal behavior*, 27:1, 103–124.

- Grindle, C. F., Hastings, R. P., Saville, M., Hughes, J. C., Huxley, K., Kovshoff, H. and Remington, B. (2012) Outcomes of a behavioral education model for children with autism in a mainstream school setting, in *Behavior modification*, 36:3, 298–319.
- Guzinski, E. M., Cihon, T. M. and Eshleman, J. (2012) The effects of tact training on stereotypic vocalizations in children with autism, in *The Analysis of verbal behavior*, 28:1, 101–110.
- Harper, C. B., Symon, J. B. G. and Frea, W. D. (2008) Recess is time-in: Using peers to improve social skills of children with autism, in *Journal of autism and developmental disorders*, 38:5, 815–826.
- Holifield, C., Goodman, J., Hazelkorn, M. and Heflin, L. J. (2010) Using self-monitoring to increase attending to task and academic accuracy in children with autism, *Focus on Autism and Other Developmental Disabilities*, 25:4, 230–238.
- Holding, E., Bray, M., and Kehle, T. (2011) Does speed matter? A comparison of the effectiveness of fluency and discrete trial training for teaching noun labels to children with autism, in *Psychology in the Schools*, 48(2), 166–183.
- Hopkins, I. M., Gower, M. W., Perez, T. A., Smith, D. S., Amthor, F. R., Wimsatt, F. C. and Biasini, F. J. (2011). Avatar assistant: Improving social skills in students with an ASD through a computer-based intervention, in *Journal of autism and developmental disorders*, 41, 1543–55.
- Isaksen, J. and Holth, P. (2009) An operant approach to teaching joint attention skills to children with autism, in *Behavioral Interventions*, 236, 215–236.
- Iskander, J. M. and Rosales, R. (2013) An evaluation of the components of a Social Stories™ intervention package, in *Research in Autism Spectrum Disorders*, 7(1), 1–8.
- Jung, S., Sainato, D. M. and Davis, C. A. (2008) Using High-probability request sequences to increase social interactions in young children with autism, in *Journal of Early Intervention*, 30:3, 163–187.
- Kaale, A., Smith, L. and Sponheim, E. (2012) A randomized controlled trial of preschool-based joint attention intervention for children with autism, in *Journal of Child Psychology and Psychiatry*, 53:1, 97–105.
- Kasari, C., Rotheram-Fuller, E., Locke, J. and Gulsrud, A. (2012) Making the connection: randomized controlled trial of social skills at school for children with autism spectrum disorders, in *Journal of child psychology and psychiatry, and allied disciplines*, 53:4, 431–439.
- Knight, V. F., Smith, B. R., Spooner, F. and Browder, D. (2012) Using explicit instruction to teach science descriptors to students with autism spectrum disorder, in *Journal of autism and developmental disorders*, 42:3, 378–389.
- Koegel, R. L., Fredeen, R., Kim, S., Daniel, J., Rubinstein, D. and Koegel, L. (2012) Using perseverative interests to improve interactions between adolescents with autism and their typical peers in school settings, in *Journal of Positive Behavior Interventions*, 14:3, 133–141.
- Koegel, L. K., Vernon, T. W., Koegel, R. L., Koegel, B. L. and Paullin, A. W. (2012) Improving social engagement and initiations between children with autism spectrum disorder and their peers in inclusive settings, in *Journal of Positive Behavior Interventions*, 14:4, 220–227.
- Koegel, L. K., Kuriakose, S., Singh, A. K., and Koegel, R. L. (2012) Improving generalization of peer socialization gains in inclusive school settings using initiations training, in *Behavior modification*, 36:3, 361–77.

- Koenig, K. P., Buckley-Reen, A. and Garg, S. (2012) Efficacy of the Get Ready to Learn yoga program among children with autism spectrum disorders: A pretest-posttest control group design, in *The American journal of occupational therapy: official publication of the American Occupational Therapy Association*, 66:5, 538–546.
- Lacava, P. G., Rankin, A., Mahlios, E., Cook, K. and Simpson, R. L. (2010) A single case design evaluation of a software and tutor intervention addressing emotion recognition and social interaction in four boys with ASD, in *Autism*, 14, 161–78.
- Laugeson, E. A., Frankel, F., Gantman, A., Dillon, A. R. and Mogil, C. (2012) Evidence-based social skills training for adolescents with autism spectrum disorders: The UCLA PEERS program, in *Journal of autism and developmental disorders*, 42:6, 1025–36.
- Laugeson, E. A., Frankel, F., Mogil, C. and Dillon, A. R. (2009) Parent-assisted social skills training to improve friendships in teens with autism spectrum disorders, in *Journal of autism and developmental disorders*, 39:4, 596–606.
- Laushey, K., Heflin, L., Shippen, M., Alberto, P. and Fredrick, L. (2009) Concept mastery routines to teach social skills to elementary children with high functioning autism, in *Journal of autism and developmental disorders*, 39, 1435–1448.
- Loftin, R. L., Odom, S. L. and Lantz, J. F. (2008) Social interaction and repetitive motor behaviors, in *Journal of autism and developmental disorders*, 38:6, 1124–35.
- Lopata, C., Thomeer, M. L., Volker, M. A., Lee, G. K., Smith, T. H., Rodgers, J. D. and Toomey, J. A. (2012) Open-trial pilot study of a comprehensive school-based intervention for high-functioning autism spectrum disorders, *Remedial and Special Education*, 34:5, 269–281.
- Lopata, C. and Thomeer, M. L. (2012) Feasibility and initial efficacy of a comprehensive school-based intervention for high-functioning autism spectrum disorders, in *Psychology in Schools*, 49:10, 967–974.
- Machalicek, W., Reilly, M. O., Chan, J. M., Lang, R., Rispoli, M., Davis, T. and Didden, R. (2009) Using videoconferencing to conduct functional analysis of challenging behavior and develop classroom behavioral support plans for students with autism, in *Education and Training in Developmental Disabilities*, 44:2, 207–217.
- Mancil, G. R., Conroy, M. A. and Haydon, T. F. (2009) Effects of a modified milieu therapy intervention on the social communicative behaviors of young children with autism spectrum disorders, in *Journal of autism and developmental disorders*, 39, 149–163.
- Mancil, G. R., Haydon, T. and Whitby, P. (2009). Differentiated effects of paper and computer-assisted social stories on inappropriate behavior in children with autism, in *Focus on Autism and Other Developmental Disabilities*, 24:4, 205–215.
- Mandell, D. S., Stahmer, A. C., Shin, S., Xie, M., Reisinger, E. and Marcus, S. C. (2013) The role of treatment fidelity on outcomes during a randomized field trial of an autism intervention, in *Autism: The International Journal of Research and Practice*, 17:3, 281–295.
- Minihan, A., Kinsella, W., and Honan, R. (2011). Social skills training for adolescents with Asperger's syndrome using a consultation model, in *Journal of Research in Special Educational Needs*, 11:1, 55–69.
- Mucchetti, C. A. (2013) Adapted shared reading at school for minimally verbal students with autism, in *Autism*, 17:3, 358–372.

- Murdock, L. C. and Hobbs, J. Q. (2011) Tell me what you did today: A visual cueing strategy for children with ASD, in *Focus on Autism and Other Developmental Disabilities*, 26:3, 162–172.
- Murdock, L. C. and Hobbs, J. Q. (2011) Picture me playing: Increasing pretend play dialogue of children with autism spectrum disorders, in *Journal of autism and developmental disorders*, 41:7, 870–878.
- Ostry, C. and Wolfe, P. S. (2011) Teaching children with autism to ask “what’s that?” using a picture communication with vocal results, in *Infants and Young Children*, 24:2, 174–192.
- Owens, G., Granader, Y., Humphrey, A. and Baron-Cohen, S. (2008) LEGO therapy and the social use of language programme: An evaluation of two social skills interventions for children with high functioning autism and Asperger syndrome, in *Journal of autism and developmental disorders*, 38:10, 1944–57.
- Pan, C.-Y. (2010) Effects of water exercise swimming program on aquatic skills and social behaviors in children with autism spectrum disorders, in *Autism: The international journal of research and practice*, 14:1, 9–28.
- Parker, D. and Kamps, D. (2010) Effects of task analysis and self-monitoring for children with autism in multiple social settings, in *Focus on Autism and Other Developmental Disabilities*, 26:3, 131–142.
- Peters-Scheffer, N., Didden, R., Mulders, M. and Korzilius, H. (2010) Low intensity behavioral treatment supplementing preschool services for young children with autism spectrum disorders and severe to mild intellectual disability, in *Research in developmental disabilities*, 31:6, 1678–1684.
- Pollard, J. S., Betz, A. M. and Higbee, T. S. (2012) Script fading to promote unscripted bids for joint attention in children with autism, in *Journal of applied behavior analysis*, 45:2, 387–393.
- Reed, P. and Osborne, L. (2012) Impact of severity of autism and intervention time-input on child outcomes: comparison across several early interventions, in *British Journal of Special Education*, 39:3, 130–136.
- Reed, P., Osborne, L. A. and Corness, M. (2010). Effectiveness of special nursery provision for children with autism spectrum disorders, in *Autism*, 14:1, 67–82.
- Reed, P., Osborne, L. A., Makrygianni, M., Waddington, E., Etherington, A. and Gainsborough, J. (2013). Evaluation of the Barnet Early Autism Model (BEAM) teaching intervention programme in a “real world” setting, in *Research in Autism Spectrum Disorders*, 7:6, 631–638.
- Reichle, J., Johnson, L., Monn, E. and Harris, M. (2010) Task engagement and escape maintained challenging behavior: differential effects of general and explicit cues when implementing a signaled delay in the delivery of reinforcement, in *Journal of Autism and Developmental Disorders*, 40, 709–720.
- Roberts, J., Williams, K., Carter, M., Evans, D., Parmenter, T., Silove, N. and Warren, A. (2011) A randomised controlled trial of two early intervention programs for young children with autism: Centre-based with parent program and home-based, in *Research in Autism Spectrum Disorders*, 5:4, 1553–1566.
- Ruble, L. A., Dalrymple, N. J., and McGrew, J. H. (2010). The effects of consultation on individualized education program outcomes for young children with autism: the collaborative model for promoting competence and success, in *Journal of Early Intervention*, 32:4, 286–301.
- Ruble, L. A., McGrew, J. H., Toland, M. D., Dalrymple, N. J. and Jung, L. A. (2013) A randomized controlled trial of COMPASS web-based and face-to-face teacher coaching in autism, in *Journal of Consulting and Clinical Psychology*, 81:3, 566–572.

- Schaefer Whitby, P. J. (2012) The effects of Solve It! on the mathematical word problem solving ability of adolescents with autism spectrum disorders, in *Focus on Autism and Other Developmental Disabilities*, 28:2, 78–88.
- Shogren, K. A., Lang, R., Machalicek, W., Rispoli, M. J. and O'Reilly, M. (2010) Self versus teacher management of behavior for elementary school students with Asperger syndrome: Impact on classroom behavior, in *Journal of Positive Behavior Interventions*, 13:2, 87–96.
- Smith, B. R., Spooner, F. and Wood, C. L. (2013) Using embedded computer-assisted explicit instruction to teach science to students with autism spectrum disorder, in *Research in Autism Spectrum Disorders*, 7:3, 433–443.
- Strain, P. S. and Bovey, E. H. (2011) Randomized, controlled trial of the LEAP model of early intervention for young children with autism spectrum disorders, in *Topics in Early Childhood Special Education*, 31:3, 133–154.
- Strain, P., Wilson, K. and Dunlap, G. (2011) Prevent–teach–reinforce: Addressing problem behaviors of students with autism in general education classrooms, in *Behavioral Disorders*, 36:3, 160–171,
- Strauss, K., Vicari, S., Valeri, G., D'Elia, L., Arima, S. and Fava, L. (2012) Parent inclusion in early intensive behavioral intervention: The influence of parental stress, parent treatment fidelity and parent-mediated generalization of behavior targets on child outcomes, in *Research in Developmental Disabilities*, 33:2, 688–703.
- Travis, J. and Geiger, M. (2010) The effectiveness of the Picture Exchange Communication System (PECS) for children with autism spectrum disorder (ASD): A South African pilot study, in *Child Language Teaching and Therapy*, 26:1, 39–59.
- Trembath, D., Balandin, S., Togher, L. and Stancliffe, R. J. (2009) Peer-mediated teaching and augmentative and alternative communication for preschool-aged children with autism, in *Journal of intellectual and developmental disability*, 34:2, 173–186.
- Trottier, N., Kamp, L. and Mirenda, P. (2011) Effects of peer-mediated instruction to teach use of speech-generating devices to students with autism in social game routines, in *Augmentative and alternative communication*, 27:1, 26–39.
- Van Rie, G. L. and Heflin, L. J. (2009) The effect of sensory activities on correct responding for children with autism spectrum disorders, in *Research in Autism Spectrum Disorders*, 3:3, 783–796.
- West, E. A. (2008) Effects of verbal cues versus pictorial cues on the transfer of stimulus control for children with autism, in *Focus on Autism and Other Developmental Disabilities*, 23:4, 229–241.
- Whalen, C., Moss, D., Ilan, A. B., Vaupel, M., Fielding, P. Macdonald, K. and Symon, J. (2010). Efficacy of TeachTown: Basics computer-assisted intervention for the Intensive Comprehensive Autism Program in Los Angeles Unified School District, in *Autism : the international journal of research and practice*, 14:3, 179–197.
- Wilson, K. P. (2013) Teaching social-communication skills to preschoolers with autism: Efficacy of video versus in vivo modeling in the classroom, in *Autism*, 43:8, 1819–1831.
- Wong, C. S. (2013). A play and joint attention intervention for teachers of young children with autism: A randomized controlled pilot study, in *Autism : The International Journal of Research and Practice*, 17:3, 340–57.

Appendix B: Studies not included as best evidence

Study	Quality of Evidence	Appropriateness of Evidence	Relevance of Evidence
Ali, E., MacFarland, S. and Umbreit, J. (2011) Tangible symbols with the Picture Exchange Communication System to teach requesting skills to children with multiple disabilities including visual impairment, in <i>Education and Training in Autism and Developmental Disabilities</i> , 46:3, 425–435.	1	3	2
Asaro-Saddler, K. and Bak, N. (2012) Teaching children with high-functioning autism spectrum disorders to write persuasive essays, in <i>Topics in Language Disorders</i> , 32:4, 361–378.	1	3	2
Åsberg, J. and Sandberg, A. D. (2010). Discourse comprehension intervention for high-functioning students with autism spectrum disorders: Preliminary findings from a school-based study, in <i>Journal of Research in Special Educational Needs</i> , 10:2, 91–98.	1	2	3
Ayres, K., Maguire, A. and McClimon, D. (2009) Acquisition and generalization of chained tasks taught with computer based video instruction to children with autism, in <i>Education and Training in Developmental Disabilities</i> , 44:4, 493–508.	1	2	2
Banda, D. R., Hart, S. L. and Liu-Gitz, L. (2010) Impact of training peers and children with autism on social skills during center time activities in inclusive classrooms, in <i>Research in Autism Spectrum Disorders</i> , 4:4, 619–625.	1	3	2
Bartolotta, T. E. and Remshifski, P. a. (2012). Coaching communication partners: A preliminary investigation of communication intervention during mealtime in Rett syndrome, in <i>Communication Disorders Quarterly</i> , 34:3, 162–171.	1	2	2
Blair, K.-S. C., Lee, I.-S., Cho, S.-J. and Dunlap, G. (2010) Positive behavior support through family-school collaboration for young children with autism, in <i>Topics in Early Childhood Special Education</i> , 31:1, 22–36.	1	2	2
Blakeley-Smith, A., Carr, E. G., Cale, S. I. and Owen-DeSchryver, J. S. (2009) Environmental fit: A model for assessing and treating problem behavior associated with curricular difficulties in children with autism spectrum disorders, in <i>Focus on Autism and Other Developmental Disabilities</i> , 24:3, 131–145.	1	2	2
Buggey, T. (2012) Effectiveness of video self-modeling to promote social initiations by 3-year-olds with autism spectrum disorders, in <i>Focus on Autism and Other Developmental Disabilities</i> , 27:2, 102–110.	2	2	1
Buggey, T., Hoomes, G., Sherberger, M. E. and Williams, S. (2011) Facilitating social initiations of preschoolers with autism spectrum disorders using video self-modeling, in <i>Focus on Autism and Other Developmental Disabilities</i> , 26:1, 25–36.	1	3	2
Carnahan, C., Basham, J. and Musti-Rao, S. (2009) A low-technology strategy for increasing engagement of students with autism and significant learning needs, in <i>Exceptionality</i> , 17:2, 76–87.	2	1	2

Study	Quality of Evidence	Appropriateness of Evidence	Relevance of Evidence
Cihak, D. F. and Foust, J. L. (2008). Comparing number lines and touch points to teach addition facts to students with autism, in <i>Focus on Autism and Other Developmental Disabilities</i> , 23:3, 131–137.	2	1	3
Cihak, David F., and Grim, J. (2008) Teaching students with autism spectrum disorder and moderate intellectual disabilities to use counting-on strategies to enhance independent purchasing skills, in <i>Research in Autism Spectrum Disorders</i> , 2:4, 716–727.	1	2	2
Cox, A. L., Gast, D. L., Luscre, D. and Ayres, K. M. (2008) The effects of weighted vests on appropriate in-seat behaviors of elementary-age students with autism and severe to profound intellectual disabilities, in <i>Focus on Autism and Other Developmental Disabilities</i> , 24:1, 17–26.	2	3	1
Delmolino, L., Hansford, A. P., Bamond, M. J., Fiske, K. E. and LaRue, R. H. (2013) The use of instructive feedback for teaching language skills to children with autism, in <i>Research in Autism Spectrum Disorders</i> , 7:6, 648–661.	2	3	1
Dorminy, K., Luscre, D., and Gast, D. (2009). Teaching organizational skills to children with high functioning autism and Asperger’s syndrome, in <i>Education and Training in Developmental Disabilities</i> , 44:4, 538–550.	1	2	2
Ducharme, J. M. and Ng, O. (2012). Errorless academic compliance training: A school-based application for young students with autism, in <i>Behavior modification</i> , 36:5, 650–669.	1	1	2
Dykstra, J. R., Boyd, B. A, Watson, L. R., Crais, E. R. and Baranek, G. T. (2012). The impact of the Advancing Social-communication And Play (ASAP) intervention on preschoolers with autism spectrum disorder, in <i>Autism : The International Journal of Research and Practice</i> , 16:1, 27–44.	2	1	2
Eikeseth, S., Klintwall, L., Jahr, E., and Karlsson, P. (2012) Outcome for children with autism receiving early and intensive behavioral intervention in mainstream preschool and kindergarten settings, in <i>Research in Autism Spectrum Disorders</i> , 6:2, 829–835.	2	1	3
Epp, K. (2008) Outcome-based evaluation of a social skills program using art therapy and group therapy for children on the autism spectrum, in <i>Children and Schools</i> , 30:1, 27–36, retrieved from http://cs.oxfordjournals.org/content/30/1/27.short .	1	1	2
Flores, Margaret, Musgrove, K., Renner, S., Hinton, V., Strozier, S., Franklin, S. and Hil, D. (2012) A comparison of communication using the Apple iPad and a picture-based system, in <i>Augmentative and alternative communication</i> , 28:2, 74–84.	2	3	1
Fujii, C., Renno, P., McLeod, B. D., Lin, C. E., Decker, K., Zielinski, K. and Wood, J. J. (2012) Intensive cognitive behavioural therapy for anxiety disorders in school-aged children with autism: A preliminary comparison with treatment-as-usual, in <i>School Mental Health</i> , 1–26.	2	1	3

Study	Quality of Evidence	Appropriateness of Evidence	Relevance of Evidence
Ganz, J. B., Bourgeois, B. C., Flores, M. M. and Campos, B. A. (2008) Implementing visually cued imitation training with children with autism spectrum disorders and developmental delays, in <i>Journal of Positive Behavior Interventions</i> , 10:1, 56–66.	1	3	2
Ganz, Jennifer B., Heath, A. K., Davis, J. L. and Vannest, K. J. (2013) Effects of a self-monitoring device on socially relevant behaviors in adolescents with Asperger disorder: A pilot study, in <i>Assistive Technology</i> , 25:3, 149–157.	1	2	2
Gianoumis, S., Sieverling, L. and Sturmney, P. (2012) The effects of behavior skills training on correct teacher implementation of natural language paradigm teaching skills and child behaviour, in <i>Behavioral Interventions</i> , 74, 57–74.	1	2	2
Green, J., Charman, T., McConachie, H., Aldred, C., Slonims, V., Howlin, P. and Pickles, A. (2010) Parent-mediated communication-focused treatment in children with autism (PACT): A randomised controlled trial, in <i>Lancet</i> , 375:9732, 2152–2160.	3	3	1
Grindle, C., Hughes, J. C., Saville, M., Huxley, K. and Hastings, R. (2013) Teaching early reading skills to children with autism using Mimiosprout Early Reading, in <i>Behavioral Interventions</i> .	1	3	2
Gutman, S. A, Raphael, E. I., Ceder, L. M., Khan, A., Timp, K. M. and Salvant, S. (2010) The effect of a motor-based, social skills intervention for adolescents with high-functioning autism: Two single-subject design cases, in <i>Occupational therapy international</i> , 17:4, 188–197.	1	3	2
Harjusola-Webb, S. M. and Robbins, S. H. (2011) The Effects of teacher-implemented naturalistic intervention on the communication of preschoolers with autism, in <i>Topics in Early Childhood Special Education</i> , 32:2, 99–110.	1	3	2
Hawkins, E., Kingsdorf, S., Charnock, J., Szabo, M., Middleton, E., Phillips, J. and Gautreaux, G. (2011) Using behaviour contracts to decrease antisocial behaviour in four boys with an autistic spectrum disorder at home and at school, in <i>British Journal of Special Education</i> , 38:4, 201–208.	1	2	2
Hayward, D., Eikeseth, S., Gale, C. and Morgan, S. (2009) Assessing progress during treatment for young children with autism receiving intensive behavioural interventions, in <i>Autism</i> , 13:6, 613–633.	2	3	1
Herbrecht, E., Poustka, F., Birnkammer, S., Duketis, E., Schlitt, S., Schmötzer, G. and Bölte, S. (2009) Pilot evaluation of the Frankfurt Social Skills Training for children and adolescents with autism spectrum disorder, in <i>European Child and Adolescent Psychiatry</i> , 18:6, 327–335.	1	1	2
Hoch, H., Taylor, B. A and Rodriguez, A. (2009) Teaching teenagers with autism to answer cell phones and seek assistance when lost, in <i>Behavior analysis in practice</i> , 2:1, 14–20.	1	1	2
Hodgetts, S., Magill-Evans, J. and Misiaszek, J. (2011) Effects of weighted vests on classroom behavior for children with autism and cognitive impairments, in <i>Research in Autism Spectrum Disorders</i> , 5:1, 495–505.	2	1	3

Study	Quality of Evidence	Appropriateness of Evidence	Relevance of Evidence
Hume, K., Plavnick, J. and Odom, S. L. (2012) Promoting task accuracy and independence in students with autism across educational setting through the use of individual work systems, in <i>Journal of autism and developmental disorders</i> , 42, 2084–2099.	1	2	2
Ingvarsson, E. T. and Hollobaugh, T. (2010) Acquisition of intraverbal behavior: Teaching children with autism to mand for answers to questions, in <i>Journal of Applied Behavior Analysis</i> , 43:1, 1–17.	1	2	2
Johnson, J. W., Blood, E., Freeman, A. and Simmons, K. (2013) Evaluating the effectiveness of teacher-implemented video prompting on an iPod Touch to teach food-preparation skills to high school students with autism spectrum disorders, in <i>Focus on Autism and Other Developmental Disabilities</i> , 28:3, 147–158.	1	2	2
Jull, S., and Mirenda, P. (2010) Parents as play date facilitators for preschoolers with autism, in <i>Journal of Positive Behavior Interventions</i> , 13:1, 17–30.	2	1	2
Kagohara, D. M., Achmadi, D., Meer, L., Lancioni, G. E., O'Reilly, M. F., Lang, R. and Sigafos, J. (2012) Teaching two students with Asperger syndrome to greet adults using Social Stories™ and video modeling, in <i>Journal of Developmental and Physical Disabilities</i> , 25:2, 241–251.	1	3	1
Kemp, S., Petriwskyj, A., Shakespeare-Finch, J. and Thorpe, K. (2013) What if you're really different? Case studies of children with high functioning autism participating in the Get REAL programme who had atypical learning trajectories, in <i>European Journal of Special Needs Education</i> , 28:1, 91–108.	1	2	1
Kempe, A., and Tissot, C. (2012) The use of drama to teach social skills in a special school setting for students with autism, in <i>Support for Learning</i> , 27:3, 97–102. x	1	1	2
Kossyvaki, L., Jones, G. and Guldberg, K. (2012) The effect of adult interactive style on the spontaneous communication of young children with autism at school, in <i>British Journal of Special Education</i> , 39:4, 173–184.	1	2	2
Kurt, O. and Parsons, C. (2009). Improving classroom learning: The effectiveness of time delay within the TEACCH approach, in <i>International Journal of Special Education</i> , 24:3, 173–185.	1	2	3
Kurt, O. and Tekin-Iftar, E. (2008). A comparison of constant time delay and simultaneous prompting within embedded instruction on teaching leisure skills to children with autism, in <i>Topics in Early Childhood Special Education</i> , 28:1, 53–64.	2	1	2
Lal, R. (2010) Effect of alternative and augmentative communication on language and social behavior of children with autism, in <i>Educational Research and Reviews</i> , 5:3, 119–125.	1	1	2
Lawton, K. and Kasari, C. (2012) Teacher-implemented joint attention intervention: Pilot randomized controlled study for preschoolers with autism, in <i>Journal of Consulting and clinical psychology</i> , 80:4, 687–693.	2	1	3

Study	Quality of Evidence	Appropriateness of Evidence	Relevance of Evidence
Ledford, J. R., Gast, D. L., Luscre, D. and Ayres, K. M. (2008) Observational and incidental learning by children with autism during small group instruction, in <i>Journal of Autism and Developmental Disorders</i> , 38:1, 86–103.	1	2	2
Legge, D., DeBar, R. and Alber-Morgan, S. (2010) The effects of self-monitoring with a MotivAider on the on-task behavior of fifth and sixth graders with autism and other disabilities, in <i>Journal of Behavior Assessment</i> , 1:1, 43–52.	1	2	2
Liber, D. B., Frea, W. D. and Symon, J. B. G. (2008) Using time-delay to improve social play skills with peers for children with autism, in <i>Journal of Autism and Developmental Disorders</i> , 38:2, 312–323.	1	3	2
MacDonald, R., Sacramone, S., Mansfield, R., Wiltz, K. and Ahearn, W. H. (2009) Using video modeling to teach reciprocal pretend play to children with autism, in <i>Journal of Applied Behavior Analysis</i> , 42:1, 43–55.	1	2	2
Machalicek, W., Shogren, K., Lang, R., Rispoli, M., O'Reilly, M. F., Franco, J. H. and Sigafoos, J. (2009) Increasing play and decreasing the challenging behavior of children with autism during recess with activity schedules and task correspondence training, in <i>Research in Autism Spectrum Disorders</i> , 3:2, 547–555.	1	2	2
McGaha, Mays, N. and Heflin, L. J. (2011) Increasing independence in self-care tasks for children with autism using self-operated auditory prompts, in <i>Research in Autism Spectrum Disorders</i> , 5(4), 1351–1357.	1	2	2
Mechling, L. C. and Savidge, E. J. (2011). Using a Personal Digital Assistant to increase completion of novel tasks and independent transitioning by students with autism spectrum disorder, in <i>Journal of autism and developmental disorders</i> , 41:6, 687–704.	2	1	3
Medhurst, B. and Clay, D. (2008) The Thomas Outreach Project (TOP): An early years intervention for children with an autistic spectrum disorder (ASD), <i>Educational Psychology in Practice</i> , 24:1, 69–78.	1	1	2
Mims, P., Lee, A., Browder, D., Zakas, T. and Flynn, S. (2012) Effects of a treatment package to facilitate English/language arts learning for middle school students with moderate to severe disabilities, in <i>Education and Training in Autism and Developmental Disabilities</i> , 47:4, 414–425.	1	2	2
Mintz, J., Branch, C., March, C. and Lerman, S. (2012). Key factors mediating the use of a mobile technology tool designed to develop social and life skills in children with autistic spectrum disorders, in <i>Computers and Education</i> , 58:1, 53–62.	1	1	1
Nicholson, H., Kehle, T., Bray, M. and Van Heest, J. (2011) The effects of antecedent physical activity on the academic engagement of children with autism spectrum disorder, in <i>Psychology in the Schools</i> , 48:2, 198–213.	1	2	2
Nuernberger, J. E., Ringdahl, J. E., Vargo, K. K., Crumpecker, A. C. and Gunnarsson, K. F. (2013) Using a behavioral skills training package to teach conversation skills to young adults with autism spectrum disorders, in <i>Research in Autism Spectrum Disorders</i> , 7:2, 411–417.	1	2	2

Study	Quality of Evidence	Appropriateness of Evidence	Relevance of Evidence
O'Neill, J., Bergstrand, L., Bowman, K., Elliot, K., Mavin, L., Stephenson, S. and Wayman, C. (2010) The SCERTS model: Implementation and evaluation in a primary special school, in <i>Good Autism Practice</i> , 11:1, 7–15.	1	1	2
Okada, S., Ohtake, Y. and Yanagihara, M. (2008) Effects of perspective sentences in social stories TM on improving the adaptive behaviors of students with autism spectrum disorders and related disabilities, in <i>Education and training in Developmental Disabilities</i> , 43:1, 46–60.	2	1	2
Owen-DeSchryver, J. S., Carr, E. G., Cale, S. I. and Blakeley-Smith, A. (2008) Promoting social interactions between students with autism spectrum disorders and their peers in inclusive school settings, in <i>Focus on Autism and Other Developmental Disabilities</i> , 23:1, 15–28.	1	3	2
Ozdemir, S. (2008) The effectiveness of social stories on decreasing disruptive behaviors of children with autism: Three case studies, in <i>Journal of Autism and Developmental Disorders</i> , 38:9, 1689–1696.	1	2	2
Pennington, R. C., Ault, M. J., Schuster, J. W. and Sanders, A. (2010). Using simultaneous prompting and computer-assisted instruction to teach story-writing to students with autism, in <i>Assistive Technology Outcomes and Benefits</i> , 7:1, 24–38.	1	2	2
Plavnick, J. B. and Ferreri, S. J. (2011) Establishing verbal repertoires in children with autism using function-based video modelling, in <i>Journal of applied behavior analysis</i> , 44:4, 747–766.	2	1	2
Probst, P. and Leppert, T. (2008) Brief report: Outcomes of a teacher training program for autism spectrum disorders, in <i>Journal of Autism and Developmental Disorders</i> , 38:9, 1791–1796.	1	2	2
Rispoli, Mandy, Lang, R., Neely, L., Camargo, S., Hutchins, N., Davenport, K. and Goodwyn, F. (2013) A comparison of within- and across-activity choices for reducing challenging behavior in children with autism spectrum disorders, in <i>Journal of Behavioral Education</i> , 22, 66–83.	2	1	2
Rispoli, Mandy, O'Reilly, M., Lang, R., Machalicek, W., Davis, T., Lancioni, G. and Sigafoos, J. (2011). Effects of motivating operations on problem and academic behavior in classrooms, in <i>Journal of Applied Behavior Analysis</i> , 44:1, 187–92.	1	2	3
Rispoli, M. J., O'Reilly, M. and Sigafoos, J. (2011) Effects of pre-session satiation on challenging behavior and academic engagement for children with autism during classroom instruction, in <i>Education and Training in Autism and Developmental Disabilities</i> , 46:4, 607–618.	2	1	2
Robinson, S. (2008) Using a strategy of "structured conversation" to enhance the quality of tutorial time, in <i>Journal of Further and Higher Education</i> , 32:1, 59–69.	1	1	2
Robinson, S. E. (2011) Teaching paraprofessionals of students with autism to implement pivotal response treatment in inclusive school settings using a brief video feedback training package, in <i>Focus on Autism and Other Developmental Disabilities</i> , 26:2, 105–118.	1	3	2

Study	Quality of Evidence	Appropriateness of Evidence	Relevance of Evidence
Ryan, C. S., Hemmes, N. S., Sturmey, P., Jacobs, J. D. and Grommet, E. K. (2008) Effects of a brief staff training procedure on instructors' use of incidental teaching and students' frequency of initiation toward instructors, in <i>Research in Autism Spectrum Disorders</i> , 2:1, 28–45.	1	1	3
Sansosti, F. J., and Powell-Smith, K. A. (2008) Using Computer-presented social stories and video models to increase the social communication skills of children with high-functioning autism spectrum disorders, in <i>Journal of Positive Behavior Interventions</i> , 10:3, 162–178.	1	2	2
Sarokoff, R. A. and Sturmey, P. (2008) The effects of instructions, rehearsal, modeling, and feedback on acquisition and generalization of staff use of discrete trial teaching and student correct responses, in <i>Research in Autism Spectrum Disorders</i> , 2:1, 125-136.	1	1	2
Schafer, E. C., Mathews, L., Mehta, S., Hill, M., Munoz, A., Bishop, R. and Moloney, M. (2013). Personal FM systems for children with autism spectrum disorders (ASD) and/or attention-deficit hyperactivity disorder (ADHD): An initial investigation, in <i>Journal of Communication Disorders</i> , 46:1, 30–52.	1	2	3
Schmidt, C. and Stichter, J. P. (2012) The use of peer-mediated interventions to promote the generalization of social competence for adolescents with high-functioning autism and Asperger's syndrome, in <i>Exceptionality</i> , 20:2, 94–113.	1	3	2
Schneider, A. B., Coddling, R. S. and Tryon, G. S. (2013) Comparing and combining accommodation and remediation interventions to improve the written-language performance of children with Asperger syndrome, in <i>Focus on Autism and Other Developmental Disabilities</i> , 28:2, 101–114.	2	1	2
Schneider, N. and Goldstein, H. (2009). Using Social Stories and visual schedules to improve socially appropriate behaviors in children with autism, in <i>Journal of Positive Behavior Interventions</i> , 12:3, 149–160.	1	3	2
Seiverling, L., Pantelides, M., Ruiz, H. and Sturmey, P. (2010) The effect of behavioral skills training with general-case training on staff chaining of child vocalizations within natural language paradigm, in <i>Behavioral Interventions</i> , 25, 53–75.	1	1	2
Silva, L. M. T., Schalock, M. and Gabrielsen, K. (2011) Early intervention for autism with a parent-delivered qigong massage program: A randomized controlled trial, in <i>American Journal of Occupational Therapy</i> , 65:5, 550–559.	3	1	3
Stagnitti, K., O'Connor, C. and Sheppard, L. (2012) Impact of the Learn to Play program on play, social competence and language for children aged 5-8 years who attend a specialist school, in <i>Australian occupational therapy journal</i> , 59:4, 302–311.	1	3	2
Stichter, J. P., O'Connor, K. V., Herzog, M. J., Lierheimer, K. and McGhee, S. D. (2012). Social competence intervention for elementary students with Asperger's syndrome and high functioning autism, in <i>Journal of Autism and Developmental Disorders</i> , 42:3, 354–366.	1	3	2

Study	Quality of Evidence	Appropriateness of Evidence	Relevance of Evidence
Stichter, J., Randolph, J., Kay, D., and Gage, N. (2009) The use of structural analysis to develop antecedent-based interventions for students with autism, in <i>Journal of Autism and Developmental Disorders</i> , 39, 883–896.	1	3	2
Stringfield, S. G., Luscre, D. and Gast, D. L. (2011) Effects of a story map on accelerated reader postreading test scores in students with high-functioning autism, in <i>Focus on Autism and Other Developmental Disabilities</i> , 26:4, 218–229.	1	2	2
Thompson, R. M., and Johnston, S. (2013) Use of social stories to improve self-regulation in children with autism spectrum disorders, in Physical and Occupational Therapy in Pediatrics , 33:3, 271–284.	1	3	2
Toelken, S. and Miltenberger, R. (2009) Increasing independence among children diagnosed with autism using a brief embedded teaching strategy, in <i>Behavioral Interventions</i> , 27, 93–104.	1	2	2
Tyminski, R. F. and Moore, P. J. (2008) The impact of group psychotherapy on social development in children with pervasive developmental disorders, in <i>International journal of group psychotherapy</i> , 58:3, 363–379.	1	1	2
Vivanti, G., Dissanayake, C., Zierhut, C. and Rogers, S. J. (2013) Brief report: predictors of outcomes in the early start denver model delivered in a group setting, in <i>Journal of Autism and Developmental Disorders</i> , 43, 1717–1724.	1	2	2
Waddington, E. M. and Reed, P. (2009) The impact of using the “Preschool Inventory of Repertoires for Kindergarten” (PIRK®) on school outcomes of children with Autistic Spectrum Disorders, in <i>Research in Autism Spectrum Disorders</i> , 3:3, 809–827.	2	1	3
White, S. W., Koenig, K. and Scahill, L. (2010) Group social skills instruction for adolescents with high-functioning autism spectrum disorders, in <i>Focus on Autism and Other Developmental Disabilities</i> , 25:4, 209–219.	1	2	2
Williamson, R. L., Casey, L. B., Robertson, J. S. and Buggie, T. (2013). Video self-modeling in children with autism: A pilot study validating prerequisite skills and extending the utilization of VSM across skill sets, in <i>Assistive Technology</i> , 25:2, 63–71.	1	3	2
Yakubova, G. and Taber-Doughty, T. (2013) Brief report: Learning via the electronic interactive whiteboard for two students with autism and a student with moderate intellectual disability, in <i>Journal of Autism and Developmental Disorders</i> , 43:6, 1465–1472.	1	1	2

Appendix C: Studies excluded through the application of inclusion/exclusion criteria

Excluded, EC1 – Includes one or no children/young people with ASD

Adams, C., Lockton, E., Freed, J., Gaile, J., Earl, G., McBean, K. et al. (2012) The Social Communication Intervention Project: A randomized controlled trial of the effectiveness of speech and language therapy for school-age children who have pragmatic and social communication problems with or without autism spectrum disorder, in *International Journal of Language and Communication Disorders*, 47:3, 233–244.

Allen, J. R. and Kinsey, K. (2013) Teaching theory of mind, in *Early Education and Development*, 24:6, 865–876.

Allison, J., Wilder, D. A., Chong, I., Lugo, A., Pike, J. and Rudy, N. (2012) A comparison of differential reinforcement and noncontingent reinforcement to treat food selectivity in a child with autism, in *Journal of Applied Behavior Analysis*, 45:3, 613–617.

Angell, M. E., Nicholson, J. K., Watts, E. H. and Blum, C. (2011) Using a multicomponent adapted power card strategy to decrease latency during interactivity transitions for three children with developmental disabilities, in *Focus on Autism and Other Developmental Disabilities*, 26:4, 206–217.

Angermeier, K., Schooley, K., Harasymowycz, U. and Schlosser, R. W. (2010) The role of finger-spelled self-cues during spelling with a speech generating device by a child with autism: A brief report, in *Journal of Developmental and Physical Disabilities*, 22:2, 197–200.

Argyropoulou, Z., and Papoudi, D. (2012) The training of a child with autism in a Greek preschool inclusive class through intensive interaction: A case study, in *European Journal of Special Needs Education*, 27:1, 99–114.

Arunothong, W. and Waewsawangwong, S. (2012) An evaluation study of parent management training (PMT) program in Northern Thai, in *AESN Journal of Psychiatry*, 13:1.

Banda, D. and Kubina, R. M. (2009) Increasing academic compliance with mathematics tasks using the high-preference strategy with a student with autism, in *Preventing School Failure: Alternative Education for Children and Youth*, 54:2, 81–85.

Barber, M. (2008) Using intensive interaction to add to the palette of interactive possibilities in teacher–pupil communication, in *European Journal of Special Needs Education*, 23:4, 393–402.

Barton, E. E., Reichow, B., Wolery, M. and Chen, C.-I. (2011) We can all participate! Adapting Circle time for children with autism, in *Young Exceptional Children*, 14:2, 2–21.

Batchelder, A., McLaughlin, T. F., Weber, K. P., Derby, K. M. and Gow, T. (2009) The effects of hand-over-hand and a dot-to-dot tracing procedure on teaching an autistic student to write his name, in *Journal of Developmental and Physical Disabilities*, 21:2, 131–138.

Beamish, W., Meadows, D. and Davies, M. (2010) Benchmarking teacher practice in queensland transition programs for youth with intellectual disability and autism, in *The Journal of Special Education*, 45:4, 227–241.

Benish, T. M. and Bramlett, R. K. (2011) Using social stories to decrease aggression and increase positive peer interactions in normally developing pre-school children, in *Educational Psychology in Practice*, 27:1, 1–17.

Bennett, K., Reichow, B. and Wolery, M. (2011) Effects of structured teaching on the behavior of young children with disabilities, in *Focus on Autism and Other Developmental Disabilities*, 26:3, 143–152.

- Blankenship, K. and Minshawi, N. (2010) Behavioral therapy with an individual with asperger's disorder, *Psychiatry*, 7:8, 38–41.
- Callahan, K., Henson, R. K. and Cowan, A. K. (2008) Social validation of evidence-based practices in autism by parents, teachers and administrators, in *Journal of Autism and Developmental Disorders*, 38:4, 678–692.
- Cao, H., Shan, W., Xu, Y. and Xu, R. (2013) Eastern sandplay as a safe container for a combined intervention for a child with Asperger syndrome: A case study, in *The Arts in Psychotherapy*, 40, 134–142.
- Cardon, T. A., Wilcox, M. J. and Campbell, P. H. (2011) Caregiver perspectives about assistive technology use with their young children with autism spectrum disorders, in *Infants and Young Children*, 24:2, 153–173.
- Chezan, L. C., Drasgow, E. and Marshall, K. J. (2012) A report on using general-case programming to teach collateral academic skills to a student in a postsecondary setting, *Focus on Autism and Other Developmental Disabilities*, 27:1, 22–30.
- Cimera, R. E., Wehman, P., West, M., and Burgess, S. (2012) Do sheltered workshops enhance employment outcomes for adults with autism spectrum disorder? in *Autism : The International Journal of Research and Practice*, 16:1, 87–94.
- Ciullo, S., SoRelle, D., Kim, S. a., Seo, Y. J. and Bryant, B. R. (2011) Monitoring student response to mathematics intervention: Using data to inform tier 3 intervention, in *Intervention in School and Clinic*, 47:2, 120–124.
- Clubb, M. (2012) An evaluation of EarlyBird and EarlyBird Plus over seven years: the benefits of parents and school staff being trained together, *Good Autism Practice (GAP)*, 13:1, 69–77.
- Coman, D., Alessandri, M., Gutierrez, A., Novotny, S., Boyd, B., Hume, K. et al (2013) Commitment to classroom model philosophy and burnout symptoms among high fidelity teachers implementing preschool programs for children with autism spectrum disorders, in *Journal of Autism and Developmental Disorders*, 43:2, 345–360.
- Devlin, S., Leader, G., and Healy, O. (2009) Comparison of behavioral intervention and sensory-integration therapy in the treatment of self-injurious behavior, in *Research in Autism Spectrum Disorders*, 3:1, 223–231.
- Dillenburger, K., Keenan, M., Doherty, A., Byrne, T. and Gallagher, S. (2012) ABA-Based programs for children diagnosed with autism spectrum disorder: parental and professional experiences at school and at home, in *Child and Family Behavior Therapy*, 34:2, 111–129.
- Dionne, M., and Martini, R. (2011) Floor time play with a child with autism: A single-subject study, in *Canadian Journal of Occupational Therapy*, 78:3, 196–203.
- Dobson, P. and Abbotts, N. (2008) How puppetry helps pupils on the autism spectrum, in *Good Autism Practice*, 9:2, 26–31.
- Dogoe, M., Banda, D., Lock, R. and Feinstein, R. (2011) Teaching generalized reading of product warning labels to young adults with autism using the constant time delay procedure, in *Education and Training in Autism and Developmental Disabilities*, 46:2, 204–213.
- Donnelly, J. L., Luyben, P. D. and Zan, C. S. (2009) Increasing eye contact toward learning materials in a toddler with autism, *Journal of Prevention and Intervention in the Community*, 37:3, 170–176.
- Donohue, M., Casey, L. B., Bicard, D. and Bicard, S. (2012) Effects of differential reinforcement of short latencies on response latency, task completion and accuracy of an adolescent with autism, in *Education in Training in Autism and Developmental Disabilities*, 47:1, 97–108.

- Downs, R. and Downs, A. (2010) Practices in early intervention for children with autism: A comparison with the National Research Council recommended practices, in *Education and Training in Autism and Developmental Disabilities*, 45:1, 150–159.
- Dunkel-Jackson, S. M., Dixon, M. R. and Szekely, S. (2012) Portable data assistants: Potential in evidence-based practice autism treatment, in *Research in Autism Spectrum Disorders*, 6:1, 65–72.
- Elkis-Abuhoff, D. L. (2008) Art therapy applied to an adolescent with Asperger's syndrome, in *The Arts in Psychotherapy*, 35:4, 262–270.
- Fava, L. and Strauss, K. (2011) Cross-setting complementary staff- and parent-mediated Early Intensive Behavioral Intervention for young children with autism: A research-based comprehensive approach, in *Research in Autism Spectrum Disorders*, 5:1, 512–522.
- Fazio, D., Martin, G. L., Arnal, L. and Yu, D. C. T. (2009) Instructing university students to conduct discrete-trials teaching with children with autism, in *Research in Autism Spectrum Disorders*, 3:1, 57–66.
- Finnigan, E. and Starr, E. (2010) Increasing social responsiveness in a child with autism. A comparison of music and non-music interventions, in *Autism*, 14:4, 321–348.
- Fischer-Terworth, C. and Probst, P. (2011) Evaluation of a TEACCH- and music therapy-based psychological intervention in mild to moderate dementia, in *GeroPsych*, 24:2, 93–101.
- Franco, J. H., Lang, R. L., O'Reilly, M. F., Chan, J. M., Sigafoos, J. and Rispoli, M. (2009) Functional analysis and treatment of inappropriate vocalizations using a speech-generating device for a child with autism, in *Focus on Autism and Other Developmental Disabilities*, 24:3, 146–155.
- Ganz, J. B., Heath, A. K., Lund, E. M., Camargo, S. P. H., Rispoli, M. J., Boles, M. and Plaisance, L. (2012) Effects of peer-mediated implementation of visual scripts in middle school, in *Behavior Modification*, 36:3, 378–398.
- Ganz, J. B., Heath, A. K., Rispoli, M. J. and Earles-Vollrath, T. L. (2009) Impact of AAC Versus verbal modeling on verbal imitation, picture discrimination and related speech: A pilot investigation, in *Journal of Developmental and Physical Disabilities*, 22:2, 179–196.
- Ganz, J. B., Sigafoos, J., Simpson, R. L. and Cook, K. E. (2008) Generalization of a pictorial alternative communication system across instructors and distance, in *Augmentative and Alternative Communication*, 24:2, 89–99.
- Ganz, J., Simpson, R. and Lund, E. (2012) The picture exchange communication system (PECS): A promising method for improving communication skills of learners with autism spectrum disorders, in *Education and Training in Autism and Developmental Disabilities*, 47:2, 176–186.
- Garland, K., Vasquez, E., Pearl, C. and Ng, V. (2012) Efficacy of individualized clinical coaching in a virtual reality classroom for increasing teachers' fidelity of implementation of discrete trial teaching, in *Education and Training in Autism and Developmental Disabilities*, 47:4, 502–515.
- Gibson, J. L., Pennington, R. C., Stenhoff, D. M. and Hopper, J. S. (2009) Using desktop videoconferencing to deliver interventions to a preschool student with autism, in *Topics in Early Childhood Special Education*, 29:4, 214–225.
- Gilboa, A. and Ben-Shetrit, S. (2009) Sowing seeds of compassion: The case of a music therapy integration group, in *The Arts in Psychotherapy*, 36:4, 251–260.

- Gilchrist, B. (2012) How can pupil voice inform planning and support for pupils in mainstream schools and what impact does it have on teachers' actions ? in *Good Autism Practice*, 13:2, 48–61.
- Gomi, Y. and Noro, F. (2010) Function-based interventions for behavior problems of a student with a developmental disability: School-based treatment implementation, in *Japanese Journal of Special Education*, 47:6, 457–469.
- Gongola, L. and Sweeney, J. (2011) Discrete trial teaching: Getting started, in *Intervention in School and Clinic*, 47:3, 183–190.
- Grenier, M., and Yeaton, P. (2011) Previewing: A successful strategy for students with autism, in *Journal of Physical Education, Recreation and Dance*, 82:1, 28–43.
- Hagopian, L. P., Kuhn, D. E. and Strother, G. E. (2009) Targeting social skills deficits in an adolescent with pervasive developmental disorder, in *Journal of Applied Behavior Analysis*, 42:4, 907–911.
- Hagopian, L. and Toole, L. (2009) Effects of response blocking and competing stimuli on stereotypic behavior, in *Behavioral Interventions*, 24, 117–125.
- Haley, J. L., Heick, P. F. and Luiselli, J. K. (2010) Use of an antecedent intervention to decrease vocal stereotypy of a student with autism in the general education classroom, in *Child and Family Behavior Therapy*, 32:4, 311–321.
- Hart, J. and Whalon, K. (2012) Using video self-modeling via iPads to increase academic responding of an adolescent with autism spectrum disorder and intellectual disability, in *Education and Training in Autism and Developmental Disabilities*, 47:4, 438–446.
- Heal, N. a, Hanley, G. P. and Layer, S. a. (2009) An evaluation of the relative efficacy of and children's preferences for teaching strategies that differ in amount of teacher directedness, in *Journal of Applied Behavior Analysis*, 42:1, 123–43.
- Hendricks, D. (2011) Special education teachers serving students with autism: A descriptive study of the characteristics and self-reported knowledge and practices employed, in *Journal of Vocational Rehabilitation*, 35, 37–50.
- Hillier, A. J., Fish, T., Siegel, J. H. and Beversdorf, D. Q. (2011) Social and Vocational skills training reduces self-reported anxiety and depression among young adults on the autism spectrum, in *Journal of Developmental and Physical Disabilities*, 23:3, 267–276.
- Howarth, I. (2011) Encouraging creativity in children with autism and severe learning difficulties using microphone-operated, interactive software in a playful context, in *Good Autism Practice*, 12:1, 52–63.
- Hua, Y., Hendrickson, J. M., Therrien, W. J., Woods-Groves, S., Ries, P. S. and Shaw, J. J. (2012) Effects of Combined reading and question generation on reading fluency and comprehension of three young adults with autism and intellectual disability, in *Focus on Autism and Other Developmental Disabilities*, 27:3, 135–146.
- Hughett, K., Kohler, F. W. and Raschke, D. (2011) The effects of a buddy skills package on preschool children's social interactions and play, in *Topics in Early Childhood Special Education*, 32:4, 246–254.
- Humphrey, N. (2008) Including pupils with autistic spectrum disorders in mainstream schools, in *Support for Learning*, 23:1, 41–47.
- Hung, L. and Smith, C. (2011) Autism in Taiwan: Using social stories to decrease disruptive behaviour, in *The British Journal of Developmental Disabilities*, 57:112, 71–80.

- Jansson, A. B. (2011) Becoming a narrator: A Case study in the dynamics of learning based on the theories/ methods of Vygotsky, in *Mind, Culture and Activity*, 18:1, 5–25.
- Jowett, E. L., Moore, D. W. and Anderson, A. (2012) Using an iPad-based video modelling package to teach numeracy skills to a child with an autism spectrum disorder, in *Developmental Neurorehabilitation*, 15:4, 304–312.
- Jurgens, A anderson, A. and Moore, D. W. (2009) The effect of teaching PECS to a child with autism on verbal behaviour, play and social functioning, *Behaviour Change*, 26:1, 66–81.
- Kagohara, D. M., van der Meer, L., Achmadi, D., Green, V. a., O’Reilly, M. F., Mulloy, A. et al. (2010) Behavioral intervention promotes successful use of an iPod-Based communication device by an adolescent with autism, in *Clinical Case Studies*, 9:5, 328–338.
- Kalmanson, B. (2009) Echoes in the nursery: Insights for treatment of early signs of autism in a baby sibling, in *Journal of Infant, Child and Adolescent Psychotherapy*, 8:1, 40–48.
- Kandalaft, M. R., Didehbani, N., Krawczyk, D. C., Allen, T. T. and Chapman, S. B. (2013) Virtual reality social cognition training for young adults with high-functioning autism, in *Journal of Autism and Developmental Disorders*, 43:1, 34–44.
- Kellems, R. and Morningstar, M. (2012) Using video modeling delivered through ipods to teach vocational tasks to young adults with autism spectrum disorders, in *Career Development and Transition for Exceptional Individuals*, 35:3, 155–167.
- Kelly, A. and Tincani, M. (2013) Collaborative training and practice among applied behavior analysts who support individuals with autism spectrum disorder, in *Education and Training in Autism and Developmental Disabilities*, 48:1, 120–131.
- Kleeberger, V. and Miranda, P. (2008) Teaching generalized imitation skills to a preschooler with autism using video modeling, in *Journal of Positive Behavior Interventions*, 12:2, 116–127.
- Knapp, V. M., Simmons, L., Verstraete, S. K. and McAdam, D. B. (2012) Assessment and Treatment of feeding-related problem behaviors of a 16-year-old girl with PDD-NOS: A school-based case study, in *Clinical Case Studies*, 11:4, 276–284.
- Kodak, T. and Clements, A. (2009) Acquisition of mands and tacts with concurrent echoic training, in *Journal of Applied Behavior Analysis*, 42:4, 839–843.
- Kodak, T., Fisher, W. W., Clements, A. and Bouxsein, K. J. (2011) Effects of computer-assisted instruction on correct responding and procedural integrity during early intensive behavioral intervention, in *Research in Autism Spectrum Disorders*, 5:1, 640–647.
- Kubina, R. M. and Yurich, K. K. L. (2009) Developing Behavioral fluency for students with autism: A guide for parents and teachers, in *Intervention in School and Clinic*, 44:3, 131–138.
- Lang, R., Davis, T., O’Reilly, M., Machalicek, W., Rispoli, M., Sigafoos, J. et al. (2010) Functional analysis and treatment of elopement across two school settings, in *Journal of Applied Behavior Analysis*, 43:1, 113–118.
- Lang, R., O’Reilly, M., Sigafoos, J., Lancioni, G. E., Machalicek, W., Rispoli, M., and White, P. (2009) Enhancing the effectiveness of a play intervention by abolishing the reinforcing value of stereotypy: a pilot study, in *Journal of Applied Behavior Analysis*, 42:4, 889–894. d

- Lang, R., Rispoli, M., Sigafoos, J., Lancioni, G. and Andrews, A. and Ortega, L. (2011) Effects of language of instruction on response accuracy and challenging behavior in a child with autism, in *Journal of Behavioral Education*, 20:4, 252–259.
- Lattimore, L. P., Parsons, M. B. and Reid, D. H. (2009) Rapid training of a community job skill to nonvocal adults with autism: An extension of intensive teaching, in *Behavior Analysis in Practice*, 2:1, 34–42.
- Leong, H. M., Stephenson, J. and Carter, M. (2011) The use of sensory integration therapy by intervention service providers in Malaysia, in *International Journal of Disability, Development and Education*, 58:4, 341–358.
- Lindstrom, J. H. (2013) Introduction to the special issue: Response to intervention within the context of specific learning disabilities, emotional disturbance, autism spectrum disorders and early childhood special education, in *Exceptionality*, 21:1, 1–4.
- Ling, C. Y. M. and Mak, W. W. S. (2012) Coping with challenging behaviours of children with autism: Effectiveness of brief training workshop for frontline staff in special education settings, in *Journal of Intellectual Disability Research*, 56:3, 258–269.
- Lo, Y. Y. and Cartledge, G. (2008) The effects of theory-of-mind and social skill training on the social competence of a sixth-grade student with autism, in *Journal of Positive Behavior Interventions*, 10:4, 228–242.
- Locke, J., Rotheram-Fuller, E. and Kasari, C. (2012) Exploring the social impact of being a typical peer model for included children with autism spectrum disorder, in *Journal of Autism and Developmental Disorders*, 42:9, 1895–1905.
- Lundqvist, L. O. andersson, G., and Viding, J. (2009) Effects of vibroacoustic music on challenging behaviors in individuals with autism and developmental disabilities, in *Research in Autism Spectrum Disorders*, 3:2, 390–400.
- Mace, F. C., Pratt, J. L., Prager, K. L. and Pritchard, D. (2011) An evaluation of three methods of saying “no” to avoid an escalating response class hierarchy, in *Journal of Applied Behavior Analysis*, 44:1, 83–94.
- Mak, C. and Zhang, K. C. (2013) Teachers’ perceptions of a community participation programme for preschoolers with autism, in *Emotional and Behavioural Difficulties*, 18:1, 102–117.
- Marshall, K. and Ferris, J. (2012) Utilising behavioural family therapy (BFT) to help support the system around a person with intellectual disability and complex mental health needs: a case study, in *Journal of Intellectual Disabilities*, 16:2, 109–118.
- Matson, J. L., LoVullo, S. V., Boisjoli, J. a. and Gonzalez, M. L. (2008), The behavioral treatment of an 11-year-old girl with autism and aggressive behaviors, in *Clinical Case Studies*, 7:4, 313–326.
- McCulloch, E. and Noonan, M. (2013) Impact of online training videos on the implementation of mand training by three elementary school paraprofessionals, in *Education and Training in Autism and Developmental Disabilities*, 48:1, 132–141.
- McDonald, J., Moore, D. W., and Anderson, A. (2012) Comparison of functional assessment methods targeting aggressive and stereotypic behaviour in a child with autism, in *The Australian Educational and Developmental Psychologist*, 29:1, 52–65.
- McDonnell, A., Sturmey, P., Oliver, C., Cunningham, J., Hayes, S., Galvin, M. et al. (2008) The effects of staff training on staff confidence and challenging behavior in services for people with autism spectrum disorders, in *Research in Autism Spectrum Disorders*, 2:2, 311–319.

- Mintz, J. (2008) Working with children with Asperger's syndrome in the mainstream classroom: A psychodynamic take from the chalk face, in *Psychodynamic Practice*, 14:2, 169–180.
- Nepo, K. (2010) The use of technology to improve staff performance, in *International Journal of Behavioral Consultation and Therapy*, 2:2, 134–141.
- Nosik, M. R., Williams, W. L., Garrido, N. and Lee, S. (2013) Comparison of computer based instruction to behavior skills training for teaching staff implementation of discrete-trial instruction with an adult with autism, in *Research in Developmental Disabilities*, 34:1, 461–468.
- O'Connor, A. and Prieto, J. (2011) A stimulus control procedure to decrease motor and vocal stereotypy, in *Behavioral Interventions*, 24:2, 231–242.
- O'Connor, E. (2009) The use of social story DVDs to reduce anxiety levels: A case study of a child with autism and learning disabilities, in *Support for Learning*, 24:3, 133–136.
- Oda, T. (2010) Tutoring an American autistic college student in Japanese and its challenges, in *Support for Learning*, 25:4, 165–171.
- Ohtake, Y., Wehmeyer, M., Uchida, N., Nakaya, A. and Yanagihara, M. (2010) Enabling a prelinguistic communicator with autism to use picture card as a strategy for repairing listener misunderstandings: A case study, in *Education and Training in Autism and Developmental Disabilities*, 45:3: 410–421.
- Okada, S., Ohtake, Y. and Yanagihara, M. (2010) Improving the manners of a student with autism: The effects of manipulating perspective holders in Social Stories™ – A pilot study, in *International Journal of Disability, Development and Education*, 57:2, 207–219.
- Ökcün, M. Ç. and Akçin, N. (2012) A description of a mother's play guidance for her child with autism in the process of playing by the rules, in *Journal of Research in Special Educational Needs*, 12:2, 96–106.
- Olive, M. L., Lang, R. B. and Davis, T. N. (2008) An analysis of the effects of functional communication and a voice output communication aid for a child with autism spectrum disorder, in *Research in Autism Spectrum Disorders*, 2:2, 223–236.
- Parker, N. and O'Brien, P. (2011) Play therapy – reaching the child with autism, in *International Journal of Special Education*, 26:1, 80–87.
- Parsons, M. B., Reid, D. H. and Lattimore, L. P. (2009) Increasing independence of adults with autism in community activities: A brief, embedded teaching strategy, in *Behavior Analysis in Practice*, 2:2, 40–48.
- Paul, R. (2010) Sally J. Rogers and Geraldine Dawson: Review of Early Start Denver Model for young children with autism: Promoting language, learning and engagement, in *Journal of Autism and Developmental Disorders*, 41:7, 978–980.
- Pelletier, K., McNamara, B., Braga-Kenyon, P. and Ahearn, W. (2010) Effect of video self-monitoring on procedural integrity, in *Behavioral Interventions*, 25, 261–274.
- Peterson, L., McLaughlin, T. F., Weber, K. P. and Anderson, H. (2008) The effects of model, lead and test technique with visual prompts paired with a fading procedure to teach "where" to a 13-year-old echolalic boy with autism, in *Journal of Developmental and Physical Disabilities*, 20:1, 31–39.
- Pizzo, B., Coyle, M., Seiverling, L. and Williams, K. (2012) Plate A–Plate B: Use of sequential presentation in the treatment of food selectivity, in *Behavioral Interventions*, 27, 175–184.

- Porter, N. (2012) Promotion of Pretend play for children with high-functioning autism through the use of circumscribed interests, in *Early Childhood Education Journal*, 40:3, 161–167.
- Probst, P., Jung, F., Micheel, J. and Glen, I. (2010) Tertiary-preventive interventions for autism spectrum disorders (ASD) in children and adults: An evaluative synthesis of two TEACCH based outcome studies, in *Life Span and Disability*, 12, 129–167.
- Rayner, C. S. (2010) Video-modelling to improve task completion in a child with autism, in *Developmental Neurorehabilitation*, 13:3, 225–230.
- Reed, D. D., Luiselli, J. K., Morizio, L. C., and Child, S. N. (2010) Sequential modification and the identification of instructional components occasioning self-injurious behavior, in *Child and Family Behavior Therapy*, 32:1, 1–16.
- Reichle, J., Dropik, P. L., Alden-Anderson, E. and Haley, T. (2008) Teaching a young child with autism to request assistance conditionally: A preliminary study, in *American Journal of Speech-Language Pathology*, 17:3, 231–240.
- Reynhout, G. and Carter, M. (2009) The use of Social Stories by teachers and their perceived efficacy, in *Research in Autism Spectrum Disorders*, 3:1, 232–251.
- Richter, S., and Test, D. (2011) Effects of multimedia social stories on knowledge of adult outcomes and opportunities among transition-aged youth with significant cognitive disabilities, in *Education and Training in Autism and Developmental Disabilities*, 46:3, 410–424.
- Robins, B., Dautenhahn, K., Ferrari, E., Kronreif, G., Prazak-Aram, B., Marti, P. et al. (2012) Scenarios of robot-assisted play for children with cognitive and physical disabilities, in *Interaction Studies*, 13:2, 189–234.
- Sahin, Y. and Cimen, F. (2011) An interactive attention board: Improving the attention of individuals with autism and mental retardation, in *Turkish Online Journal of Educational Technology*, 10:1, 24–35.
- Sanefuji, W., Yamashita, H. and Ohgami, H. (2009) Shared minds: Effects of a mother's imitation of her child on the mother-child interaction, in *Infant Mental Health Journal*, 30:2, 145–157.
- Sansosti, F. and Sansosti, J. (2013) Effective school-based service delivery for students with autistic spectrum disorders: Where are we and where do we need to go, in *Psychology in the Schools*, 50:3, 229–244.
- Scattone, D. (2008) Enhancing the conversation skills of a boy with Asperger's Disorder through Social Stories and video modeling, in *Journal of Autism and Developmental Disorders*, 38:2, 395–400.
- Schmidt, J. D., Luiselli, J. K., Rue, H. and Whalley, K. (2013) Graduated exposure and positive reinforcement to overcome setting and activity avoidance in an adolescent with autism. *Behavior Modification*, 37:1, 128–142.
- Severtson, J. M. and Carr, J. E. (2012) Training novice instructors to implement errorless discrete-trial teaching: a sequential analysis. *Behavior Analysis in Practice*, 5:2, 13–23.
- Shrestha, A., Anderson, A. and Moore, D. W. (2012) Using Point-of-view video modeling and forward chaining to teach a functional self-help skill to a child with autism, in *Journal of Behavioral Education*, 22:2, 157–167.
- Sidener, T. M., Carr, J. E., Karsten, A. M., Severtson, J. M., Cornelius, C. E. and Heinicke, M. R. (2010) Evaluation of single and mixed verbal operant arrangements for teaching mands and tacts, in *The Analysis of Verbal Behavior*, 26:1, 15–30.

- Sigafoos, J., Green, V. A., Payne, D., O'Reilly, M. F. and Lancioni, G. E. (2009) A classroom-based antecedent intervention reduces obsessive-repetitive behavior in an adolescent with autism, in *Clinical Case Studies*, 8:1, 3–13.
- Sipilä, A.-K. and Määttä, K. (2011) Can the facilitated communication method support autistic people, according to facilitators' opinions? in *Psychology of Language and Communication*, 15:1, 1–26.
- Slocum, S. K., Miller, S. J. and Tiger, J. H. (2012) Using a blocked-trials procedure to teach identity matching to a child with autism, in *Journal of Applied Behavior Analysis*, 45:3, 619–624.
- Soares, D., Vannest, K. and Harrison, J. (2009) Computer aided self-monitoring to increase academic production and reduce self-injurious behavior in a child with autism, in *Behavioral Interventions*, 24, 171–183.
- Spencer, T. D. and Higbee, T. S. (2012) Using transfer of stimulus control technology to promote generalization and spontaneity of language, in *Focus on Autism and Other Developmental Disabilities*, 27:4, 225–236.
- Stahmer, A. C. and Aarons, G. (2009) Attitudes toward adoption of evidence-based practices: a comparison of autism early intervention providers and children's mental health providers, in *Psychological Services*, 6:3, 223–234.
- State, T. M. and Kern, L. (2011) A comparison of video feedback and in vivo self-monitoring on the social interactions of an adolescent with Asperger syndrome, in *Journal of Behavioral Education*, 21:1, 18–33.
- Sturm, J. M. (2012) An enriched writers' workshop for beginning writers with developmental disabilities, in *Topics in Language Disorders*, 32:4, 335–360.
- Sulzer-Azaroff, B., Fleming, R., Tupa, M., Bass, R. and Hamad, C. (2008) Choosing objectives for a distance learning behavioral intervention in autism curriculum, *Focus on Autism and Other Developmental Disabilities*, 23:1, 29–36.
- Taylor, K. and Preece, D. (2010) Using aspects of the TEACCH structured teaching approach with students with multiple disabilities and visual impairment: Reflections on practice, in *British Journal of Visual Impairment*, 28:3, 244–259.
- Valentino, A. L., Shillingsburg, M. A., Conine, D. E. and Powell, N. M. (2012) Decreasing echolalia of the instruction "say" during echoic training through use of the cues-pause-point procedure, in *Journal of Behavioral Education*, 21:4, 315–328.
- Vismara, L. A. and Rogers, S. J. (2010) Behavioral treatments in autism spectrum disorder: what do we know? in *Annual Review of Clinical Psychology*, 6, 447–468.
- Vismara, L. A. and Rogers, S. J. (2008) The Early Start Denver Model: A case study of an innovative practice, in *Journal of Early Intervention*, 31:1, 91–108.
- Weiss, M. J., Zane, T., Vets, T. L. and Green, G. (2010) Three important things to consider when starting intervention for a child diagnosed with autism, in *Behavior Analysis in Practice*, 3:2, 58–60.
- Welton, E. and Vakil, S. (2010) Enhancing the development of dispositions in pre-service teacher preparation programs, in *Revista de Psihologie*, 56:3, 261–268.
- Whalon, K. and Hart, J. E. (2010) Adapting an evidence-based reading comprehension strategy for learners with autism spectrum disorder, in *Intervention in School and Clinic*, 46:4, 195–203.

Whitcomb, S. A., Bass, J. D. and Luiselli, J. K. (2011) Effects of a computer-based early reading program (Headsprout®) on word list and text reading skills in a student with autism, in *Journal of Developmental and Physical Disabilities*, 23:6, 491–499.

Wilkinson, L. A. (2008) Self-management for children with high-functioning autism spectrum disorders, in *Intervention in School and Clinic*, 43:3, 150–157.

Wilson, K. (2013) Incorporating video modeling into a school-based intervention for students with autism spectrum disorders, in *Language, Speech and Hearing Services in Schools*, 44, 105–117.

Wolfberg, P., Bottema-Beutel, K. and DeWitt, M. (2012) Including children with autism in social and imaginary play with typical peers, in *American Journal of Play*, 5:1, 55–80.

Wolfe, J. and Matthews, T. (2012) Devising relevant and quality training to meet the growing need for knowledge about the autism spectrum in secondary schools in Ireland and Wales, in *Good Autism Practice*, 13:2, 40–47.

Wu, Y., Mirenda, P., Wang, H. and Chen, M. (2010) Assessment and treatment of stereotypic vocalizations in a Taiwanese adolescent with autism: A case study, in *International Journal of Special Education*, 25:3, 160–167.

Yaw, J. S., Skinner, C. H., Parkhurst, J., Taylor, C. M., Booher, J. and Chambers, K. (2011) Extending research on a computer-based sight-word reading intervention to a student with autism, in *Journal of Behavioral Education*, 20:1, 44–54.

Excluded, EC2 – Reports on an intervention that is not researcher-manipulated, or reports on no intervention at all

Åsberg, J., Zander, U., Zander, E. and Dahlgren Sandberg, A. (2012) Social and individual aspects of classroom learning in students with autism spectrum disorder: An action research pilot study on assessment, in *European Journal of Special Needs Education*, 27:1, 115–127.

Ashby, C. E. and Causton-Theoharis, J. (2012) “Moving quietly through the door of opportunity”: Perspectives of college students who type to communicate, in *Equity and Excellence in Education*, 45:2, 261–282.

Barnhill, G. P., Polloway, E. A. and Sumutka, B. M. (2010) A survey of personnel preparation practices in autism spectrum disorders, in *Focus on Autism and Other Developmental Disabilities*, 26:2, 75–86.

Beardon, L., Martin, N. and Woolsey, I. (2009) What do students with Asperger syndrome or high-functioning autism want at college and university? (in their own words), in *Good Autism Practice*, 10:2, 35–43.

Benson, P., Karlof, K. L. and Siperstein, G. N. (2008) Maternal involvement in the education of young children with autism spectrum disorders, in *Autism*, 12:1, 47–63.

Bird, E. K.R., Lamond, E. and Holden, J. (2012) Survey of bilingualism in autism spectrum disorders, in *International Journal of Language and Communication Disorders*, 47:1, 52–64.

Bowker, A., D’Angelo, N. M., Hicks, R. and Wells, K. (2011) Treatments for autism: parental choices and perceptions of change, in *Journal of Autism and Developmental Disorders*, 41:10, 1373–1382.

Boyd, B., Conroy, M., Asmus, J., McKenney, E. and Mancil, G. (2008) Descriptive analysis of classroom setting events on the social behaviors of children with autism spectrum disorder, in *Education and Training in Developmental Disabilities*, 43:2, 186–197.

- Brewster, S. and Coleyshaw, L. (2011) Participation or exclusion? Perspectives of pupils with autistic spectrum disorders on their participation in leisure activities, in *British Journal of Learning Disabilities*, 39:4, 284–291.
- Bruns, D. A. and Thompson, S. (2011) Time to eat: Improving mealtimes of young children with autism, in *Young Exceptional Children*, 14:4, 3–18.
- Callahan, K., Shukla-Mehta, S., Magee, S. and Wie, M. (2010) ABA versus TEACCH: The case for defining and validating comprehensive treatment models in autism, in *Journal of Autism and Developmental Disorders*, 40, 74–88.
- Camarena, P. M. and Sarigiani, P. A. (2009) Postsecondary educational aspirations of high-functioning adolescents with autism spectrum disorders and their parents, in *Focus on Autism and Other Developmental Disabilities*, 24:2, 115–128.
- Carter, M., Roberts, J., Williams, K., Evans, D., Parmenter, T., Silove, N. et al. (2011) Interventions used with an Australian sample of preschool children with autism spectrum disorders, in *Research in Autism Spectrum Disorders*, 5:3, 1033–1041.
- Chandler-Olcott, K. and Kluth, P. (2008) “Mother’s voice was the main source of learning”: Parents’ role in supporting the literacy development of students with autism, in *Journal of Literacy Research*, 40:4, 461–492.
- Chen, G. M., Yoder, K. J., Ganzel, B. L., Goodwin, M. S. and Belmonte, M. K. (2012) Harnessing repetitive behaviours to engage attention and learning in a novel therapy for autism: An exploratory analysis, in *Frontiers in Psychology*, 3, 1–16.
- Cullen, J. P., Ownbey, J. B. and Ownbey, M. A. (2010) The effects of the healthy families america home visitation program on parenting attitudes and practices and child social and emotional competence, in *Child and Adolescent Social Work Journal*, 27:5, 335–354.
- Dillon, G. and Underwood, J. (2012) Computer mediated imaginative storytelling in children with autism, in *International Journal of Human-Computer Studies*, 70:2, 169–178.
- Dixon, D. R., Tarbox, J., Najdowski, A. C., Wilke, A. E. and Granpeesheh, D. (2011) A comprehensive evaluation of language for early behavioral intervention programs: The reliability of the SKILLS Language Index, in *Research in Autism Spectrum Disorders*, 5(1), 506–511.
- Eldevik, S., Hastings, R. P., Hughes, J. C., Jahr, E., Eikeseth, S. and Cross, S. (2010) Using participant data to extend the evidence base for intensive behavioral intervention for children with autism, *American Journal on Intellectual and Developmental Disabilities*, 115:5, 381–405.
- Frederickson, N., Jones, A. P. and Lang, J. (2010) Inclusive provision options for pupils on the autistic spectrum, in *Journal of Research in Special Educational Needs*, 10:2, 63–73.
- Frey, A. J., Lee Park, K., Browne-Ferrigno, T. and Korfhage, T. L. (2010) The social validity of program – wide positive behavior support, in *Journal of Positive Behavior Interventions*, 12:4, 222–235.
- Greenberg, J. and Martinez, C. (2008) Starting off on the right foot: One year of behavior analysis in practice and relative cost, in *International Journal of Behavioral Consultation and Therapy*, 4:2, 212–226.
- Griffith, G. M., Fletcher, R. and Hastings, R. P. (2012) A national UK census of applied behavior analysis school provision for children with autism, in *Research in Autism Spectrum Disorders*, 6:2, 798–805.

- Grindle, C. F., Hastings, R. P., Saville, M., Hughes, J. C., Huxley, K., Kovshoff, H. et al. (2012) Outcomes of a behavioral education model for children with autism in a mainstream school setting, in *Behavior Modification*, 36:3, 298–319.
- Grindle, C., Hastings, R., Saville, M., Hughes, J., Kovshoff, H. and Huxley, K. (2009) Integrating evidence-based behavioural teaching methods into education for children with autism, in *Educational and Child Psychology*, 26:4, 65–81.
- Hallett, F. and Armstrong, D. (2012) "I want to stay over": A phenomenographic analysis of a short break/ extended stay pilot project for children and young people with autism, in *British Journal of Learning Disabilities*, 41, 66–72.
- Hastwell, J., Martin, N., Cohen, S. B. and Harding, J. (2012) Giving Cambridge University students with Asperger syndrome a voice: A qualitative, interview-based study towards developing a model of best practice, in *Good Autism Practice*, 13:1, 56–63.
- Houghton, C. (2013) Capturing the pupil voice of secondary gifted and talented students who had attended an enrichment programme in their infant school, in *Gifted Education International*, 1–14.
- Humphrey, N., and Lewis, S. (2008) "Make me normal": The views and experiences of pupils on the autistic spectrum in mainstream secondary schools, in *Autism*, 12, 23–46.
- Hurlbutt, K. S. (2011) Experiences of parents who homeschool their children with autism spectrum disorders, in *Focus on Autism and Other Developmental Disabilities*, 26:4, 239–249.
- Ito, H., Tani, I., Yukihiro, R., Adachi, J., Hara, K., Ogasawara, M. et al. (2012) Validation of an interview-based rating scale developed in Japan for pervasive developmental disorders, in *Research in Autism Spectrum Disorders*, 6:4, 1265–1272.
- Kidd, T. and Kaczmarek, E. (2010) The experiences of mothers home educating their children with autism spectrum disorder, in *Issues in Educational Research*, 20:3, 257–275.
- Kurth, J., and Mastergeorge, A. M. (2009) Individual education plan goals and services for adolescents with autism: Impact of age and educational setting, in *The Journal of Special Education*, 44:3, 146–160.
- Kurth, J., and Mastergeorge, A. M. (2010) Impact of setting and instructional context for adolescents with autism, in *The Journal of Special Education*, 46:1, 36–48.
- Makrygianni, M. K. and Reed, P. (2010) Factors impacting on the outcomes of Greek intervention programmes for children with autistic spectrum disorders, in *Research in Autism Spectrum Disorders*, 4:4, 697–708.
- Mancil, G. and Pearl, C. (2008) Restricted interests as motivators: Improving academic engagement and outcomes of children on the autism spectrum, *TEACHING Exceptional Children Plus*, 4:6, 1–15.
- Manti, E., Scholte, E. M. and Van Berckelaer-Onnes, I. A. (2013) Exploration of teaching strategies that stimulate the growth of academic skills of children with ASD in special education school, in *European Journal of Special Needs Education*, 28:1, 64–77.
- McGarrell, M., Healy, O., Leader, G., O'Connor, J. and Kenny, N. (2009) Six reports of children with autism spectrum disorder following intensive behavioral intervention using the Preschool Inventory of Repertoires for Kindergarten (PIRK®), in *Research in Autism Spectrum Disorders*, 3:3, 767–782.
- Menzinger, B. and Jackson, R. (2009) The effect of light intensity and noise on the classroom behaviour of pupils with Asperger syndrome, in *Support for Learning*, 24:4, 170–175.

- Morewood, G., Humphrey, N. and Symes, W. (2011) Mainstreaming autism: Making it work, in *Good Autism Practice*, 12:2, 62–68.
- Morrier, M. J., Hess, K. L. and Heflin, L. J. (2010) Teacher training for implementation of teaching strategies for students with autism spectrum disorders, in *Teacher Education and Special Education*, 34:2, 119–132.
- Müller, E., Schuler, A. and Yates, G. B. (2008) Social challenges and supports from the perspective of individuals with Asperger syndrome and other autism spectrum disabilities, in *Autism*, 12:2, 173–190.
- Nahmias, A. S., Kase, C. and Mandell, D. S. (2012) Comparing cognitive outcomes among children with autism spectrum disorders receiving community-based early intervention in one of three placements, in *Autism*, 1–15.
- Natof, T. and Romanczyk, R. (2009) Teaching students with ASD: Does teacher enthusiasm make a difference? in *Behavioral Interventions*, 24, 55–72.
- Nikolis, S. (2008) A study into the management of behaviour of children with autistic spectrum disorders by staff in eight Greek special schools, in *Good Autism Practice*, 9:1, 27–31.
- O'Connor, A. B. and Healy, O. (2010) Long-term post-intensive behavioral intervention outcomes for five children with autism spectrum disorder, in *Research in Autism Spectrum Disorders*, 4:4, 594–604.
- O'Reilly, M., Rispoli, M., Davis, T., Machalicek, W., Lang, R., Sigafoos, J. et al. (2010) Functional analysis of challenging behavior in children with autism spectrum disorders: A summary of 10 cases, in *Research in Autism Spectrum Disorders*, 4:1, 1–10.
- Ostmeyer, K. and Scarpa, A. (2012) Examining school-based social skills program needs and barriers for students with high-functioning autism spectrum disorders using participatory action research, in *Psychology in the Schools*, 49:10, 932–941.
- Panerai, S., Zingale, M., Trubia, G., Finocchiaro, M., Zuccarello, R., Ferri, R. and Maurizio, E. (2009) Special education versus inclusive education: the role of the TEACCH program, in *Journal of Autism and Developmental Disorders*, 39, 874–882.
- Parsons, S., Lewis, A. and Ellins, J. (2009) The views and experiences of parents of children with autistic spectrum disorder about educational provision: Comparisons with parents of children with other disabilities from an online survey, in *European Journal of Special Needs Education*, 24:1, 37–58.
- Pasco, G. and Tohill, C. (2011) Predicting progress in Picture Exchange Communication System (PECS) use by children with autism, in *International Journal of Language and Communication Disorders*, 46:1, 120–125.
- Pituch, K. A., Green, V. A., Didden, R., Lang, R., O'Reilly, M. F., Lancioni, G. E. and Sigafoos, J. (2011) Parent reported treatment priorities for children with autism spectrum disorders, in *Research in Autism Spectrum Disorders*, 5:1, 135–143.
- Priestley, M. G. (2011) The outcomes from attendance on selected mainstream further education courses, for a group of learners at a specialist college for young people on the autism spectrum, in *Good Autism Practice*, 12:2, 69–72.
- Quintero, N. and McIntyre, L. L. (2010) Kindergarten transition preparation: A comparison of teacher and parent practices for children with autism and other developmental disabilities, in *Early Childhood Education Journal*, 38:6, 411–420.
- Regehr, K. and Feldman, M. (2009) Parent-selected Interventions for Infants at-risk for autism spectrum disorders and their affected siblings, in *Behavioral Interventions*, 24, 237–248.

- Reynolds, S., Bendixen, R. M., Lawrence, T. and Lane, S. J. (2011) A pilot study examining activity participation, sensory responsiveness and competence in children with high functioning autism spectrum disorder, in *Journal of Autism and Developmental Disorders*, 41(11), 1496–1506.
- Robledo, J. and Donnellan, A. (2008) Properties of supportive relationships from the perspective of academically successful individuals with autism, in *Intellectual and Developmental Disabilities*, 46:4, 299–310.
- Rossetti, Z., Ashby, C., Arndt, K., Chadwick, M. and Kasahara, M. (2008) "I like others to not try to fix me": Agency, independence and autism, in *Intellectual and Developmental Disabilities*, 46:5, 364–375.
- Saggers, B., Hwang, S.-Y. and Mercer, L. (2011) Your voice counts: Listening to the voice of high school students with autism spectrum disorder, in *Australasian Journal of Special Education*, 35:2, 173–190.
- Schenning, H., Knight, V. and Spooner, F. (2013) Effects of structured inquiry and graphic organizers on social studies comprehension by students with autism spectrum disorders, in *Research in Autism Spectrum Disorders*, 7:4, 526–540.
- Sciutto, M., Richwine, S., Mentrikoski, J. and Niedzwiecki, K. (2012) A qualitative analysis of the school experiences of students with Asperger syndrome, in *Focus on Autism and Other Developmental Disabilities*, 27:3, 177–188.
- Segall, M. J., and Campbell, J. M. (2012) Factors relating to education professionals' classroom practices for the inclusion of students with autism spectrum disorders, in *Research in Autism Spectrum Disorders*, 6:3, 1156–1167.
- Serpentine, E. C., Tarnai, B., Drager, K. D. R. and Finke, E. H. (2010) Decision making of parents of children with autism spectrum disorder concerning augmentative and alternative communication in Hungary, in *Communication Disorders Quarterly*, 32:4, 221–231.
- Shogren, K. A and Plotner, A. J. (2012) Transition planning for students with intellectual disability, autism, or other disabilities: data from the National Longitudinal Transition Study–2, in *Intellectual and Developmental Disabilities*, 50:1, 16–30.
- Stahmer, A. C., Brookman-Frazee, L., Lee, E., Searcy, K. and Reed, S. (2011) Parent and multidisciplinary provider perspectives on earliest intervention for children at risk for autism spectrum disorders, in *Infants and Young Children*, 24:4, 344–363.
- Stahmer, A. C., Schreibman, L. and Cunningham, A. B. (2011) Toward a technology of treatment individualization for young children with autism spectrum disorders, in *Brain Research*, 1380, 229–39.
- Stichter, J. P., Herzog, M. J., O'Connor, K. V. and Schmidt, C. (2012) A preliminary examination of a general social outcome measure, in *Assessment for Effective Intervention*, 38:1, 40–52.
- Symes, W. and Humphrey, N. (2012) Including pupils with autistic spectrum disorders in the classroom: The role of teaching assistants, in *European Journal of Special Needs Education*, 27:4, 517–532.
- Tarnai, B. and Wolfe, P. S. (2008) Social stories for sexuality education for persons with autism/pervasive developmental disorder, in *Sexuality and Disability*, 26:1, 29–36.
- Taylor, B. A. and DeQuinzio, J. A. (2012) Observational learning and children with autism, in *Behavior Modification*, 36:3, 341–360.
- Tobias, A. (2009) Supporting students with autistic spectrum disorder (ASD) at secondary school: A parent and student perspective, in *Educational Psychology in Practice*, 25:2, 151–165.

Tzanakaki, P., Grindle, C., Hastings, R., Hughes, J., Kovshoff, H. and Remington, B. (2012) How and why do parents choose Early Intensive Behavioral Intervention for their young child with autism? in *Education and Training in Autism and Developmental Disabilities*, 47:1, 58–71.

Ulke-Kurkcuoglu, B. and Kircaali-Iftar, G. (2010) A comparison of the effects of providing activity and material choice to children with autism spectrum disorders, in *Journal of Applied Behavior Analysis*, 43:4, 717–721.

VanBergeijk, E. (2011) Sarita Freedman: Developing college skills in students with autism and Asperger's syndrome, in *Journal of Autism and Developmental Disorders*, 42:3, 470–471.

Whalon, K. J. and Hart, J. E. (2010) Children with autism spectrum disorder and literacy instruction: An exploratory study of elementary inclusive settings, in *Remedial and Special Education*, 32:3, 243–255.

Yechiam, E., Arshavsky, O., Shamay-Tsoory, S. G., Yaniv, S. and Aharon, J. (2010) Adapted to explore: Reinforcement learning in autistic spectrum conditions, in *Brain and Cognition*, 72:2, 317–324.

Zager, D. and Alpern, C. S. (2010) College-based inclusion programming for transition-age students with autism, in *Focus on Autism and Other Developmental Disabilities*, 25:3, 151–157.

Excluded, EC3 – Does not provide evidence of educational utility of the intervention

Achmadi, D., Kagohara, D. M., van der Meer, L., O'Reilly, M. F., Lancioni, G. E. Sutherland, D. et al. (2012) Teaching advanced operation of an iPod-based speech-generating device to two students with autism spectrum disorders, in *Research in Autism Spectrum Disorders*, 6:4, 1258–1264.

Adcock, J. and Cuvo, A. J. (2009) Enhancing learning for children with autism spectrum disorders in regular education by instructional modifications, in *Research in Autism Spectrum Disorders*, 3:2, 319–328.

Ahrens, E. N., Lerman, D. C., Kodak, T., Worsdell, A. S. and Keegan, C. (2011) Further evaluation of response interruption and redirection as treatment for stereotypy, in *Journal of Applied Behavior Analysis*, 44:1, 95–108.

Akechi, H., Kikuchi, Y., Tojo, Y., Osanai, H. and Hasegawa, T. (2013) Brief report: Pointing cues facilitate word learning in children with autism spectrum disorder, in *Journal of Autism and Developmental Disorders*, 43:1, 230–235.

Akmanoglu, N. and Tekin-Iftar, E. (2011) Teaching children with autism how to respond to the lures of strangers, in *Autism*, 15:2, 205–222.

Albert, K., Carbone, V., Murrari, D., Hagerty, M. and Sweeney-Kerwin, E. (2012) Increasing the mand repertoire of children with autism through the use of an interrupted chain procedure, in *Behavior Analysis in Practice*, 5:2, 65–76.

Aldred, C., Green, J., Emsley, R. and McConachie, H. (2012) Brief report: mediation of treatment effect in a communication intervention for pre-school children with autism, in *Journal of Autism and Developmental Disorders*, 42:3, 447–454.

Aliee, Z., Jonhari, N., Rezaei, R. and Alias, N. (2013) The effectiveness of managing split attention among autistic children using computer based intervention, in *Turkish Online Journal of Educational Technology*, 12:2, 281–302.

Allen, K. D., Burke, R. V., Howard, M. R., Wallace, D. P. and Bowen, S. L. (2012) Use of audio cuing to expand employment opportunities for adolescents with autism spectrum disorders and intellectual disabilities, in *Journal of Autism and Developmental Disorders*, 42:11, 2410–2419.

- Anan, R., Warner, L., McGillivray, J., Chong, I. and Hines, S. (2008) Group Intensive Family Training (GIFT) for preschoolers with autism spectrum disorders, in *Behavioral Interventions*, 23, 165–180.
- Angermeier, K., Schlosser, R. W., Luiselli, J. K., Harrington, C. and Carter, B. (2008) Effects of iconicity on requesting with the Picture Exchange Communication System in children with autism spectrum disorder, in *Research in Autism Spectrum Disorders*, 2:3, 430–446.
- Antshel, K. M., Polacek, C., McMahon, M., Dygert, K. Spenceley, L. Dygert, L. et al. (2011) Comorbid ADHD and anxiety affect social skills group intervention treatment efficacy in children with autism spectrum disorders, in *Journal of Developmental and Behavioral Pediatrics*, 32:6, 439–446.
- Armstrong, T. and Hughes, M. (2012) Exploring computer and storybook interventions for children with high functioning autism, in *International Journal of Special Education*, 27:3, 1–12, retrieved from http://www.internationalsped.com/documents/Exploring Computer and Storybook Interventions_FORMATTED.docx.
- Arntzen, E., Halstadro, L.-B. and Halstadro, M. (2009) The “silent dog” method: Analyzing the impact of self-generated rules when teaching different computer chains to boys with autism, in *The Analysis of Verbal Behavior*, 25, 51–66.
- Baghdadli, A., Brisot, J., Henry, V., Michelon, C., Soussana, M., Rattaz, C. and Picot, M. C. (2013) Social skills improvement in children with high-functioning autism: a pilot randomized controlled trial, in *European Child and Adolescent Psychiatry*, 22:7, 433–442.
- Bailey, R., Angell, M. and Stoner, J. (2011) Improving literacy skills in students with complex communication needs who use augmentative/alternative communication systems, in *Education and Training in Autism and Developmental Disabilities*, 46:3, 352–368, retrieved from http://daddceec.org/Portals/0/CEC/Autism_Disabilities/Research/Publications/Education_Training_Development_Disabilities/2011v46_Journals/ETADD_2011v4n3p352-369_Improving_literacy_skills.pdf
- Baltruschat, L., Hasselhorn, M., Tarbox, J., Dixon, D. R., Najdowski, A. C., Mullins, R. D. and Gould, E. R. (2011) Further analysis of the effects of positive reinforcement on working memory in children with autism, in *Research in Autism Spectrum Disorders*, 5:2, 855–863.
- Bancroft, S. L., Weiss, J. S., Libby, M. E. and Ahearn, W. H. (2011) A comparison of procedural variations in teaching behavior chains: Manual guidance, trainer completion and no completion of untrained steps, in *Journal of Applied Behavior Analysis*, 44:3, 559–569.
- Barnes, C. S. and Rehfeldt, R. A. (2013) Effects of fluency instruction on selection-based and topography-based comprehension measures, in *Research in Autism Spectrum Disorders*, 7:6, 639–647.
- Bearss, K., Johnson, C., Handen, B., Smith, T. and Scahill, L. (2013) A pilot study of parent training in young children with autism spectrum disorders and disruptive behavior, in *Journal of Autism and Developmental Disorders*, 43:4, 829–840.
- Beaumont, R. and Sofronoff, K. (2008) A multi-component social skills intervention for children with Asperger syndrome: The Junior Detective Training Program, in *Journal of Child Psychology and Psychiatry*, 49:7, 743–753.
- Begeer, S., Gevers, C., Clifford, P., Verhoeve, M., Kat, K., Hoddenbach, E. and Boer, F. (2011) Theory of mind training in children with autism: A randomized controlled trial, in *Journal of Autism and Developmental Disorders*, 41:8, 997–1006.
- Belfiore, P. J., Fritts, K. M. and Herman, B. C. (2008) The role of procedural integrity: Using self-monitoring to enhance discrete trial instruction (DTI), in *Focus on Autism and Other Developmental Disabilities*, 23:2, 95–102.

- Ben Itzchak, E. and Zachor, D. A. (2011) Who benefits from early intervention in autism spectrum disorders? in *Research in Autism Spectrum Disorders*, 5:1, 345–350.
- Bennett, K. D., Ramasamy, R. and Honsberger, T. (2013a) Further examination of covert audio coaching on improving employment skills among secondary students with autism, in *Journal of Behavioral Education*, 22:2, 103–119.
- Bennett, K. D., Ramasamy, R. and Honsberger, T. (2013b) The effects of covert audio coaching on teaching clerical skills to adolescents with autism spectrum disorder, in *Journal of Autism and Developmental Disorders*, 43:3, 585–593.
- Bereznak, S., Ayres, K. M., Mechling, L. C. and Alexander, J. L. (2012) Video self-prompting and mobile technology to increase daily living and vocational independence for students with autism spectrum disorders, in *Journal of Developmental and Physical Disabilities*, 24:3, 269–285.
- Bergstrom, R., Najdowski, A. C. and Tarbox, J. (2012) Teaching children with autism to seek help when lost in public, in *Journal of Applied Behavior Analysis*, 45:1, 191–195.
- Bimbrahw, J., Boger, J. and Mihailidis, A. (2012) Investigating the efficacy of a computerized prompting device to assist children with autism spectrum disorder with activities of daily living, in *Assistive Technology*, 24:4, 286–298.
- Boesch, M. C., Wendt, O., Subramanian, A. and Hsu, N. (2013) Comparative efficacy of the Picture Exchange Communication System (PECS) versus a speech-generating device: Effects on requesting skills, in *Research in Autism Spectrum Disorders*, 7:3, 480–493.
- Bögels, S., Hoogstad, B., van Dun, L., de Schutter, S. and Restifo, K. (2008) Mindfulness training for adolescents with externalizing disorders and their parents, in *Behavioural and Cognitive Psychotherapy*, 36:2, 193–209.
- Boudreau, E. and D'Entremont, B. (2010) Improving the pretend play skills of preschoolers with autism spectrum disorders: The effects of video modeling, in *Journal of Developmental and Physical Disabilities*, 22:4, 415–431.
- Bowen, C. N., Shillingsburg, M. A. and Carr, J. E. (2012) The effects of the question "What do you want?" on mand training outcomes of children with autism, in *Journal of Applied Behavior Analysis*, 45:4, 833–838.
- Boyd, B. A., McDonough, S. G., Rupp, B., Khan, F. and Bodfish, J. W. (2011) Effects of a family-implemented treatment on the repetitive behaviors of children with autism, in *Journal of Autism and Developmental Disorders*, 41:10, 1330–1341.
- Braiden, H. J., McDaniel, B., McCrudden, E., Janes, M. and Crozier, B. (2012) A practice-based evaluation of barnardo's forward steps early intervention programme for children diagnosed with autism, in *Child Care in Practice*, 18:3, 227–242.
- Brookman-Frazer, L. I., Drahota, A. and Stadnick, N. (2012) Training community mental health therapists to deliver a package of evidence-based practice strategies for school-age children with autism spectrum disorders: A pilot study, in *Journal of Autism and Developmental Disorders*, 42:8, 1651–1661.
- Brown, J. L., Krantz, P. J., McClannahan, L. E. and Poulson, C. L. (2008) Using script fading to promote natural environment stimulus control of verbal interactions among youths with autism, in *Research in Autism Spectrum Disorders*, 2:3, 480–497.

- Caballero, A. and Connell, J. (2010) Evaluation of the effects of social cue cards for preschool-aged children with autism spectrum disorders (ASD), in *Journal of Behavior Assessment and Intervention in Children*, 1:1, 25–42.
- Carbone, V. J., Sweeney-Kerwin, E. J., Attanasio, V. and Kasper, T. (2010) Increasing the vocal responses of children with autism and developmental disabilities using manual sign mand training and prompt delay, in *Journal of Applied Behavior Analysis*, 43:4, 705–709.
- Cardon, T. A and Wilcox, M. J. (2011) Promoting imitation in young children with autism: A comparison of reciprocal imitation training and video modeling, in *Journal of Autism and Developmental Disorders*, 41:5, 654–666.
- Cardon, T. A. (2012) Teaching caregivers to implement video modeling imitation training via iPad for their children with autism, in *Research in Autism Spectrum Disorders*, 6:4, 1389–1400.
- Carp, C. L., Peterson, S. P., Arkel, A. J., Petursdottir, A. I. and Ingvarsson, E. T. (2012) A further evaluation of picture prompts during auditory-visual conditional discrimination training, in *Journal of Applied Behavior Analysis*, 45:4, 737–751.
- Carr, D. and Felce, J. (2008) Teaching picture-to-object relations in picture-based requesting by children with autism: A comparison between error prevention and error correction teaching procedures, in *Journal of Intellectual Disability Research : JIDR*, 52, 309–317.
- Carter, A. S., Messinger, D. S., Stone, W. L., Celimli, S., Nahmias, A. S. and Yoder, P. (2011) A randomized controlled trial of Hanen's "More Than Words" in toddlers with early autism symptoms, in *Journal of Child Psychology and Psychiatry*, 52(7), 741–752.
- Casenhiser, D. M., Shanker, S. G. and Stieben, J. (2013) Learning through interaction in children with autism: Preliminary data from asocial-communication-based intervention, in *Autism*, 17(2), 220–241.
- Castorina, L. L. and Negri, L. M. (2011) The inclusion of siblings in social skills training groups for boys with Asperger syndrome, in *Journal of Autism and Developmental Disorders*, 41:1, 73–81.
- Cavkaytar, A. and Pollard, E. (2009) Effectiveness of parent and therapist collaboration program (PTCP) for teaching self-care and domestic skills to individuals with autism, in *Education and Training in Developmental Disabilities*, 44:3, 381–395.
- Charania, S. M., LeBlanc, L. A., Sabanathan, N., Ktaech, I. A., Carr, J. E. and Gunby, K. (2010) Teaching effective hand raising to children with autism during group instruction, in *Journal of Applied Behavior Analysis*, 43:3, 493–497.
- Charlop, M. H., Malmberg, D. B. and Berquist, K. L. (2008) An application of the Picture Exchange Communication System (PECS) with children with autism and a visually impaired therapist, in *Journal of Developmental and Physical Disabilities*, 20:6, 509–525.
- Cheng, Y., Chiang, H.-C. Ye, J. and Cheng, L. (2010) Enhancing empathy instruction using a collaborative virtual learning environment for children with autistic spectrum conditions, in *Computers and Education*, 55:4, 1449–1458.
- Cheng, Y. and Huang, R. (2012) Using virtual reality environment to improve joint attention associated with pervasive developmental disorder, in *Research in Developmental Disabilities*, 33:6, 2141–2152.

- Chu, C.-H. and Pan, C.-Y. (2012) The effect of peer- and sibling-assisted aquatic program on interaction behaviors and aquatic skills of children with autism spectrum disorders and their peers/siblings, in *Research in Autism Spectrum Disorders*, 6:3, 1211–1223.
- Colón, C. L., Ahearn, W. H., Clark, K. M. and Masalsky, J. (2012) The effects of verbal operant training and response interruption and redirection on appropriate and inappropriate vocalizations, in *Journal of Applied Behavior Analysis*, 45:1, 107–120.
- Conallen, K. and Reed, P. (2012) The effects of a conversation prompt procedure on independent play, in *Research in Autism Spectrum Disorders*, 6:1, 365–377.
- Coolican, J., Smith, I. and Bryson, S. (2010) Brief parent training in pivotal response treatment for preschoolers with autism, in *Journal of Child Psychology and Psychiatry*, 51:12, 1321–1330.
- Cotugno, A. (2009) Social competence and social skills training and intervention for children with autism spectrum disorders, in *Journal of Autism and Developmental Disorders*, 39, 1268–1277.
- Crooke, P. J., Hendrix, R. E. and Rachman, J. Y. (2008) Brief report: Measuring the effectiveness of teaching social thinking to children with Asperger syndrome (AS) and high functioning autism (HFA), in *Journal of Autism and Developmental Disorders*, 38:3, 581–591.
- Crowley, K., McLaughlin, T. and Kahn, R. (2012) Using direct instruction flashcards and reading racetracks to improve sight word recognition of two elementary students with autism, in *Journal of Developmental and Physical Disabilities*, 25:3, 297–311.
- Cuhadar, S. and Diken, I. (2011) Effectiveness of instruction performed through activity schedules on leisure skills of children with autism, in *Education and Training in Autism and Developmental Disabilities*, 46:3, 386–398.
- Cummings, A. R. and Carr, J. E. (2009) Evaluating progress in behavioral programs for children with autism spectrum disorders via continuous and discontinuous measurement, in *Journal of Applied Behavior Analysis*, 42:1, 57–71.
- Dawson, G., Rogers, S., Munson, J., Smith, M., Winter, J., Greenson, J. et al. (2010) Randomized, controlled trial of an intervention for toddlers with autism: The Early Start Denver Model, in *Pediatrics*, 125:1, e17–e23.
- De Bruin, E. I. and Verheij, F. (2012) Social skills training in children with PDD-NOS: an exploratory study, in *International Journal of Psychiatry in Clinical Practice*, 16:1, 60–67.
- DeQuinzio, J. A., Townsend, D. B. and Poulson, C. L. (2008) The effects of forward chaining and contingent social interaction on the acquisition of complex sharing responses by children with autism, in *Research in Autism Spectrum Disorders*, 2:2, 264–275.
- DeRosier, M. E., Swick, D. C., Davis, N. O., McMillen, J. S. and Matthews, R. (2011) The efficacy of a social skills group intervention for improving social behaviors in children with high functioning autism spectrum disorders, in *Journal of Autism and Developmental Disorders*, 41:8, 1033–1043.
- Dodd, J. L., Ocampo, A. and Kennedy, K. S. (2011) Perspective taking through narratives: An intervention for students with ASD, in *Communication Disorders Quarterly*, 33:1, 23–33.
- Dogoe, M., Banda, D. and Lock, R. (2010) Acquisition and generalization of the picture exchange communication system behaviors across settings, persons and stimulus classes with three students with autism, in *Education and Training in Autism and Developmental Disabilities*, 45:2, 216–219.

- Donaldson, J. M. and Vollmer, T. R. (2011) An evaluation and comparison of time-out procedures with and without release contingencies, in *Journal of Applied Behavior Analysis*, 44:4, 693–705.
- Dotson, W. H., Leaf, J. B., Sheldon, J. B. and Sherman, J. A. (2010) Group teaching of conversational skills to adolescents on the autism spectrum, in *Research in Autism Spectrum Disorders*, 4:2, 199–209.
- Dotto-Fojut, K. M., Reeve, K. F., Townsend, D. B. and Progar, P. R. (2011) Teaching adolescents with autism to describe a problem and request assistance during simulated vocational tasks, in *Research in Autism Spectrum Disorders*, 5:2, 826–833.
- Doyle, T. and Arnedillo-Sánchez, I. (2011) Using multimedia to reveal the hidden code of everyday behaviour to children with autistic spectrum disorders (ASDs), in *Computers and Education*, 56:2, 357–369.
- Drahota, A., Wood, J. J., Sze, K. M. and Van Dyke, M. (2011) Effects of cognitive behavioral therapy on daily living skills in children with high-functioning autism and concurrent anxiety disorders, in *Journal of Autism and Developmental Disorders*, 41:3, 257–265.
- Drysdale, M. T. B., Martinez, Y. J. and Thompson, L. (2012) The effects of humorous literature on emotion: a pilot project comparing children with asperger's syndrome before and after neurofeedback training and controls, in *Journal of Neurotherapy*, 16:3, 196–209.
- Dunst, C. J., Trivette, C. M. and Masiello, T. (2011) Exploratory investigation of the effects of interest-based learning on the development of young children with autism, in *Autism: The International Journal of Research and Practice*, 15:3, 295–305.
- Eikeseth, S., Hayward, D., Gale, C., Gitlesen, J.-P. and Eldevik, S. (2009) Intensity of supervision and outcome for preschool-aged children receiving early and intensive behavioral interventions: A preliminary study, in *Research in Autism Spectrum Disorders*, 3:1, 67–73.
- Elder, J. H., Donaldson, S. O., Kairalla, J., Valcante, G., Bendixen, R., Ferdig, R. et al. (2011) In-home training for fathers of children with autism: A follow up study and evaluation of four individual training components, in *Journal of Child and Family Studies*, 20:3, 263–271.
- Eldevik, S., Jahr, E., Eikeseth, S., Hastings, R. P. and Hughes, C. J. (2010) Cognitive and adaptive behavior outcomes of behavioral intervention for young children with intellectual disability, in *Behavior Modification*, 34:1, 16–34.
- Falcomata, T. S., Roane, H. S., Muething, C. S., Stephenson, K. M. and Ing, A. D. (2012) Functional communication training and chained schedules of reinforcement to treat challenging behavior maintained by terminations of activity interruptions, in *Behavior Modification*, 36:5, 630–649.
- Farr, W., Yuill, N. and Raffle, H. (2010) Social benefits of a tangible user interface for children with autistic spectrum conditions, in *Autism*, 14:3, 237–252.
- Fava, L., Strauss, K., Valeri, G., D'Elia, L., Arima, S. and Vicari, S. (2011) The effectiveness of a cross-setting complementary staff- and parent-mediated early intensive behavioral intervention for young children with ASD, in *Research in Autism Spectrum Disorders*, 5:4, 1479–1492.
- Fentress, G. M. and Lerman, D. C. (2012) A comparison of two prompting procedures for teaching basic skills to children with autism, in *Research in Autism Spectrum Disorders*, 6:3, 1083–1090.

- Fernell, E., Hedvall, Å., Westerlund, J., Höglund Carlsson, L., Eriksson, M., Barnevik Olsson, M. et al. (2011) Early intervention in 208 Swedish preschoolers with autism spectrum disorder. A prospective naturalistic study, in *Research in Developmental Disabilities*, 32:6, 2092–2101.
- Ferraioli, S. and Harris, S. (2011) Teaching joint attention to children with autism through a sibling-mediated behavioral intervention, in *Behavioral Interventions*, 26, 261–281.
- Finn, H. E., Miguel, C. F. and Ahearn, W. H. (2012) The emergence of untrained mands and tacts in children with autism, in *Journal of Applied Behavior Analysis*, 45:2, 265–280.
- Fischer, J. L., Howard, J. S., Sparkman, C. R. and Moore, A. G. (2010) Establishing generalized syntactical responding in young children with autism, in *Research in Autism Spectrum Disorders*, 4:1, 76–88.
- Fischetti, A. T., Wilder, D. A., Myers, K., Leon-Enriquez, Y., Sinn, S. and Rodriguez, R. (2012) An evaluation of evidence-based interventions to increase compliance among children with autism, in *Journal of Applied Behavior Analysis*, 45:4, 859–863.
- Flanagan, H. E., Perry, A. and Freeman, N. L. (2012) Effectiveness of large-scale community-based intensive behavioral intervention: A waitlist comparison study exploring outcomes and predictors, in *Research in Autism Spectrum Disorders*, 6:2, 673–682.
- Flores, M. and Ganz, J. (2009) Effects of direct instruction on the reading comprehension of students with autism and developmental disabilities, in *Education and Training in Developmental Disabilities*, 44:1, 39–53.
- Flores, M., Nelson, C. and Hinton, V. (2013) Teaching reading comprehension and language skills to students with autism spectrum disorders and developmental disabilities using direct instruction, in *Education and Training in Autism and Developmental Disabilities*, 48:1, 41–48.
- Fragale, C. L., O'Reilly, M. F., Aguilar, J., Pierce, N., Lang, R., Sigafoos, J. and Lancioni, G. (2012) The influence of motivating operations on generalization probes of specific mands by children with autism, in *Journal of Applied Behavior Analysis*, 45:3, 565–577.
- Franken, T. E., Lewis, C. and Malone, S. A. (2010) Brief report: are children with autism proficient word learners? in *Journal of Autism and Developmental Disorders*, 40:2, 255–259.
- Freitag, C. M., Feineis-Matthews, S., Valerian, J., Teufel, K. and Wilker, C. (2012) The Frankfurt early intervention program FFIP for preschool-aged children with autism spectrum disorder: a pilot study, in *Journal of Neural Transmission*, 119, 1011–1021.
- Fujimoto, I., Matsumoto, T., Silva, P. R. S., Kobayashi, M. and Higashi, M. (2011) Mimicking and evaluating human motion to improve the imitation skill of children with autism through a robot, in *International Journal of Social Robotics*, 3:4, 349–357.
- Gantman, A., Kapp, S. K., Orenski, K. and Laugeson, E. A. (2012) Social skills training for young adults with high-functioning autism spectrum disorders: a randomized controlled pilot study, in *Journal of Autism and Developmental Disorders*, 42:6, 1094–1103.
- Ganz, J., Flores, M. and Lashley, E. (2011) Effects of a treatment package on imitated and spontaneous verbal requests in children with autism, in *Education and Training in Autism and Developmental Disabilities*, 46 (December), 596–606.
- Ganz, J. B. and Flores, M. M. (2008) Effects of the use of visual strategies in play groups for children with autism spectrum disorders and their peers, in *Journal of Autism and Developmental Disorders*, 38:5, 926–940.

- Ganz, J. B. and Flores, M. M. (2009) The effectiveness of direct instruction for teaching language to children with autism spectrum disorders: identifying materials, in *Journal of Autism and Developmental Disorders*, 39:1, 75–83.
- Ganz, J. B., Lashley, E. and Rispoli, M. J. (2010) Non-responsiveness to intervention: children with autism spectrum disorders who do not rapidly respond to communication interventions, in *Developmental Neurorehabilitation*, 13:6, 399–407.
- Ganz, J. B., Simpson, R. L. and Corbin-Newsome, J. (2008) The impact of the Picture Exchange Communication System on requesting and speech development in preschoolers with autism spectrum disorders and similar characteristics, in *Research in Autism Spectrum Disorders*, 2:1, 157–169.
- Geiger, K. B., Carr, J. E., Leblanc, L. A., Hanney, N. M., Polick, A. S. and Heinicke, M. R. (2012) Teaching receptive discriminations to children with autism: A comparison of traditional and embedded discrete trial teaching, in *Behavior Analysis in Practice*, 5:2, 49–59.
- Geiger, K. B., Leblanc, L. A., Dillon, C. M. and Bates, S. L. (2010) An evaluation of preference for video and in vivo modeling, in *Journal of Applied Behavior Analysis*, 43:2, 279–283.
- Gentry, T., Wallace, J., Kvarfordt, C. and Lynch, K. (2010) Personal digital assistants as cognitive aids for high school students with autism: Results of a community-based trial, in *Journal of Vocational Rehabilitation*, 32, 101–107.
- Grannan, L. and Rehfeldt, R. A. (2012) Emergent intraverbal responses via tact and match-to-sample instruction, in *Journal of Applied Behavior Analysis*, 45:3, 601–605.
- Granpeesheh, D., Dixon, D. R., Tarbox, J., Kaplan, A. M. and Wilke, A. E. (2009) The effects of age and treatment intensity on behavioral intervention outcomes for children with autism spectrum disorders, in *Research in Autism Spectrum Disorders*, 3:4, 1014–1022
- Graudins, M. M., Rehfeldt, R. A., DeMattei, R., Baker, J. C. and Scaglia, F. (2012) Exploring the efficacy of behavioral skills training to teach basic behavior analytic techniques to oral care providers, in *Research in Autism Spectrum Disorders*, 6:3, 978–987.
- Greenberg, A., Tomaino, M. and Charlop, M. (2012) Assessing generalization of the picture exchange communication system in children with autism, in *Journal of Developmental and Physical Disabilities*, 24, 539–558.
- Groskreutz, N. C., Groskreutz, M. P. and Higbee, T. S. (2011) Effects of varied levels of treatment integrity on appropriate toy manipulation in children with autism, in *Research in Autism Spectrum Disorders*, 5:4, 1358–1369.
- Grow, L. L., Carr, J. E., Kodak, T. M., Jostad, C. M. and Kisamore, A. N. (2011) A comparison of methods for teaching receptive labeling to children with autism spectrum disorders, in *Journal of Applied Behavior Analysis*, 44:3, 475–498.
- Gunby, K. V, Carr, J. E. and Leblanc, L. A. (2010) Teaching abduction-prevention skills to children with autism, in *Journal of Applied Behavior Analysis*, 43:1, 107–112.
- Gutierrez, A., Hale, M. N., O'Brien, H. A., Fischer, A. J., Durocher, J. S. and Alessandri, M. (2009) Evaluating the effectiveness of two commonly used discrete trial procedures for teaching receptive discrimination to young children with autism spectrum disorders, in *Research in Autism Spectrum Disorders*, 3:3, 630–638.

- Hagner, D., Kurtz, A., Cloutier, H., Arakelian, C., Brucker, D. L. and May, J. (2012) Outcomes of a Family-Centered Transition Process for Students With Autism Spectrum Disorders, in *Focus on Autism and Other Developmental Disabilities*, 27:1, 42–50.
- Hagopian, L. and González, M. (2011) Response interruption and differential reinforcement of alternative behavior for the treatment of PICA, in *Behavioral Interventions*, 26, 309–325.
- Herrera, G., Alcantud, F., Jordan, R., Blanquer, A., Labajo, G. and De Pablo, C. (2008) Development of symbolic play through the use of virtual reality tools in children with autistic spectrum disorders: two case studies, in *Autism*, 12:2, 143–157.
- Hill, K. and Lord, S. (2011) What helps? Perceptions of pupils on the autism spectrum about metacognitive strategies, in *Good Autism Practice*, 12:2, 73–84.
- Hillier, A., Greher, G., Poto, N. and Dougherty, M. (2011) Positive outcomes following participation in a music intervention for adolescents and young adults on the autism spectrum, in *Psychology of Music*, 40:2, 201–215.
- Hsieh, H.-H., Wilder, D. A. and Abellon, O. E. (2011) The effects of training on caregiver implementation of incidental teaching, in *Journal of Applied Behavior Analysis*, 44:1, 199–203.
- Hundert, J. and van Delft, S. (2009) Teaching children with autism spectrum disorders to answer inferential “why” questions, in *Focus on Autism and Other Developmental Disabilities*, 24:2, 67–76.
- Iftar, E. T., Kurt, O. and Cetin, O. (2011) A comparison of constant time delay instruction with high and low treatment integrity, in *Educational Sciences: Theory and Practice*, 11:1, 375–381.
- Ingersoll, B. (2010) The differential effect of three naturalistic language interventions on language use in children with autism, in *Journal of Positive Behavior Interventions*, 13:2, 109–118.
- Ingersoll, B., Meyer, K., Bonter, N. and Jelinek, S. (2012) A comparison of developmental social–pragmatic and naturalistic behavioral interventions on language use and social engagement in children with autism, in *Journal of Speech, Language and Hearing Research*, 55, 1301–1314.
- Ingersoll, B. and Wainer, A. (2013) Initial efficacy of Project ImPACT: A parent-mediated social communication intervention for young children with ASD, in *Journal of Autism and Developmental Disorders*, 43:12, 2943–2952.
- Ingvarsson, E. T. and Le, D. D. (2011) Further evaluation of prompting tactics for establishing intraverbal responding in children with autism, in *The Analysis of Verbal Behavior*, 27:1, 75–93.
- Jang, J., Dixon, D. R., Tarbox, J., Granpeesheh, D., Kornack, J. and de Nocker, Y. (2012) Randomized trial of an eLearning program for training family members of children with autism in the principles and procedures of applied behavior analysis, in *Research in Autism Spectrum Disorders*, 6:2, 852–856.
- Jenkins, S. R. and DiGennaro Reed, F. D. (2013) An experimental analysis of the effects of therapeutic horseback riding on the behavior of children with autism, in *Research in Autism Spectrum Disorders*, 7:6, 721–740.
- Jennett, H. K., Harris, S. L. and Delmolino, L. (2008) Discrete trial instruction vs. mand training for teaching children with autism to make requests, in *The Analysis of Verbal Behavior*, 24, 69–85.
- Johnston, S. S., Buchanan, S. and Davenport, L. (2009) Comparison of fixed and gradual array when teaching sound-letter correspondence to two children with autism who use AAC, in *Augmentative and Alternative Communication*, 25:2, 136–144.

- Kagohara, D. M., Sigafos, J., Achmadi, D., O'Reilly, M. and Lancioni, G. (2012) Teaching children with autism spectrum disorders to check the spelling of words, in *Research in Autism Spectrum Disorders*, 6:1, 304–310.
- Kagohara, D. M., van der Meer, L., Achmadi, D., Green, V. A., O'Reilly, M. F., Lancioni, G. E. et al. (2012) Teaching picture naming to two adolescents with autism spectrum disorders using systematic instruction and speech-generating devices, in *Research in Autism Spectrum Disorders*, 6:3, 1224–1233.
- Kaiser, A. and Roberts, M. (2013) Parent-implemented enhanced milieu teaching with preschool children who have intellectual disabilities, in *Journal of Speech, Language and Hearing Research*, 56, 295–310.
- Kang, S., O'Reilly, M., Rojeski, L., Blenden, K., Xu, Z., Davis, T. et al. (2013) Effects of tangible and social reinforcers on skill acquisition, stereotyped behavior and task engagement in three children with autism spectrum disorders, in *Research in Developmental Disabilities*, 34:2, 739–744.
- Kaplan-Reimer, H., Sidener, T., Reeve, K. and Sidener, D. (2011) Using stimulus control procedures to teach indoor rock climbing to children with autism, in *Behavioral Interventions*, 26, 1–22.
- Karsten, A. M. and Carr, J. E. (2009) The effects of differential reinforcement of unprompted responding on the skill acquisition of children with autism, in *Journal of Applied Behavior Analysis*, 42:2, 327–334.
- Kasari, C., Paparella, T., Freeman, S. and Jahromi, L. B. (2008) Language outcome in autism: randomized comparison of joint attention and play interventions, in *Journal of Consulting and Clinical Psychology*, 76:1, 125–137.
- Keay-Bright, W. and Howarth, I. (2011) Is simplicity the key to engagement for children on the autism spectrum? in *Personal and Ubiquitous Computing*, 16:2, 129–141.
- Keen, D., Couzens, D., Muspratt, S. and Rodger, S. (2010) The effects of a parent-focused intervention for children with a recent diagnosis of autism spectrum disorder on parenting stress and competence, in *Research in Autism Spectrum Disorders*, 4:2, 229–241.
- Kim, E. S., Berkovits, L. D., Bernier, E. P., Leyzberg, D., Shic, F., Paul, R. and Scassellati, B. (2013) Social robots as embedded reinforcers of social behavior in children with autism, in *Journal of Autism and Developmental Disorders*, 43:5, 1038–1949.
- Kim, J., Wigram, T. and Gold, C. (2008) The effects of improvisational music therapy on joint attention behaviors in autistic children: a randomized controlled study, in *Journal of Autism and Developmental Disorders*, 38:9, 1758–176.
- King, M. J. and Valdovinos, M. G. (2009) Social validity of behavioral practices in the treatment of autism – A review of the Super Nanny, in *Research in Autism Spectrum Disorders*, 3:1, 173–178.
- Klein, J. L., Macdonald, R. F. P., Vaillancourt, G., Ahearn, W. H. and Dube, W. V. (2009) Teaching discrimination of adult gaze direction to children with autism, in *Research in Autism Spectrum Disorders*, 3:1, 42–49.
- Klett, L. S. and Turan, Y. (2011) Generalized effects of social stories with task analysis for teaching menstrual care to three young girls with autism, in *Sexuality and Disability*, 30:3, 319–336.
- Knight, V. F., Spooner, F., Browder, D. M., Smith, B. R. and Wood, C. L. (2013) Using systematic instruction and graphic organizers to teach science concepts to students with autism spectrum disorders and intellectual disability, in *Focus on Autism and Other Developmental Disabilities*, 28:2, 115–126.

- Kodak, T., Clements, A. and LeBlanc, B. (2013) A rapid assessment of instructional strategies to teach auditory-visual conditional discriminations to children with autism, in *Research in Autism Spectrum Disorders*, 7:6, 801–807.
- Koegel, L., Singh, A. and Koegel, R. (2010) Improving motivation for academics in children with autism, in *Journal of Autism and Developmental Disorders*, 40, 1057–1066.
- Koegel, R. L., Vernon, T. W. and Koegel, L. K. (2009) Improving social initiations in young children with autism using reinforcers with embedded social interactions, in *Journal of Autism and Developmental Disorders*, 39:9, 1240–1251.
- Koegel, R., Shirotova, L. and Koegel, L. (2009) Brief report: Using individualized orienting cues to facilitate first-word acquisition in non-responders with autism, in *Journal of Autism and Developmental Disorders*, 39, 1587–1592.
- Kooistra, E. T., Buchmeier, A. L. and Klatt, K. P. (2012) The effect of motivating operations on the transfer from tacts to mands for children diagnosed with autism, in *Research in Autism Spectrum Disorders*, 6:1, 109–114.
- Kourkoulou, A., Leekam, S. R. and Findlay, J. M. (2012) Implicit learning of local context in autism spectrum disorder, in *Journal of Autism and Developmental Disorders*, 42:2, 244–256.
- Kovshoff, H., Hastings, R. P. and Remington, B. (2011) Two-year outcomes for children with autism after the cessation of early intensive behavioral intervention, in *Behavior Modification*, 35:5, 427–450.
- Kozima, H., Michalowski, M. P. and Nakagawa, C. (2008) Keepon, in *International Journal of Social Robotics*, 1, 3–18.
- Kroeger, K. and Sorensen, R. (2010) A parent training model for toilet training children with autism, in *Journal of Intellectual Disability Research*, 54:6, 556–567.
- Kurt, O. (2011) A comparison of discrete trial teaching with and without gestures/signs in teaching receptive language skills to children with autism, in *Educational Sciences: Theory and Practice*, 11:3, 1436–1444.
- Laarhoven, T., Van, Winiarski, L., Blood, E. and Chan, J. (2012) Maintaining vocational skills of individuals with autism and developmental disabilities through video modeling, in *Education and Training in Autism and Developmental Disabilities*, 47:4, 447–461.
- Lamella, L. and Tincani, M. (2012) Brief wait time to increase response opportunity and correct responding of children with autism spectrum disorder who display challenging behavior, in *Journal of Developmental and Physical Disabilities*, 24, 559–573.
- Landa, R. J., Holman, K. C., O’Neill, A. H. and Stuart, E. A. (2011) Intervention targeting development of socially synchronous engagement in toddlers with autism spectrum disorder: A randomized controlled trial, in *Journal of Child Psychology and Psychiatry*, 52:1, 13–21.
- Lang, R., O’Reilly, M., Sigafoos, J., Machalicek, W., Rispoli, M., Lancioni, G. E. et al. (2010) The effects of an abolishing operation intervention component on play skills, challenging behavior and stereotypy, in *Behavior Modification*, 34:4, 267–289.
- Lang, R., Shogren, K. A., Machalicek, W., Rispoli, M., O’Reilly, M., Baker, S. and Regester, A. (2009) Video self-modeling to teach classroom rules to two students with Asperger’s, in *Research in Autism Spectrum Disorders*, 3:2, 483–488.

- Lawton, K. and Kasari, C. (2012) Brief report: longitudinal improvements in the quality of joint attention in preschool children with autism, in *Journal of Autism and Developmental Disorders*, 42:2, 307–312.
- Leaf, J. B., Dotson, W. H., Oppenheim, M. L., Sheldon, J. B. and Sherman, J. a. (2010) The effectiveness of a group teaching interaction procedure for teaching social skills to young children with a pervasive developmental disorder, in *Research in Autism Spectrum Disorders*, 4:2, 186–198.
- Leaf, J. B., Oppenheim-Leaf, M. L., Call, N. A., Sheldon, J. B., Sherman, J. A, Taubman, M. et al. (2012) Comparing the teaching interaction procedure to social stories for people with autism, in *Journal of Applied Behavior Analysis*, 45:2, 281–298.
- Leaf, J. B., Sheldon, J. B. and Sherman, J. A. (2010) Comparison of simultaneous prompting and no-no prompting in two-choice discrimination learning with children with autism, in *Journal of Applied Behavior Analysis*, 43:2, 215–228.
- Leaf, J. B., Taubman, M., Bloomfield, S., Palos-Rafuse, L., Leaf, R., McEachin, J. and Oppenheim, M. L. (2009) Increasing social skills and pro-social behavior for three children diagnosed with autism through the use of a teaching package, in *Research in Autism Spectrum Disorders*, 3:1, 275–289.
- Leaf, J., Oppenheim-Leaf, M., Dotson, W., Johnson, V., Courtemanche, A., Sheldon, J. and Sherman, J. (2011) Effects of no-no prompting on teaching expressive labeling of facial expressions to children with and without a pervasive developmental disorder, in *Education and Training in Autism and Developmental Disabilities*, 46:2, 186–203.
- Leaf, J., Tsuji, K., Lentell, A., Dale, S., Kassardjian, A., Taubman, M. et al. (2013) A comparison of discrete trial teaching implemented in a one-to-one instructional format and in a group instructional format, in *Behavioral Interventions*, 28, 82–106.
- Leew, S. V., Stein, N. G. and Gibbard, W. Ben. (2010) Weighted vests' effect on social attention for toddlers with autism spectrum disorders, in *Canadian Journal of Occupational Therapy*, 77:2, 113–124.
- Lerna, A., Esposito, D., Conson, M., Russo, L. and Massagli, A. (2012) Social-communicative effects of the Picture Exchange Communication System (PECS) in autism spectrum disorders, in *International Journal of Language and Communication Disorders*, 47:5, 609–617.
- Lerner, M. D. and Mikami, A. Y. (2012) A preliminary randomized controlled trial of two social skills interventions for youth with high-functioning autism spectrum disorders, in *Focus on Autism and Other Developmental Disabilities*, 27:3, 147–157.
- Lerner, M. D., Mikami, A. Y. and Levine, K. (2011) Socio-dramatic affective-relational intervention for adolescents with Asperger syndrome and high functioning autism: pilot study, in *Autism*, 15:1, 21–42.
- Li, K., Lou, S., Tsai, H. and Shih, R. (2012) The effects of applying game-based learning to webcam motion sensor games for autistic students' sensory integration training, in *Turkish Online Journal of Educational Technology*, 11:4, 451–459.
- Lopata, C., Thomeer, M. L., Volker, M. A., Nida, R. E. and Lee, G. K. (2008) Effectiveness of a manualized summer social treatment program for high-functioning children with autism spectrum disorders, in *Journal of Autism and Developmental Disorders*, 38:5, 890–904
- Lopata, C., Thomeer, M. L., Volker, M. A., Toomey, J. A., Nida, R. E., Lee, G. K. et al. (2010) RCT of a manualized social treatment for high-functioning autism spectrum disorders, in *Journal of Autism and Developmental Disorders*, 40:11, 1297–310.

- Lough, C. L., Rice, M. S. and Lough, L. G. (2012) Choice as a strategy to enhance engagement in a colouring task in children with autism spectrum disorders, in *Occupational Therapy International*, 19:4, 204–211.
- Lu, L., Petersen, F., Lacroix, L. and Rousseau, C. (2010) Stimulating creative play in children with autism through sandplay, in *The Arts in Psychotherapy*, 37:1, 56–64.
- Lund, S. K. and Troha, J. M. (2008) Teaching young people who are blind and have autism to make requests using a variation on the picture exchange communication system with tactile symbols: a preliminary investigation, in *Journal of Autism and Developmental Disorders*, 38:4, 719–730.
- Lydon, H., Healy, O. and Leader, G. (2011) A comparison of video modeling and pivotal response training to teach pretend play skills to children with autism spectrum disorder, in *Research in Autism Spectrum Disorders*, 5:2, 872–884.
- MacDonald, J. M., Ahearn, W. H., Parry-Cruwys, D., Bancroft, S. and Dube, W. V. (2013) Persistence during extinction: Examining the effects of continuous and intermittent reinforcement on problem behavior, in *Journal of Applied Behavior Analysis*, 46:1, 333–338.
- Madzharova, M., Sturmey, P. and Jones, E. (2012) Training staff to increase manding in students with autism: Two preliminary case studies, in *Behavioral Interventions*, 27, 224–235.
- Magiati, I., Moss, J., Charman, T. and Howlin, P. (2011) Patterns of change in children with autism spectrum disorders who received community based comprehensive interventions in their pre-school years: A seven year follow-up study, in *Research in Autism Spectrum Disorders*, 5:3, 1016–1027.
- Marchese, N. V., Carr, J. E., LeBlanc, L. A., Rosati, T. C. and Conroy, S. A. (2012) The effects of the question “What is this?” on tact-training outcomes of children with autism, in *Journal of Applied Behavior Analysis*, 45:3, 539–547.
- Marcus, A., Sinnott, B., Bradley, S. and Grey, I. (2010) Treatment of idiopathic toe-walking in children with autism using GaitSpot Auditory Speakers and simplified habit reversal, in *Research in Autism Spectrum Disorders*, 4:2, 260–267.
- Marcus, A. and Wilder, D. A. (2009) A comparison of peer video modeling and self video modeling to teach textual responses in children with autism, in *Journal of Applied Behavior Analysis*, 42:2, 335–341.
- Martens, B. K., Gertz, L. E., Lacy Werder, C. S. and Rymanowski, J. L. (2010) Agreement Between Descriptive and Experimental Analyses of Behavior under Naturalistic Test Conditions, in *Journal of Behavioral Education*, 19:3, 205–221.
- Marzullo-Kerth, D., Reeve, S. A., Reeve, K. F. and Townsend, D. B. (2011) Using multiple-exemplar training to teach a generalized repertoire of sharing to children with autism, in *Journal of Applied Behavior Analysis*, 44:2, 279–294.
- Mashal, N. and Kasirer, A. (2011) Thinking maps enhance metaphoric competence in children with autism and learning disabilities, in *Research in Developmental Disabilities*, 32:6, 2045–2054.
- Mason, R. A., Rispoli, M., Ganz, J. B., Boles, M. B. and Orr, K. (2012) Effects of video modeling on communicative social skills of college students with Asperger syndrome, in *Developmental Neurorehabilitation*, 15:6, 425–434.
- Matsuda, S. and Yamamoto, J. (2013) Intervention for increasing the comprehension of affective prosody in children with autism spectrum disorders, in *Research in Autism Spectrum Disorders*, 7:8, 938–946.

- Mavropoulou, S., Papadopoulou, E. and Kakana, D. (2011) Effects of task organization on the independent play of students with autism spectrum disorders, in *Journal of Autism and Developmental Disorders*, 41:7, 913–925.
- May, R. J., Hawkins, E. and Dymond, S. (2013) Brief report: Effects of tact training on emergent intraverbal vocal responses in adolescents with autism, in *Journal of Autism and Developmental Disorders*, 43:4, 996–1004.
- McClellan, B. and Grey, I. (2012) An evaluation of an intervention sequence outline in positive behaviour support for people with autism and severe escape-motivated challenging behaviour, in *Journal of Intellectual and Developmental Disability*, 37:3, 209–220.
- McConkey, R., MacLeod, S. and Cassidy, A. (2011) The Keyhole® Rainbow Resource Kit: Meeting the needs of parents of newly diagnosed preschoolers with ASD, in *Early Child Development and Care*, 181:3, 321–334.
- McConkey, R., Truesdale-Kennedy, M., Crawford, H., McGreevy, E., Reavey, M. and Cassidy, A. (2010) Preschoolers with autism spectrum disorders: Evaluating the impact of a home-based intervention to promote their communication, in *Early Child Development and Care*, 180:3, 299–315.
- McDuffie, A. S., Lieberman, R. G. and Yoder, P. J. (2012) Object interest in autism spectrum disorder: A treatment comparison, in *Autism*, 16:4, 398–405.
- McNally Keehn, R. H., Lincoln, A. J., Brown, M. Z. and Chavira, D. A. (2013) The Coping Cat program for children with anxiety and autism spectrum disorder: a pilot randomized controlled trial, in *Journal of Autism and Developmental Disorders*, 43:1, 57–67.
- Mechling, L. C., Ayres, K. M., Foster, A. L. and Bryant, K. J. (2013) Comparing the effects of commercially available and custom-made video prompting for teaching cooking skills to high school students with autism, in *Remedial and Special Education*, 1–13.
- Mechling, L. and Ayres, K. (2012) A comparative study: Completion of fine motor office related tasks by high school students with autism using video models on large and small screen sizes, in *Journal of Autism and Developmental Disorders*, 42:11, 2364–2373.
- Mechling, L., Gast, D. and Seid, N. (2009) Using a personal digital assistant to increase independent task completion by students with autism spectrum disorder, in *Journal of Autism and Developmental Disorders*, 39, 1420–1434.
- Meier, A. E., Fryling, M. J. and Wallace, M. D. (2012) Using high-probability foods to increase the acceptance of low-probability foods, in *Journal of Applied Behavior Analysis*, 45:1, 149–153.
- Mims, P. J., Hudson, M. E. and Browder, D. M. (2012) Using read-alouds of grade-level biographies and systematic prompting to promote comprehension for students with moderate and severe developmental disabilities, in *Focus on Autism and Other Developmental Disabilities*, 27:2, 67–80.
- Minjarez, M. B., Mercier, E. M., Williams, S. E. and Hardan, A. Y. (2012) Impact of pivotal response training group therapy on stress and empowerment in parents of children with autism, in *Journal of Positive Behavior Interventions*, 15:2, 71–78.
- Minjarez, M. B., Williams, S. E., Mercier, E. M. and Hardan, A. Y. (2011) Pivotal response group treatment program for parents of children with autism, in *Journal of Autism and Developmental Disorders*, 41:1, 92–101.
- Minne, E. P. and Semrud-Clikeman, M. (2012) A social competence intervention for young children with high functioning autism and Asperger syndrome: A pilot study, in *Autism*, 16:6, 586–602.

- Moore, T. R. and Symons, F. J. (2011) Adherence to treatment in a behavioral intervention curriculum for parents of children with autism spectrum disorder, in *Behavior Modification*, 35:6, 570–594.
- Mrug, S. and Hodgens, J. B. (2008) Behavioral summer treatment program improves social and behavioral functioning of four children with Asperger's disorder, in *Clinical Case Studies*, 7:3, 171–190.
- Mulholland, R., Pete, A. and Popeson, J. (2008) Using animated language software with children diagnosed with autism spectrum disorders, in *TEACHING Exceptional Children Plus*, 4:6, 1–9.
- Murphy, C. and Barnes-Holmes, D. (2009) Derived more-less relational mands in children diagnosed with autism, in *Journal of Applied Behavior Analysis*, 42:2, 253–268.
- Murray, M., Ackerman-Spain, K., Williams, E. and Ryley, A. (2011) Knowledge is power: Empowering the autism community through parent-professional training, in *The School Community Journal*, 21:1, 19–36.
- Naoi, N., Tsuchiya, R., Yamamoto, J.-I. and Nakamura, K. (2008) Functional training for initiating joint attention in children with autism, in *Research in Developmental Disabilities*, 29:6, 595–609.
- Napolitano, D. A., Smith, T., Zarcone, J. R., Goodkin, K. and McAdam, D. B. (2010) Increasing response diversity in children with autism, in *Journal of Applied Behavior Analysis*, 43:2, 265–271.
- Neely, L., Rispoli, M., Camargo, S., Davis, H. and Boles, M. (2013) The effect of instructional use of an iPad® on challenging behavior and academic engagement for two students with autism, in *Research in Autism Spectrum Disorders*, 7:4, 509–516.
- Newman, B., Reinecke, D. and Ramos, M. (2009) Is a reasonable attempt reasonable? Shaping versus reinforcing verbal attempts of preschoolers with autism, in *The Analysis of Verbal Behavior*, 25, 67–72.
- Nigro-Bruzzi, D. and Sturmey, P. (2010) The effects of behavioral skills training on mand training by staff and unprompted vocal mands by children, in *Journal of Applied Behavior Analysis*, 43:4, 757–761.
- Nikopoulos, C. K., Canavan, C. and Nikopoulou-Smyrni, P. (2008) Generalized effects of video modeling on establishing instructional stimulus control in children with autism: results of a preliminary study, in *Journal of Positive Behavior Interventions*, 11:4, 198–207.
- Normand, M. P. and Beaulieu, L. (2011) Further evaluation of response-independent delivery of preferred stimuli and child compliance, in *Journal of Applied Behavior Analysis*, 44:3, 665–669.
- O'Reilly, M., Lang, R., Davis, T., Rispoli, M., Machalicek, W., Sigafos, J. et al. (2009) A systematic examination of different parameters of pre-session exposure to tangible stimuli that maintain problem behavior, in *Journal of Applied Behavior Analysis*, 42:4, 773–783.
- Olivier, M. A. and Ah Hing, A. D. (2009) Autistic spectrum disorder (ASD): Parental challenges and strategies, in *Vulnerable Children and Youth Studies*, 4:1, 58–66.
- Oppenheim-Leaf, M. L., Leaf, J. B., Dozier, C., Sheldon, J. B. and Sherman, J. A. (2012) Teaching typically developing children to promote social play with their siblings with autism, in *Research in Autism Spectrum Disorders*, 6:2, 777–791.
- Osborne, L. A., McHugh, L., Saunders, J. and Reed, P. (2008) Parenting stress reduces the effectiveness of early teaching interventions for autistic spectrum disorders, in *Journal of Autism and Developmental Disorders*, 38:6, 1092–1103.

- Ozen, A., Batu, S. and Birkan, B. (2012) Teaching play skills to children with autism through video modeling: Small group arrangement and observational learning, in *Education and Training in Autism and Developmental Disabilities*, 47:1, 84–96.
- Pajareya, K. and Nopmaneejumruslers, K. (2011) A pilot randomized controlled trial of DIR/Floortime™ parent training intervention for pre-school children with autistic spectrum disorders, in *Autism*, 15:5, 563–577.
- Palmen, A. and Didden, R. (2012) Task engagement in young adults with high-functioning autism spectrum disorders: Generalization effects of behavioral skills training, in *Research in Autism Spectrum Disorders*, 6:4, 1377–1388.
- Palmen, A., Didden, R. and Arts, M. (2008) Improving question asking in high-functioning adolescents with autism spectrum disorders: Effectiveness of small-group training, in *Autism*, 12(1), 83–98.
- Palmen, A., Didden, R. and Korzilius, H. (2010) Effectiveness of behavioral skills training on staff performance in a job training setting for high-functioning adolescents with autism spectrum disorders, in *Research in Autism Spectrum Disorders*, 4:4, 731–740.
- Palmen, A., Didden, R. and Korzilius, H. (2011) An outpatient group training programme for improving leisure lifestyle in high-functioning young adults with ASD: a pilot study, in *Developmental Neurorehabilitation*, 14:5, 297–309.
- Pan, C.-Y. (2011) The efficacy of an aquatic program on physical fitness and aquatic skills in children with and without autism spectrum disorders, in *Research in Autism Spectrum Disorders*, 5:1, 657–665.
- Park, J. H., Alber-Morgan, S. R. and Cannella-Malone, H. (2010) Effects of mother-implemented Picture Exchange Communication System (PECS) training on independent communicative behaviors of young children with autism spectrum disorders, in *Topics in Early Childhood Special Education*, 31:1, 37–47.
- Patterson, S. Y. and Smith, V. (2011) The experience of parents of toddlers diagnosed with autism spectrum disorder in the more than words parent education program, in *Infants and Young Children*, 24:4, 329–343.
- Paul, R., Campbell, D., Gilbert, K. and Tsiouri, I. (2013) Comparing spoken language treatments for minimally verbal preschoolers with autism spectrum disorders, in *Journal of Autism and Developmental Disorders*, 43:2, 418–431.
- Paynter, J. and Peterson, C. C. (2013) Further evidence of benefits of thought-bubble training for theory of mind development in children with autism spectrum disorders, in *Research in Autism Spectrum Disorders*, 7:2, 344–348.
- Perry, A., Cummings, A., Dunn Geier, J., Freeman, N. L., Hughes, S., LaRose, L. et al. (2008) Effectiveness of intensive behavioral intervention in a large, community-based program, in *Research in Autism Spectrum Disorders*, 2:4, 621–642.
- Persicke, A., Tarbox, J., Ranick, J. and St. Clair, M. (2012) Establishing metaphorical reasoning in children with autism, in *Research in Autism Spectrum Disorders*, 6:2, 913–920.
- Persicke, A., Tarbox, J., Ranick, J. and St. Clair, M. (2013) Teaching children with autism to detect and respond to sarcasm, in *Research in Autism Spectrum Disorders*, 7:1, 193–198.
- Pfeiffer, B. A., Koenig, K., Kinnealey, M., Sheppard, M. and Henderson, L. (2011) Effectiveness of sensory integration interventions in children with autism spectrum disorders: A pilot study, in *American Journal of Occupational Therapy*, 65:1, 76–85.

- Pillay, M., Alderson-Day, B., Wright, B., Williams, C. and Urwin, B. (2011) Autism spectrum conditions – Enhancing nurture and development (ASCEND): an evaluation of intervention support groups for parents, in *Clinical Child Psychology and Psychiatry*, 16:1, 5–20.
- Pitts, L. and Dymond, S. (2012) Increasing compliance of children with autism: Effects of programmed reinforcement for high-probability requests and varied inter-instruction intervals, in *Research in Autism Spectrum Disorders*, 6:1, 135–143.
- Plavnick, J. B. and Ferreri, S. J. (2012) Collateral effects of mand training for children with autism, in *Research in Autism Spectrum Disorders*, 6:4, 1366–1376.
- Polick, A. S., Carr, J. E. and Hanney, N. M. (2012) A comparison of general and descriptive praise in teaching intraverbal behavior to children with autism, in *Journal of Applied Behavior Analysis*, 45:3, 593–599.
- Preece, D. and Almond, J. (2008) Supporting families with children on the autism spectrum: using structured teaching approaches in the home and community, in *Good Autism Practice*, 9(2), 44–53.
- Prelock, P. A., Calhoun, J., Morris, H. and Platt, G. (2011) Supporting parents to facilitate communication and joint attention in their young children with autism spectrum disorders, in *Topics in Language Disorders*, 31:3, 210–234.
- Probst, P. and Glen, I. (2011) TEACCH-based interventions for families with children with autism spectrum disorders: Outcomes of a parent group training study and a home-based child-parent training single case study, in *Life Span and Disability*, 2, 111–138.
- Ratcliff, J. (2008) Amazing awareness bands: How wristbands help convey emotion, in *Good Autism Practice*, 9:2, 39–43.
- Rayner, C. (2011) Teaching students with autism to tie a shoelace knot using video prompting and backward chaining, in *Developmental Neurorehabilitation*, 14:6, 339–347.
- Reagon, K. A. and Higbee, T. S. (2009) Parent-implemented script fading to promote play-based verbal initiations in children with autism, in *Journal of Applied Behavior Analysis*, 42:3, 659–664.
- Reichow, B. and Wolery, M. (2011) Comparison of progressive prompt delay with and without instructive feedback, in *Journal of Applied Behavior Analysis*, 44:2, 327–340.
- Roberts, D. and Pickering, N. (2010) Parent training programme for autism spectrum disorders: an evaluation, in *Community Practitioner*, 83:10, 27–30.
- Rockwell, S. B., Griffin, C. C. and Jones, H. a. (2011) Schema-based strategy instruction in mathematics and the word problem-solving performance of a student with autism, in *Focus on Autism and Other Developmental Disabilities*, 26:2, 87–95.
- Rodger, S. and Brandenburg, J. (2009) Cognitive orientation to (daily) occupational performance (CO-OP) with children with Asperger's syndrome who have motor-based occupational performance goals, in *Australian Occupational Therapy Journal*, 56:1, 41–50.
- Rodger, S., Keen, D., Braithwaite, M. and Cook, S. (2008) Mothers' satisfaction with a home based early intervention programme for children with ASD, in *Journal of Applied Research in Intellectual Disabilities*, 21:2, 174–182.

- Rodger, S. and Vishram, A. (2010) Mastering social and organization goals: strategy use by two children with Asperger syndrome during cognitive orientation to daily occupational performance, in *Physical and Occupational Therapy in Pediatrics*, 30:4, 264–276.
- Rogers, L., Hemmeter, M. L. and Wolery, M. (2010) Using a constant time delay procedure to teach foundational swimming skills to children with autism, in *Topics in Early Childhood Special Education*, 30:2, 102–111.
- Rogers, S. J., Estes, A., Lord, C., Vismara, L., Winter, J., Fitzpatrick, A. et al. (2012) Effects of a brief Early Start Denver model (ESDM)-based parent intervention on toddlers at risk for autism spectrum disorders: a randomized controlled trial, in *Journal of the American Academy of Child and Adolescent Psychiatry*, 51:10, 1052–1065.
- Rose, R. and Anketell, C. (2009) The benefits of social skills groups for young people with autism spectrum disorder: A pilot study, in *Child Care in Practice*, 15:2, 127–144.
- Roxburgh, C. A. and Carbone, V. J. (2013) The effect of varying teacher presentation rates on responding during discrete trial training for two children with autism, in *Behavior Modification*, 37:3, 298–323.
- Samuels, R. and Stansfield, J. (2012) The effectiveness of social stories™ to develop social interactions with adults with characteristics of autism spectrum disorder, in *British Journal of Learning Disabilities*, 40:4, 272–285.
- Sanefuji, W. and Ohgami, H. (2013) “Being-imitated” strategy at home-based intervention for young children with autism, in *Infant Mental Health Journal*, 34:1, 72–79.
- Saylor, S., Sidener, T. M., Reeve, S. A., Fetherston, A. and Progar, P. R. (2012) Effects of three types of noncontingent auditory stimulation on vocal stereotypy in children with autism, in *Journal of Applied Behavior Analysis*, 45:1, 185–190.
- Schertz, H. H., Odom, S. L., Baggett, K. M. and Sideris, J. H. (2013) Effects of Joint attention mediated learning for toddlers with autism spectrum disorders: An initial randomized controlled study, in *Early Childhood Research Quarterly*, 28:2, 249–258.
- Schrandt, J. A., Townsend, D. B. and Poulson, C. L. (2009) Teaching empathy skills to children with autism, in *Journal of Applied Behavior Analysis*, 42:1, 17–32.
- Schreibman, L., Stahmer, A. C., Barlett, V. C. and Dufek, S. (2009) Brief report: Toward refinement of a predictive behavioral profile for treatment outcome in children with autism, in *Research in Autism Spectrum Disorders*, 3:1, 163–172.
- Sears, K. M., Blair, K.-S. C., Lovannone, R. and Crosland, K. (2013) Using the prevent–teach–reinforce model with families of young children with ASD, in *Journal of Autism and Developmental Disorders*, 43:5, 1005–1016.
- Shillingsburg, M. A., Valentino, A. L., Bowen, C. N., Bradley, D. and Zavatkay, D. (2011) Teaching children with autism to request information, in *Research in Autism Spectrum Disorders*, 5:1, 670–679.
- Siller, M., Hutman, T. and Sigman, M. (2013) A parent-mediated intervention to increase responsive parental behaviors and child communication in children with ASD: a randomized clinical trial, in *Journal of Autism and Developmental Disorders*, 43:3, 540–555.
- Simpson, K. and Keen, D. (2009) Teaching young children with autism graphic symbols embedded within an interactive song, in *Journal of Developmental and Physical Disabilities*, 22:2, 165–177.

- Singh, N. N., Lancioni, G. E., Manikam, R., Winton, A. S. W., Singh, A. N. A., Singh, J. and Singh, A. D. A. (2011) A mindfulness-based strategy for self-management of aggressive behavior in adolescents with autism, *Research in Autism Spectrum Disorders*, 5:3, 1153–1158.
- Singh, N. N., Lancioni, G. E., Singh, A. D. A., Winton, A. S. W., Singh, A. N. A. and Singh, J. (2011) Adolescents with Asperger syndrome can use a mindfulness-based strategy to control their aggressive behavior, in *Research in Autism Spectrum Disorders*, 5:3, 1103–1109.
- Smith, I. M., Koegel, R. L., Koegel, L. K., Openden, D. A., Fossum, K. L. and Bryson, S. E. (2010) Effectiveness of a novel community-based early intervention model for children with autistic spectrum disorder, in *American Journal on Intellectual and Developmental Disabilities*, 115:6, 504–523.
- Soluaga, D., Leaf, J. B., Taubman, M., McEachin, J. and Leaf, R. (2008) A comparison of flexible prompt fading and constant time delay for five children with autism, in *Research in Autism Spectrum Disorders*, 2:4, 753–765.
- Songlee, D., Miller, S. P., Tincani, M., Sileo, N. M. and Perkins, P. G. (2008) Effects of test-taking strategy instruction on high-functioning adolescents with autism spectrum disorders, in *Focus on Autism and Other Developmental Disabilities*, 23:4, 217–228.
- Sowden, H., Perkins, M. and Clegg, J. (2010) Context and communication strategies in naturalistic behavioural intervention: A framework for understanding how practitioners facilitate communication in children with ASD, in *Child Language Teaching and Therapy*, 27:1, 21–38.
- Sprinkle, E. and Miguel, C. (2013) Establishing derived textual activity schedules in children with autism, in *Behavioral Interventions*, 28, 185–202.
- Sprinkle, E. C. and Miguel, C. F. (2012) The effects of listener and speaker training on emergent relations in children with autism, in *The Analysis of Verbal Behavior*, 28:1, 111–117.
- Stahmer, A. C., Akshoomoff, N. and Cunningham, A. B. (2011) Inclusion for toddlers with autism spectrum disorders: The first ten years of a community program. *Autism*, 15:5, 625–641.
- Steiner, A. M. (2010) A strength-based approach to parent education for children with autism, in *Journal of Positive Behavior Interventions*, 13:3, 178–190.
- Stephens, C. E. (2008) Spontaneous imitation by children with autism during a repetitive musical play routine, in *Autism*, 12:6, 645–671.
- Stichter, J. P., Herzog, M. J., Visovsky, K., Schmidt, C., Randolph, J., Schultz, T. and Gage, N. (2010) Social competence intervention for youth with Asperger Syndrome and high-functioning autism: An initial investigation, in *Journal of Autism and Developmental Disorders*, 40:9, 1067–1079.
- Stockley, C. (2010) The FeelGood PE programme: Designing an autism-friendly PE curriculum in a residential school setting, in *Good Autism Practice*, 11:2, 18–26.
- Stokes, J. and Luiselli, J. (2008) In-home parent training of functional analysis skills, in *International Journal of Behavioral Consultation and Therapy*, 4:3, 259–263.
- Summers, J., Tarbox, J., Findel-Pyles, R. S., Wilke, A. E., Bergstrom, R. and Williams, W. L. (2011) Teaching two household safety skills to children with autism, in *Research in Autism Spectrum Disorders*, 5:1, 629–632.
- Tanaka, J. W., Wolf, J. M., Klaiman, C., Koenig, K., Cockburn, J., Herlihy, L. et al. (2010) Using computerized games to teach face recognition skills to children with autism spectrum disorder: The Let's Face It! program, in *Journal of Child Psychology and Psychiatry and Allied Disciplines*, 51:8, 944–952.

- Tanji, T. and Noro, F. (2011) Matrix training for generative spelling in children with autism spectrum disorder, in *Behavioral Interventions*, 26, 326–339.
- Tanji, T., Takahashi, K. and Noro, F. (2013) Teaching generalized reading and spelling to children with autism, in *Research in Autism Spectrum Disorders*, 7:2, 276–287.
- Tarbox, J., Zuckerman, C. K., Bishop, M. R., Olive, M. L. and O’Hora, D. P. (2011) Rule-governed behavior: Teaching a preliminary repertoire of rule-following to children with autism, in *The Analysis of Verbal Behavior*, 27:1, 125–139.
- Taylor, B. A., DeQuinzio, J. A., and Stine, J. (2012) Increasing observational learning of children with autism: A preliminary analysis, in *Journal of Applied Behavior Analysis*, 45:4, 815–820.
- Tekin-Iftar, E. and Birkan, B. (2008) Small group instruction for students with autism: General case training and observational learning, in *The Journal of Special Education*, 44:1, 50–63.
- Tereshko, L., MacDonald, R. and Ahearn, W. H. (2010) Strategies for teaching children with autism to imitate response chains using video modeling, in *Research in Autism Spectrum Disorders*, 4:3, 479–489.
- Thomeer, M. L., Rodgers, J. D., Lopata, C., McDonald, C. A., Volker, M. A., Toomey, J. A. et al. (2011) Open-trial pilot of mind reading and in vivo rehearsal for children with HFASD, in *Focus on Autism and Other Developmental Disabilities*, 26:3, 153–161.
- Thomeer, M. Lopata, C. Volker, M. Toomey, J. Lee, G. Smerbeck, A. et al. (2012) Randomized clinical trial replication of a psychosocial treatment for children with high-functioning autism spectrum disorders, in *Psychology in the Schools*, 49:10, 942–954.
- Thunberg, G., Sandberg, A. D. and Ahlsen, E. (2009) Speech-generating devices used at home by children with autism spectrum disorders: A preliminary assessment, in *Focus on Autism and Other Developmental Disabilities*, 24:2, 104–114.
- Tincani, M. and Devis, K. (2010) Quantitative synthesis and component analysis of single-participant studies on the Picture Exchange Communication System, in *Remedial and Special Education*, 32:6, 458–470.
- Trivette, C. and Dunst, C. (2011) Consequences of interest-based learning on the social-affective behavior of young children with autism, in *Life Span and Disability*, 2, 101–110.
- Tsiouri, I., Schoen Simmons, E. and Paul, R. (2012) Enhancing the application and evaluation of a discrete trial intervention package for eliciting first words in preverbal preschoolers with ASD, in *Journal of Autism and Developmental Disorders*, 42:7, 1281–1293.
- Turan, M. K., Moroz, L. and Croteau, N. P. (2012) Comparing the effectiveness of error-correction strategies in discrete trial training, in *Behavior Modification*, 36:2, 218–234.
- Twarek, M., Cihon, T. and Eshleman, J. (2010) The effects of fluent levels of big 6+6 skill elements on functional motor skills with children with autism, in *Behavioral Interventions*, 25, 275–293.
- Valenti, M., Cerbo, R., Masedu, F., De Caris, M. and Sorge, G. (2010) Intensive intervention for children and adolescents with autism in a community setting in Italy: a single-group longitudinal study, in *Child and Adolescent Psychiatry and Mental Health*, 4:23.
- Van der Meer, L., Sutherland, D., O’Reilly, M. F., Lancioni, G. E. and Sigafos, J. (2012) A further comparison of manual signing, picture exchange and speech-generating devices as communication modes for children with autism spectrum disorders, in *Research in Autism Spectrum Disorders*, 6:4, 1247–1257.

- Van Laarhoven, T., Kraus, E., Karpman, K., Nizzi, R. and Valentino, J. (2010) A comparison of picture and video prompts to teach daily living skills to individuals with autism, in *Focus on Autism and Other Developmental Disabilities*, 25:4, 195–208.
- Vedora, J., Meunier, L. and Mackay, H. (2009) Teaching intraverbal behavior to children with autism: A comparison of textual and echoic prompts, in *The Analysis of Verbal Behavior*, 25, 79–86.
- Venkatesh, S., Greenhill, S., Phung, D., Adams, B. and Duong, T. (2012) Pervasive multimedia for autism intervention, in *Pervasive and Mobile Computing*, 8:6, 863–882.
- Venker, C. E., McDuffie, A., Ellis Weismer, S. and Abbeduto, L. (2012) Increasing verbal responsiveness in parents of children with autism: A pilot study, in *Autism: The International Journal of Research and Practice*, 16:6, 568–585.
- Vernon, T. W., Koegel, R. L., Dauterman, H. and Stolen, K. (2012) An early social engagement intervention for young children with autism and their parents, in *Journal of Autism and Developmental Disorders*, 42:12, 2702–2717.
- Vismara, L. A., Colombi, C. and Rogers, S. J. (2009) Can one hour per week of therapy lead to lasting changes in young children with autism? in *Autism*, 13:1, 93–115.
- Volkert, V. M., Lerman, D. C., Trosclair, N., Addison, L. and Kodak, T. (2008) An exploratory analysis of task-interspersal procedures while teaching object labels to children with autism, in *Journal of Applied Behavior Analysis*, 41:3, 335–350.
- Wacker, D. P., Lee, J. F., Padilla Dalmau, Y. C., Kopelman, T. G., Lindgren, S. D., Kuhle, J. et al. (2013) Conducting functional communication training via telehealth to reduce the problem behavior of young children with autism, in *Journal of Developmental and Physical Disabilities*, 25:1, 35–48.
- Wainer, A. L. and Ingersoll, B. R. (2013) Disseminating ASD interventions: A pilot study of a distance learning program for parents and professionals, in *Journal of Autism and Developmental Disorders*, 43:1, 11–24.
- Wainer, J., Ferrari, E., Dautenhahn, K. and Robins, B. (2010) The effectiveness of using a robotics class to foster collaboration among groups of children with autism in an exploratory study, in *Personal and Ubiquitous Computing*, 14:5, 445–455.
- Walberg, J. L. and Craig-unkefer, L. A. (2010) An examination of the effects of a social communication intervention on the play behaviors of children with autism spectrum disorder, in *Education and Training in Autism and Developmental Disabilities*, 45:1, 69–80.
- Walker, A. N., Barry, T. D. and Bader, S. H. (2010) Therapist and parent ratings of changes in adaptive social skills following a summer treatment camp for children with autism spectrum disorders: A preliminary study. *Child and Youth Care Forum*, 39:5, 305–322.
- Walton, K. M. and Ingersoll, B. R. (2012) Evaluation of a sibling-mediated imitation intervention for young children with autism, in *Journal of Positive Behavior Interventions*, 14:4, 241–253.
- Wang, P. (2008) Effects of a parent training program on the interactive skills of parents of children with autism in China, in *Journal of Policy and Practice in Intellectual Disabilities*, 5:2, 96–104.
- Watkins, N., Paananen, L., Rudrud, E. and Rapp, J. T. (2011) Treating vocal stereotypy with environmental enrichment and response cost, in *Clinical Case Studies*, 10:6, 440–448.

- Wehman, P., Schall, C., McDonough, J., Molinelli, A., Riehle, E., Ham, W. and Thiss, W. R. (2012) Project SEARCH for youth with autism spectrum disorders: increasing competitive employment on transition from high school, in *Journal of Positive Behavior Interventions*, 15:3, 144–155.
- Welterlin, A., Turner-Brown, L. M., Harris, S., Mesibov, G. and Delmolino, L. (2012) The home TEACCHing program for toddlers with autism, in *Journal of Autism and Developmental Disorders*, 42:9, 1827–1835.
- Wentz, E. Nydén, A. and Krevers, B. (2012) Development of an internet-based support and coaching model for adolescents and young adults with ADHD and autism spectrum disorders: A pilot study, in *European Child and Adolescent Psychiatry*, 21:11, 611–622.
- Whalon, K. and Hanline, M. (2008) Effects of a reciprocal questioning intervention on the question generation and responding of children with autism spectrum disorder, in *Education and Training in Developmental Disabilities*, 43:3, 367–387.
- White, E. R., Hoffmann, B., Hoch, H. and Taylor, B. A. (2011a) Teaching teamwork to adolescents with autism: The cooperative use of activity schedules, in *Behavior Analysis in Practice*, 4:1, 27–35.
- White, E. R., Hoffmann, B., Hoch, H. and Taylor, B. A. (2011b) Teaching teamwork to adolescents with autism: The cooperative use of activity schedules, in *Behavior Analysis in Practice*, 4:1, 27–35.
- White, S. W. Ollendick, T. Albano, A. M. Oswald, D. Johnson, C. Southam-Gerow, M. A. et al. (2013) Randomized controlled trial: Multimodal Anxiety and Social Skill Intervention for adolescents with autism spectrum disorder, in *Journal of Autism and Developmental Disorders*, 43:2, 382–934.
- Whittingham, K., Sofronoff, K., Sheffield, J. and Sanders, M. R. (2009) Stepping Stones Triple P: An RCT of a parenting program with parents of a child diagnosed with an autism spectrum disorder, in *Journal of Abnormal Child Psychology*, 37:4, 469–480.
- Whyte, E. M., Nelson, K. E. and Khan, K. S. (2013) Learning of idiomatic language expressions in a group intervention for children with autism, in *Autism*, 17:4, 449–464.
- Wichnick, A. M. Vener, S. M. Pyrtek, M. and Poulson, C. L. (2010) The effect of a script-fading procedure on responses to peer initiations among young children with autism, in *Research in Autism Spectrum Disorders*, 4:2, 290–299.
- Williams, B. T., Gray, K. M. and Tonge, B. J. (2012) Teaching emotion recognition skills to young children with autism: A randomised controlled trial of an emotion training programme, in *Journal of Child Psychology and Psychiatry*, 53:12, 1268–1276.
- Wong, V. and Kwan, Q. (2010) Randomized Controlled trial for early intervention for autism: A pilot study of the autism 1-2-3 Project, in *Journal of Autism and Developmental Disorders*, 40, 677–688.
- Wood, J., Drahota, A., Sze, K., Van Dyke, M., Decker, K., Fujii, C. et al. (2009) Brief report: Effects of cognitive behavioral therapy on parent-reported autism symptoms in school-age children with high-functioning autism, in *Journal of Autism and Developmental Disorders*, 39, 1608–1612.
- Woods-Groves, S., Therrien, W., Hua, Y., Hendricksen, J., Shaw, J. and Hughes, C. (2012) Effectiveness of an essay writing strategy for post-secondary students with developmental disabilities, in *Education and Training in Autism and Developmental Disabilities*, 47:2, 210–222.

- Woods, J. J. and Brown, J. A. (2011) Integrating family capacity-building and child outcomes to support social communication development in young children with autism spectrum disorder, in *Topics in Language Disorders*, 31:3, 235–246.
- Wright, C., Diener, M. L., Dunn, L., Wright, S. D., Linnell, L., Newbold, K. et al. (2011) SketchUp™: A Technology tool to facilitate intergenerational family relationships for children with autism spectrum disorders (ASD), in *Family and Consumer Sciences Research Journal*, 40:2, 135–149.
- Yamashita, Y., Mukasa, A., Honda, Y., Anai, C., Kunisaki, C., Koutaki, J. et al. (2010) Short-term effect of American summer treatment program for Japanese children with attention deficit hyperactivity disorder, in *Brain and Development*, 32:2, 115–122.
- Yanardag, M., Akmanoglu, N. and Yilmaz, I. (2013) The effectiveness of video prompting on teaching aquatic play skills for children with autism, in *Disability and Rehabilitation*, 35:1, 47–56.
- Yanardag, M., Birkan, B., Yilmaz, I., Konukman, F., Agbuga, B. and Liberman, L. (2011) The effects of least-to-most prompting procedure in teaching basic tennis skills to children with autism, in *Kineziologija*, 43:1, 44–55.
- Yilmaz, I., Konukman, F., Birkan, B., Ozen, A., Yanardag, M. and Camursoy, I. (2010) Effects of constant time delay procedure on the Halliwick's method of swimming rotation skills for children with autism, in *Education and Training in Autism and Developmental Disabilities*, 45:1, 124–135.
- Yilmaz, I., Konukman, F., Birkan, B. and Yanardag, M. (2010) Effects of most to least prompting on teaching simple progression swimming skill for children with autism, in *Education and Training in Autism and Developmental Disabilities*, 45:3, 440–448.
- Yoder, P. and Liberman, R. (2010) Brief report: Randomized test of the efficacy of Picture Exchange Communication System on highly generalized picture exchanges in children with ASD, *Journal of Autism and Developmental Disorders*, 40, 629–632.
- Young, R. L. and Posselt, M. (2012) Using the transporters DVD as a learning tool for children with autism spectrum disorders (ASD), *Journal of Autism and Developmental Disorders*, 42:6, 984–991.
- Zachor, D. A. and Ben Itzhak, E. (2010) Treatment approach, autism severity and intervention outcomes in young children, *Research in Autism Spectrum Disorders*, 4:3, 425–432.
- Zingale, M., Belfiore, G., Mongelli, V., Trubia, G. and Buono, S. (2008) Organization of a family training service pertaining to intellectual disabilities, *Journal of Policy and Practice in Intellectual Disabilities*, 5:1, 69–72.

Excluded, EC4 – Reports no outcomes measures about the children/young people with ASD

- Allen, D., Rogers, J. and Thomas, G. (2009) The Hollies Booster Class: Specialised provision to maximise the potential of children on the autism spectrum to access education in a mainstream school, in *Good Autism Practice*, 10:2, 44–49.
- Barnes, C. S., Dunning, J. L. and Rehfeldt, R. A. (2011) An evaluation of strategies for training staff to implement the picture exchange communication system, in *Research in Autism Spectrum Disorders*, 5:4, 1574–1583.
- Behrends, A., Müller, S. and Dziobek, I. (2012) Moving in and out of synchrony: A concept for a new intervention fostering empathy through interactional movement and dance, in *The Arts in Psychotherapy*, 39:2, 107–116.

- Birkin, C., Anderson, A., Seymour, F. and Moore, D. W. (2008) A parent-focused early intervention program for autism: Who gets access? in *Journal of Intellectual and Developmental Disability*, 33:2, 108–116.
- Cebula, K. R. (2012) Applied behavior analysis programs for autism: Sibling psychosocial adjustment during and following intervention use, in *Journal of Autism and Developmental Disorders*, 42:5, 847–862.
- Downs, A. and Downs, R. C. (2012) Training new instructors to implement discrete trial teaching strategies with children with autism in a community-based intervention program, in *Focus on Autism and Other Developmental Disabilities*, 1–10.
- Eldevik, S., Ondire, I., Hughes, J. C., Grindle, C. F., Randell, T. and Remington, B. (2013) Effects of computer simulation training on in vivo discrete trial teaching, in *Journal of Autism and Developmental Disorders*, 43:3, 569–578.
- Feldman, E. K. and Matos, R. (2012) Training paraprofessionals to facilitate social interactions between children with autism and their typically developing peers, in *Journal of Positive Behavior Interventions*, 15:3, 169–179.
- Glod, M. (2013) Teaching emotion recognition skills to young children with autism: a randomised controlled trial of an emotion training programme, in *Child: Care, Health and Development*, 39:4, 613–613.
- Granger, S., des Rivieres-Pigeon, C., Sabourin, G. and Forget, J. (2010) Mothers' reports of their involvement in early intensive behavioral intervention, in *Topics in Early Childhood Special Education*, 32:2, 68–77.
- Grey, I., Lynn, E. and McClean, B. (2010) Parents of children with autism, in *The Irish Journal of Psychology*, 31:3-4, 111–124.
- Grindle, C. F., Kovshoff, H., Hastings, R. P., and Remington, B. (2009) Parents' experiences of home-based applied behavior analysis programs for young children with autism, in *Journal of Autism and Developmental Disorders*, 39:1, 42–56.
- Guldborg, K. (2010) Educating children on the autism spectrum: Preconditions for inclusion and notions of "best autism practice" in the early years, in *British Journal of Special Education*, 37:4, 168–174.
- Hall, L. and Grundon, G. (2010) Training paraprofessionals to use behavioral strategies when educating learners with autism spectrum disorders across environments, in *Behavioral Interventions*, 25, 37–51.
- Hamad, C. D., Serna, R. W., Morrison, L. and Fleming, R. (2010) Extending the reach of early intervention training for practitioners, in *Infants and Young Children*, 23:3, 195–208.
- Hess, K. L., Morrier, M. J., Heflin, L. J. and Ivey, M. L. (2008) Autism treatment survey: Services received by children with autism spectrum disorders in public school classrooms, in *Journal of Autism and Developmental Disorders*, 38:5, 961–971.
- Hume, K., Boyd, B., McBee, M., Coman, D., Gutierrez, A., Shaw, E. et al. (2011) Assessing implementation of comprehensive treatment models for young children with ASD: Reliability and validity of two measures, in *Research in Autism Spectrum Disorders*, 5:4, 1430–1440.
- Keane, E., Aldridge, F. J., Costley, D. and Clark, T. (2012) Students with autism in regular classes: A long-term follow-up study of a satellite class transition model. *International Journal of Inclusive Education*, 16:10, 1001–1017.
- Kobak, K. A, Stone, W. L., Wallace, E., Warren, Z., Swanson, A. and Robson, K. (2011) A web-based tutorial for parents of young children with autism: results from a pilot study, in *Telemedicine Journal and E-Health*, 17:10, 804–808.

- Kraemer, B. R., Cook, C. R., Browning-Wright, D., Mayer, G. R., and Wallace, M. D. (2008) Effects of training on the use of the behavior support plan quality evaluation guide with autism educators: A preliminary investigation examining positive behavior support plans, in *Journal of Positive Behavior Interventions*, 10:3, 179–189.
- Kuo, C.-C., Maker, J., Su, F.-L. and Hu, C. (2010) Identifying young gifted children and cultivating problem solving abilities and multiple intelligences, in *Learning and Individual Differences*, 20:4, 365–379.
- Lerman, D. C., Tetreault, A., Hovanetz, A., Strobel, M. and Garro, J. (2008) Further evaluation of a brief, intensive teacher-training model, in *Journal of Applied Behavior Analysis*, 41:2, 243–248.
- Lorenzo, G., Pomares, J. and Lledó, A. (2013) Inclusion of immersive virtual learning environments and visual control systems to support the learning of students with Asperger syndrome, in *Computers and Education*, 62, 88–101.
- McAteer, M. and Wilkinson, M. (2009) Adult style: What helps to facilitate interaction and communication with children on the autism spectrum? in *Good Autism Practice*, 10:2, 57–63.
- McCabe, H. (2008) Effective teacher training at the Autism Institute in the People's Republic of China, in *Teacher Education and Special Education*, 31:2, 103–117.
- McConkey, R., Mullan, A., and Addis, J. (2012) Promoting the social inclusion of children with autism spectrum disorders in community groups, in *Early Child Development and Care*, 182:7, 827–835.
- Mintz, J. (2013) Additional key factors mediating the use of a mobile technology tool designed to develop social and life skills in children with autism spectrum disorders: Evaluation of the 2nd HANDS prototype. *Computers and Education*, 63, 17–27.
- Morrison, R. and Blackburn, A. (2008) Take the challenge: Building social competency in adolescents with Asperger's syndrome, in *TEACHING Exceptional Children Plus*, 5:2, 1–17.
- Ripley, K., Osborne, C. and Sergeant, T. (2011) Effective early intervention for young children on the autism spectrum: The Thomas Outreach Programme (TOP), in *Good Autism Practice*, 12:2, 25–36.
- Su, H., Lai, L. and Rivera, H. (2012) Effective mathematics strategies for pre-school children with autism, in *Australian Primary Mathematics Classroom*, 17:1, 25–30.
- Suhrheinrich, J. (2011) Training teachers to use pivotal response training with children with autism: Coaching as a critical component, in *Teacher Education and Special Education*, 34:4, 339–349.
- Thiessen, C., Fazio, D., Arnal, L., Martin, G. L., Yu, C. T. and Keilback, L. (2009) Evaluation of a self-instructional manual for conducting discrete-trials teaching with children with autism, in *Behavior Modification*, 33:3, 360–373.
- Thomeer, M. (2012) Collaborative development and component trials of a comprehensive school-based intervention for children with HFASDS, in *Psychology in the Schools*, 49:10, 955–962.
- Thomson, K. M., Martin, G. L., Fazio, D., Salem, S., Young, K. and Yu, C. T. (2012) Evaluation of a self-instructional package for teaching tutors to conduct discrete-trials teaching with children with autism, in *Research in Autism Spectrum Disorders*, 6:3, 1073–1082.
- Vismara, L., Young, G. and Rogers, S. (2013) Community dissemination of the Early Start Denver Model : Implications for science and practice, in *Topics in Early Childhood Special Education*, 32:4, 223–233.

Wallace, S., Parsons, S., Westbury, A., White, K., White, K. and Bailey, A. (2010) Sense of presence and atypical social judgments in immersive virtual environments. Responses of adolescents with autism spectrum disorders, in *Autism*, 14:3, 199–213.

Weinkauff, S. M., Zeigler, N. M. and Anderson, C. T. and Ala'i-Rosales, S. (2011) Evaluating the effectiveness of a comprehensive staff training package for behavioral interventions for children with autism, in *Research in Autism Spectrum Disorders*, 5:2, 864–871.

Whittingham, K., Sofronoff, K., Sheffield, J. and Sanders, M. R. (2009) Behavioural family intervention with parents of children with ASD: What do they find useful in the parenting program Stepping Stones Triple P? *Research in Autism Spectrum Disorders*, 3:3, 702–713.

Wilson, K. P., Dykstra, J. R., Watson, L. R., Boyd, B. A. and Crais, E. R. (2011) Coaching in early education classrooms serving children with autism: A pilot study, in *Early Childhood Education Journal*, 40:2, 97–105.

Wood, P. and Johnson, M. (2012) Evaluation and reflections on ASDWISE: An early intervention group for parents who have recently received a diagnosis of autism for their pre-school child, in *Good Autism Practice*, 13:2, 26–31.

Woodcock, A., Woolner, A. and Benedyk, R. (2009) Applying the Hexagon-Spindle Model to the design of school environments for children with autistic spectrum disorders, in *Work*, 32:3, 249–259.

Excluded, EC5 – Not concerned with educational provision that takes place in the home, community, clinic or in school/college-based settings

Kimhi, Y. and Bauminger-Zviely, N. (2012) Collaborative problem solving in young typical development and HFASD, in *Journal of Autism and Developmental Disorders*, 42:9, 1984–1997.

Quirnbach, L. M., Lincoln, A. J., Feinberg-Gizzo, M. J., Ingersoll, B. R. and Andrews, S. M. (2009) Social stories: Mechanisms of effectiveness in increasing game play skills in children diagnosed with autism spectrum disorder using a pretest posttest repeated measures randomized control group design, in *Journal of Autism and Developmental Disorders*, 39:2, 299–321.

Excluded, EC6 – Descriptions, development of methodology, commentary or opinion not based on empirical studies or single case studies. Does not involve the collection of quantitative or qualitative data.

Aitken, K. (2011) C. G. Simpson and L. Warner: successful inclusion strategies for early years teachers, in *Journal of Autism and Developmental Disorders*, 42:5, 897–898.

Axelrod, S., McElrath, K. and Wine, B. (2012) Applied behavior analysis: Autism and beyond, in *Behavioral Interventions*, 27, 1–15.

Ayres, K., Mechling, L. and Sansosti, F. (2013) Life skills/independence of students with moderate/severe intellectual disability and/or autism spectrum disorders: Considerations for the future of school psychology, in *Psychology in the Schools*, 50:3, 259–271.

Bellini, S., and McConnell, L. L. (2010) Strength-based educational programming for students with autism spectrum disorders: A case for video self-modeling, in *Preventing School Failure: Alternative Education for Children and Youth*, 54:4, 220–227.

- Boutot, E. (2009) Using "I Will" cards and social coaches to improve social behaviors of students with Asperger syndrome, in *Intervention in School and Clinic*, 44:5, 276–281.
- Bruder, M. B. (2011) A well walked path to program efficacy: The details tell the story, in *Topics in Early Childhood Special Education*, 31:3, 158–161.
- Buggey, T. and Hoomes, G. (2011) Using video self-modeling with preschoolers with autism spectrum disorder: Seeing can be believing, in *Young Exceptional Children*, 14:3, 2–12.
- Carbone, V. J., Morgenstern, B., Zecchin-Tirri, G. and Kolberg, L. (2010) The role of the Reflexive-Conditioned Motivating Operation (CMO-R) during discrete trial instruction of children with autism, in *Focus on Autism and Other Developmental Disabilities*, 25:2, 110–124.
- Carnahan, C., Harte, H., Schumacher, K., Hume, K., and Borders, C. (2010) Structured work systems: Supporting meaningful engagement in preschool settings for children with autism spectrum disorders, in *Young Exceptional Children*, 14:1, 2–16.
- Charman, T. (2011) Commentary: Glass half full or half empty? Testing social communication interventions for young children with autism – Reflections on Landa Holman, O'Neill and Stuart (2011), in *Journal of Child Psychology and Psychiatry and Allied Disciplines*, 52:1, 22–23.
- Christie, P., Fidler, R., Butterfield, B. and Davies, K. (2008) Promoting social and emotional development in children with autism: Personal tutorials, in *Good Autism Practice*, 9:2, 32–38.
- Devlin, S., Healy, O., Leader, G. and Hughes, B. M. (2011) Comparison of behavioral intervention and sensory-integration therapy in the treatment of challenging behavior, in *Journal of Autism and Developmental Disorders*, 41, 1303–1320.
- Dillenburger, K. (2012) Why reinvent the wheel? A behaviour analyst's reflections on pedagogy for inclusion for students with intellectual and developmental disability, in *Journal of Intellectual and Developmental Disability*, 37:2, 169–180.
- Dimitriadis, T. and Smeijsters, H. (2011) Autistic spectrum disorder and music therapy: theory underpinning practice, in *Nordic Journal of Music Therapy*, 20:2, 108–122.
- Dingfelder, H. E. and Mandell, D. S. (2011) Bridging the research-to-practice gap in autism intervention: An application of diffusion of innovation theory, in *Journal of Autism and Developmental Disorders*, 41:5, 597–609.
- Duncan, A. W., and Klinger, L. G. (2010) Autism spectrum disorders: Building social skills in group, school and community settings, in *Social Work With Groups*, 33:2-3, 175–193.
- Fava, L., Vicari, S., Valeri, G., D'Elia, L., Arima, S. and Strauss, K. (2012) Intensive behavioral intervention for school-aged children with autism: Una Breccia nel Muro (UBM) – A comprehensive behavioral model, in *Research in Autism Spectrum Disorders*, 6:4, 1273–1288.
- Fittipaldi-Wert, J. and Mowling, C. M. (2009) Using visual supports for students with autism in physical education, in *Journal of Physical Education, Recreation and Dance*, 80:2, 39–43.
- Frankel, F. and Whitham, C. (2011) Parent-assisted group treatment for friendship problems of children with autism spectrum disorders, in *Brain Research*, 1380, 240–5.
- Ganz, J. B. and Flores, M. M. (2009) Supporting the play of preschoolers with autism spectrum disorders: Implementation of visual scripts, in *Young Exceptional Children*, 13:2, 58–70.

- Ganz, J., Earles-Vollrath, T. and Cook, K. (2011) Video modeling – A visually based intervention for children with autism spectrum disorder, in *Teaching Exceptional Children*, 43:6, 8–19.
- Ganz, J. and Flores, M. (2010) Implementing visual cues for young children with autism spectrum disorders and their classmates, in *Young Children*, 78–83.
- Gelbar, N., Anderson, C., McCarthy, S. and Buggey, T. (2012) Video self-modeling as an intervention strategy for individuals with autism spectrum disorders, in *Psychology in the Schools*, 49:1, 15–22.
- Gerhardt, P. F. and Lainer, I. (2010) Addressing the needs of adolescents and adults with autism: A crisis on the horizon. *Journal of Contemporary Psychotherapy*, 41:1, 37–45.
- Gobbo, K. and Shmulsky, S. (2012) Classroom needs of community college students with asperger's disorder and autism spectrum disorders, in *Community College Journal of Research and Practice*, 36:1, 40–46.
- Gül, S. and Vuran, S. (2010) An analysis of studies conducted video modeling in teaching social skills, in *Educational Sciences: Theory and Practice*, 10:1, 250–274.
- Hammond, R. K., Campbell, J. M. and Ruble, L. A. (2013) Considering identification and service provision for students with autism spectrum disorders within the context of response to intervention, in *Exceptionality*, 21:1, 34–50.
- Hart, D., Grigal, M. and Weir, C. (2010) Expanding the paradigm: Postsecondary education options for individuals with autism spectrum disorder and intellectual disabilities, in *Focus on Autism and Other Developmental Disabilities*, 25:3, 134–150.
- Hart, J. E., and Whalon, K. J. (2011) Creating social opportunities for students with autism spectrum disorder in inclusive settings, in *Intervention in School and Clinic*, 46:5, 273–279.
- Hayward, D.W., Gale, C. M. and Eikeseth, S. (2009) Intensive behavioural intervention for young children with autism: A research-based service model, in *Research in Autism Spectrum Disorders*, 3:3, 571–580.
- Higgins, K. K., Koch, L. C., Boughfman, E. M. and Vierstra, C. (2008) School-to-work transition and Asperger syndrome, in *Work*, 31:3, 291–298.
- Horn, E. and Banerjee, R. (2009) Understanding curriculum modifications and embedded learning opportunities in the context of supporting all children's success, in *Language, Speech and Hearing Services in Schools*, 40, 406–416.
- Hovey, K. (2011) Six steps for planning a fitness circuit for individuals with autism. *Strategies*, 24:5, 12–15.
- Ingersoll, B. R. (2009) Teaching social communication: A comparison of naturalistic behavioral and development, social pragmatic approaches for children with autism spectrum disorders, in *Journal of Positive Behavior Interventions*, 12:1, 33–43.
- Isbell, J. S., and Jolivette, K. (2011) Stop, think, proceed: Solving problems in the real world, in *Intervention in School and Clinic*, 47:1, 31–38.
- Jones, E. W., Hoerger, M., Hughes, J. C., Williams, B. M., Jones, B., Moseley, Y. et al. (2011) ABA and diverse cultural and linguistic environments: A Welsh perspective, in *Journal of Behavioral Education*, 20:4, 297–305.
- Jones, K. and Howley, M. (2010) An investigation into an interaction programme for children on the autism spectrum: Outcomes for children, perceptions of schools and a model for training, in *Journal of Research in Special Educational Needs*, 10:2, 115–123.

Koegel, L., Matos-Freden, R., Lang, R. and Koegel, R. (2012) Interventions for children with autism spectrum disorders in inclusive school settings, in *Cognitive and Behavioral Practice*, 19:3, 401–412.

Koenig, K., De Los Reyes, A., Cicchetti, D., Scahill, L. and Klin, A. (2009) Group intervention to promote social skills in school-age children with pervasive developmental disorders: Reconsidering efficacy, in *Journal of Autism and Developmental Disorders*, 39, 1163–1172.

Lanou, A., Hough, L. and Powell, E. (2011) Case studies on using strengths and interests to address the needs of students with autism spectrum disorders, in *Intervention in School and Clinic*, 47:3, 175–182.

Leach, D. and Duffy, M. L. (2009) Supporting students with autism spectrum disorders in inclusive settings, in *Intervention in School and Clinic*, 45:1, 31–37.

Leach, D. and LaRocque, M. (2009) Increasing social reciprocity in young children with autism, in *Intervention in School and Clinic*, 46:3, 150–156.

Leaf, J. B., Dotson, W. H., Oppenheim-Leaf, M. L., Sherman, J. A. and Sheldon, J. B. (2011) A programmatic description of a social skills group for young children with autism, in *Topics in Early Childhood Special Education*, 32:2, 111–121.

Lechago, S. A. and Carr, J. E. (2008) Recommendations for reporting independent variables in outcome studies of early and intensive behavioral intervention for autism, in *Behavior Modification*, 32:4, 489–503.

Lobar, S. L., Fritts, M. K., Arbide, Z. and Russell, D. (2008) The role of the nurse practitioner in an individualized education plan and coordination of care for the child with Asperger's syndrome, in *Journal of Pediatric Health Care*, 22:2, 111–119.

Longhurst, J., Richards, D., Copenhaver, J. and Morrow, D. (2010) "Outside In" Group treatment of youth with Asperger's, in *Reclaiming Children and Youth*, 19:3, 40–44.

Magyar, C. and Pandolfi, V. (2012) Considerations for establishing a multi-tiered problem-solving model for students with autism spectrum disorders and comorbid emotional-behavioral disorders, in *Psychology in the Schools*, 49:10, 975–987.

Mancil, G., Boyd, B. and Bedesem, P. (2009) Parental stress and autism: Are there useful coping strategies? in *Education and Training in Developmental Disabilities*, 44:4, 523–537.

Mancil, G. R., and Boman, M. (2010) Functional communication training in the classroom: A guide for success, in *Preventing School Failure*, 54:4, 238–246.

Mason, R. A., Ganz, J. B., Parker, R. I., Boles, M. B., Davis, H. S. and Rispoli, M. J. (2013) Video-based modeling: Differential effects due to treatment protocol, in *Research in Autism Spectrum Disorders*, 7:1, 120–131.

Mastrangelo, S. (2009) Harnessing the power of play opportunities for children with autism spectrum disorders, in *Teaching Exceptional Children*, 42:1, 34–44.

Matson, J. L., Adams, H. L., Williams, L. W. and Rieske, R. D. (2013) Why are there so many unsubstantiated treatments in autism? in *Research in Autism Spectrum Disorders*, 7:3, 466–474.

Matson, J. L., Hattier, M. A. and Belva, B. (2012) Treating adaptive living skills of persons with autism using applied behavior analysis: A review, in *Research in Autism Spectrum Disorders*, 6:1, 271–276.

Matson, J. L., Tureck, K., Turygin, N., Beighley, J. and Rieske, R. (2012) Trends and topics in early intensive behavioral interventions for toddlers with autism, in *Research in Autism Spectrum Disorders*, 6:4, 1412–1417.

- Matson, J. L., Turygin, N. C., Beighley, J. and Matson, M. L. (2012) Status of single-case research designs for evidence-based practice, in *Research in Autism Spectrum Disorders*, 6:2, 931–938.
- McAllister, K. and Maguire, B. (2012) A design model: The Autism Spectrum Disorder Classroom Design Kit. *British Journal of Special Education*, 39:4, 201–208.
- McAllister, K. and Maguire, B. (2012) Design considerations for the autism spectrum disorder-friendly Key Stage 1 classroom, in *Support for Learning*, 27:3, 103–112.
- Mesibov, G. B. and Shea, V. (2011) Evidence-based practices and autism, in *Autism*, 15:1, 114–133.
- Mesibov, G. and Shea, V. (2010) The TEACCH program in the era of evidence-based practice, in *Journal of Autism and Developmental Disorders*, 40, 570–579.
- Mintz, J. and Aagaard, M. (2012) The application of persuasive technology to educational settings, in *Educational Technology Research and Development*, 60:3, 483–499.
- Mitelman, S. and Kohorn, O. Von. (2012) Social signals – Mike’s crush, in *American Journal of Sexuality Education*, 7:3, 282–284.
- Murray, M., Baker, P. H., Murray-Slutsky, C. and Paris, B. (2009) Strategies for supporting the sensory-based learner, in *Preventing School Failure*, 53:4, 245–252.
- Neitzel, J. (2010) Positive behavior supports for children and youth with autism spectrum disorders, in *Preventing School Failure*, 54:4, 247–255.
- Obrusnikova, I., Bibik, J. M., Cavalier, A. R. and Manley, K. (2012) Integrating therapy dog teams in a physical activity program for children with autism spectrum disorders, in *Journal of Physical Education, Recreation and Dance*, 83:6, 37–48.
- Odom, S., Hume, K., Boyd, B. and Stabel, A. (2012) Moving beyond the intensive behavior treatment versus eclectic dichotomy: Evidence-based and individualized programs for learners with ASD, in *Behavior Modification*, 36:3, 270–297.
- Odom, S. L., Collet-Klingenberg, L., Rogers, S. J. and Hatton, D. D. (2010) Evidence-based practices in interventions for children and youth with autism spectrum disorders, in *Preventing School Failure: Alternative Education for Children and Youth*, 54:4, 275–282.
- Passerino, L. M. and Santarosa, L. M. C. (2008) Autism and digital learning environments: Processes of interaction and mediation, in *Computers and Education*, 51:1, 385–402.
- Paul, R. (2008) Interventions to improve communication in autism, in *Child and Adolescent Psychiatric Clinics of North America*, 17:4, 835–856.
- Peters-Scheffer, N., Didden, R., Korzilius, H., and Sturmey, P. (2011) A meta-analytic study on the effectiveness of comprehensive ABA-based early intervention programs for children with autism spectrum disorders, in *Research in Autism Spectrum Disorders*, 5:1, 60–69.
- Pillay, Y. and Bhat, C. (2012) Facilitating support for students with Asperger’s syndrome, in *Journal of College Student Psychotherapy*, 26:2, 140–154.
- Pope, M., Liu, T., Breslin, C. M. and Getchell, N. (2012) Using constraints to design developmentally appropriate movement activities for children with autism spectrum disorders, in *Journal of Physical Education, Recreation and Dance*, 83:2, 35–41.

- Rämä, I. and Kontu, E. (2012) Searching for pedagogical adaptations by exploring teacher's tacit knowledge and interactional co-regulation in the education of pupils with autism, in *European Journal of Special Needs Education*, 27:4, 417–431.
- Ravet, J. and Taylor, M. (2008) Developing educational provision for pupils with autism spectrum disorders in the north of Scotland: A vision from the chalkface, in *Good Autism Practice*, 9:1, 17–25.
- Reichow, B., Volkmar, F. R. and Cicchetti, D. V. (2008) Development of the evaluative method for evaluating and determining evidence-based practices in autism, in *Journal of Autism and Developmental Disorders*, 38:7, 1311–1319.
- Renshaw, T. L. and Kuriakose, S. (2011) Pivotal response treatment for children with autism: Core principles and applications for school psychologists, in *Journal of Applied School Psychology*, 27:2, 181–200.
- Rixon, E. and Jaeger, S. (2011) Narrative therapy: A whole-school approach within a specialist residential school for young people on the autism spectrum, in *Good Autism Practice*, 12:1, 64–74.
- Rowlandson, P. H. and Smith, C. (2009) An interagency service delivery model for autistic spectrum disorders and attention deficit hyperactivity disorder, in *Child: Care, Health and Development*, 35:5, 681–690.
- Ruef, M., Nefdt, N., Openden, D., Elmensdorp, S., Harris, K. and Robinson, S. (2009) Learn by doing: A collaborative model for training teacher-candidate students in autism, in *Education and Training in Developmental Disabilities*, 44:3, 343–355.
- Salter, T., Werry, I. and Michaud, F. (2008) Going into the wild in child–robot interaction studies: Issues in social robotic development, in *Intelligent Service Robotics*, 1:2, 93–108.
- Sandall, S. R., Ashmun, J. W., Schwartz, I. S., Davis, C. A., Williams, P., Leon-Guerrero, R. et al. (2011) Differential response to a school-based program for young children with ASD, in *Topics in Early Childhood Special Education*, 31:3, 166–177.
- Sandt, D. (2008) Social stories for students with autism in physical education, in *Journal of Physical Education, Recreation and Dance*, 79:6, 42–45.
- Sansosti, F. (2010) Teaching social skills to children with autism spectrum disorders using tiers of support: A guide for school based professionals, in *Psychology in the Schools*, 47:3, 257–281.
- Schmidt, M., Laffey, J. M., Schmidt, C. T., Wang, X. and Stichter, J. (2012) Developing methods for understanding social behavior in a 3D virtual learning environment, in *Computers in Human Behavior*, 28:2, 405–413.
- Shane, H. C., Laubscher, E. H., Schlosser, R. W., Flynn, S., Sorce, J. F. and Abramson, J. (2012) Applying technology to visually support language and communication in individuals with autism spectrum disorders, in *Journal of Autism and Developmental Disorders*, 42:6, 1228–1235.
- Shyman, E. (2012) Teacher education in autism spectrum disorders: A potential blueprint. *Education and Training in Autism and Developmental Disabilities*, 47:2, 187–197.
- Simpson, R. L., Mundschenk, N. A. and Heflin, L. J. (2011) Issues, policies and recommendations for improving the education of learners with autism spectrum disorders, in *Journal of Disability Policy Studies*, 22:1, 3–17.
- Spencer, V. G., Simpson, C. G. and Lynch, S. A. (2008) Using social stories to increase positive behaviors for children with autism spectrum disorders, in *Intervention in School and Clinic*, 44:1, 58–61.

- Sperry, L., Neitzel, J. and Engelhardt-Wells, K. (2010) Peer-mediated instruction and intervention strategies for students with autism spectrum disorders, in *Preventing School Failure*, 54:4, 256–264.
- Wang, P. and Spillane, A. (2009) Evidence-based social skills interventions for children with autism: A meta-analysis, in *Education and Training in Developmental Disabilities*, 44:3, 318–342.
- Wang, S.-Y., Cui, Y. and Parrila, R. (2011) Examining the effectiveness of peer-mediated and video-modeling social skills interventions for children with autism spectrum disorders: A meta-analysis in single-case research using HLM, in *Research in Autism Spectrum Disorders*, 5:1, 562–569.
- Wehmeyer, M., Shogren, K., Zager, D., Smith, T. and Simpson, R. (2010) Research-based principles and practices for educating students with autism: Self-determination and social interactions, in *Education and Training in Autism and Developmental Disabilities*, 45:4, 475–486.
- Zhang, J. and Wheeler, J. J. (2011) A meta-analysis of peer-mediated interventions for young children with autism spectrum disorders, in *Education and Training in Autism and Developmental Disabilities*, 46:1, 62–77.
- Zucker, S., Perras, C., Perner, D. and Smith, J. (2009) Best practices in cognitive disabilities/mental retardation, autism and related disabilities, in *Education and Training in Autism and Developmental Disabilities*, 44:3, 291–294.

Excluded, EC7 – Not written in English

- Chiecher, A., Donolo, D. and Rinaudo, M. (2009) Regulación y planificación del estudio. Una perspectiva comparativa en ambientes presenciales y virtuales, in *Electronic Journal of Research in Educational Psychology*, 7:17, 209–224.

Appendix D: Worked examples of IC3 (educational utility)

Cihak, D., Fahrenkrog, C., Ayres, K. M. and Smith, C. (2010) The use of video modeling via a video iPod and a system of least prompts to improve transitional behaviors for students with autism spectrum disorders in the general education classroom, in *Journal of Positive Behavior Interventions*, 12:2, 103–115.

This study examined the effectiveness of video modelling and a system of least prompts for improving transitioning between locations and activities for four elementary school students with ASD. This study met the IC3 (educational utility) criteria. It had evidence of both educational utility and effectiveness. In terms of utility, school staff delivered the intervention, and social validity measures were used to assess staff views on the educational utility of the intervention. With regards to effectiveness, outcome measures in the child's general education setting (i.e. transitioning between locations and/or activities) were collected.

Holding, E., Bray, M., and Kehle, T. (2011) Does speed matter? A comparison of the effectiveness of fluency and discrete trial training for teaching noun labels to children with autism, in *Psychology in the Schools*, 48:2, 166–183.

This study compared the efficacy of discrete trial training and fluency training on the acquisition, stimulus generalisation and retention of noun labels, on four elementary school-aged children with ASD. Although this study took place in the homes of the participating children, it still met the IC3 (educational utility) criteria as staff delivered the intervention. All of the children were enrolled in an intensive behavioural home programme, making their home their primary education context and programme staff delivered the intervention.

Ledford, J. R., Gast, D. L., Luscre, D. and Ayres, K. M. (2008) Observational and incidental learning by children with autism during small group instruction, in *Journal of Autism and Developmental Disorders*, 38:1, 86–103.

This study evaluated the acquisition of incidental and observational information presented to six children with ASD in a small group setting using a constant time delay procedure. This study met the IC3 (educational utility) criteria. Specifically, it had evidence of educational effectiveness. Although the intervention took place in the school of the participating children, it did not have utility, as it was delivered by the researcher away from the children's typical classroom routines. However, evidence of educational effectiveness came from outcome measures in general school setting (the ability of the children to identify taught signs in their natural school environment, with their teacher).

Ozen, A., Batu, S., and Birkan, B. (2012). Teaching play skills to children with autism through video modeling: Small group arrangement and observational learning. *Education and Training in Autism and Developmental Disabilities*, 47(1), 84–96.

This study examined whether video modelling was an effective way of teaching socio-dramatic play skills to three nine-year-old boys with ASD in a small group setting. This study did not meet the IC3 (educational utility) criteria, and instead met the EC3 (educational utility) criteria and was excluded from the review. The intervention took part in a research institute, rather than the boys' primary education setting, and did not include school staff. Furthermore, there were no outcome measures in the boys' general education setting.

Appendix E: Guidance Coding Framework

Inclusion criteria

- Dated 2007–2013 only
- Focused on, or has specific reference to, children and young people with ASD
- Focused on educational provision (broadly defined as home, community or school/college-based settings)
- Published/available in English
- Stand-alone published documents or downloadable pdfs or word documents

Analysis framework

- Date of publication
- Developer(s)
- Intended audience
- Guidance given regarding age range covered and/or setting applicable to
- Intervention focus of guidelines
- Evidence used to inform guidance.

Evaluation of guidance

Guidance will be screened and evaluated according to its overall relevance to the review. Guidance will be categorised as follows.

- Very relevant: wide ranging, well-informed and thorough, includes consideration of policy, research and practice.
- Relevant: thorough and well-informed guidance but may be restricted to one area of policy, research or practice.
- Moderately relevant: guidance may rely on limited evidence or adopt a narrow or less educational focus.
- Least relevant: Unclear sources of evidence and limited focus on education for children and young people with ASD.

Appendix F: Case Studies

Introduction

In order to systematically select five countries/jurisdictions to be included as case studies, the research team developed a set of 'best practice' criteria. Donabedian (2003) defines best or good practice as drawn '...either from direct knowledge of the scientific literature and its findings, or from the agreed-upon opinions of experts and leaders, an opinion presumably based on knowledge of the pertinent literature as well as on clinical experience' (p. 62).

The ASD-specific criteria were developed from the Parsons et al. (2009) review and the Charman et al. (2011) report. This enabled empirical evidence, expert opinions and views from school staff and students and their parents to all be represented in the criteria, which are described in Box 1, overleaf.

Box 1: ASD-specific criteria

Guidelines and policies should be developed in collaboration with students with ASD, and people with ASD should be given formal roles within policy development.

The policy should promote a school ethos that encourages and supports students with ASD in reaching their potential, achieving their goals, and enables participation in all aspects of school life.

Curriculum

- Adapting curricula to the student's needs and abilities.
- Creating bespoke curricula to target particular areas of need such as an emphasis on developing independence and life skills.
- Adaptations to help students access curricula, such as visual timetables, social stories, homework clubs, PECS.

Monitoring progress

- Systems in place to monitor outcomes beyond academic outcomes e.g. behavioural and social outcomes.
- Systems in place for progress to be shared between staff, parents and peers.

Choice of interventions

- There should be a range of intervention options available.
- The profile and needs of the student should be the biggest consideration when choosing an intervention for a specific student.
- The views of the student need to be taken into account when choosing provision.
- Parsons et al. (2009) state that there does not seem to be enough evidence to promote one intervention over another, and this view is supported by numerous meta analyses. However, any interventions on offer should make reference to evidence that supports their use. Deciding whether an intervention can be described as 'evidence-based' will consider the presence/absence of supporting evidence within the policy document itself, as well as the Reichow, Volkmar and Cicchetti (2008) criteria for assessing whether an intervention/practice for children and young people with ASD can be regarded as evidence-based. These criteria include things such as the number and quality of supporting studies for a particular intervention/practice.
- There should be an emphasis on early intervention, which should target communicative behaviours/skills at the core of ASD.

Staff training

- All staff working with students with ASD should have access to training.
- Training should be available on a continuum, from basic introductory training to higher level, accredited course e.g. at masters level.
- Training should be available to everyone within the schools, such as teachers, teaching assistants, administration staff and catering staff.

Involving parents

- Schools should support parents e.g. by training them in methods used in the school.
- Parents should have access to formal training, and barriers to attendance should be removed.

Box 1: ASD-specific criteria

Collaboration

- Standardised protocols to facilitate multi-agency collaboration.
- Schools to work jointly with other professionals e.g. educational psychologists, speech and language therapists, occupational therapists.
- Sharing of good practice between staff, schools and parents.
- Range of supports and range of funding available.

Managing transitions

- Clear planning procedures to prepare young people for transitions e.g. from primary to secondary school.
- Formal links created between education providers to manage transitions.
- Processes in place to allow communication between old and new school staff, and parents and carers.

Communication

- Schools should have mechanisms in place for encouraging good communication between staff, staff and parents and staff and pupils.
- Schools should form links with their local community and other schools to promote understanding and awareness of ASD.

It was anticipated that following an initial scoping exercise the template could be used to enable selection of case study countries/jurisdictions on the basis of best practice.

Alongside the definitions of good practice the research team also developed a case study coding template, which was used to collate information relating to:

- prevalence of ASD
- educational settings
- specialist provision
- interventions
- professionals involved
- legislation/policy
- teacher education; and
- outcomes for children and young people with ASD.

The template was trialled with England, as the researchers know this context well and could pre-identify documents which should be found using the template. Although most of the template could be completed there were some gaps in the data, particularly in the areas of provision for 17–19 year olds, detail in relation to specialist provision such as staffing ratios, information about holiday provision and wider outcomes such as mental health and criminal justice. The template was subsequently revised to better reflect the depth and breadth of emergent data. In particular, the categories within the 'outcomes' section were changed to allow for different data to be collected from each country around four key themes: attainment-related outcomes, attendance-related outcomes, happiness-related outcomes and independence-related outcomes. Furthermore, some additional items were added to the template after discussion with the Advisory Group. (For the full template see Appendix G).

Following the initial trial and revisions of the template a scoping exercise was undertaken of 13 countries (as shown in Table A1). This phase involved web searches of policy and practice in countries/jurisdictions identified by the Advisory Group and research team using an abbreviated template (Appendix H).

Country	General SEN legislation	ASD defined in legislation	Provision decentralised	Outcomes – all pupils	Outcomes – ASD specific educational	Outcomes – ASD specific wider
North Carolina (US)	Yes	No but named as a disability	No	Yes	No	No
California (US)	Yes	Yes	No	No	No	No
Massachusetts (US)	Yes	Yes	No	No	No	No
Quebec (Canada)	Partial	No but named as a handicap	Unclear	No	No	No
Sweden	Yes	No	Yes	No	No	Partial (economic costs from 1 municipality)
Finland	Yes	No	Yes	No	No	No
Norway	Yes	No	Yes	No	No	No
New Zealand	Yes	No	Unclear	No	No	No
Queensland (Australia)	Yes	Yes	Unclear	No	No	Partial (economic costs only Australia)
Victoria (Australia)	Partial	Partial – intervention level	Unclear	No	No	Partial (economic costs only Australia data)
Scotland	Yes	No	Yes	Partial	No	Partial (economic cost only – UK data)
Wales	Yes	No but named as a disability	Unclear	Partial	Partial	Partial (economic cost and other outcomes – UK study)
Italy	No	No	No	No	No	No

As discussed in the methodology chapter, the gaps in the case study scoping data meant that case studies could not be selected on the basis of best evidence. Instead a shortlist was drawn up based on countries/ jurisdictions that demonstrated a range of practice and where evidence was likely to be available. This meant that countries were selected on the basis of more subjective criteria such as existing contacts or perceptions of good practice rather than good practice in relation to explicit criteria. Once the final shortlist of five countries/ jurisdictions had been agreed by the Advisory Group, the findings from the scoping exercise were added to the case study template, and searches were made for relevant data to complete the template. This involved the following stages.

- (a)** Identification of policy documentation and 'grey' literature pertaining to each country: These were found via Google, using search words such as the name of the country/jurisdiction, 'education', 'provision', 'policy' and 'autism'. The documents were then read and any relevant policies or documents mentioned within them were subsequently tracked down. This process was continued until no new policies or documents were found.
- (b)** Information and data from national and international websites: For each country/jurisdiction, a range of websites was searched for relevant information, documents or contacts. This typically included any national/regional (where appropriate) societies for people with ASD, such as the National Autistic Society (UK), and websites of national/regional education departments, educational programmes for pupils with ASD, parenting websites, healthcare providers, prison services and universities (to see if any research into the education of pupils with ASD was being conducted there). Some international websites were also searched, including the European Agency for Special Needs and Inclusive Education. As with the policy and grey literature search, websites were identified via a Google search using search terms relevant to the information being sought. Links from websites were also followed if appropriate. This process was continued until no new websites were found. Details of websites were not kept unless data had been taken from them.
- (c)** Emailing identified contacts: Any potentially useful contacts identified from the website searches were then contacted via email to see if they knew if the data being sought were available, and if so where to find them. The case study template was emailed to general contacts such as ASD societies, education departments and university staff. They were asked to mark on the template any information they knew (including data sources) or to indicate if and where the data might be found. Leads from this were then followed up, with these contacts being emailed for specific data, rather than being emailed the case study template as a whole. This process was continued until no new contacts were identified, or until it was established that the data being sought were not available. The latter was particularly the case for the outcome data: no country/jurisdiction seemed to hold data for all of the outcome subheadings, and indeed, some countries/jurisdictions did not have any outcome data at all.
- (d)** Verification of case studies: Once case studies had been compiled from the available data these were verified with country/jurisdiction contacts.

Overview of findings

As discussed in Chapter 2, although a thorough research process was undertaken there were significant gaps in the data available for the case studies. These gaps resulted from information not being collected in relation to a particular category; not available in a form which could be shared with the research team; being confidential; or not being found by the research team. These gaps in the data are illustrated in Table A2 and need to be taken into consideration when interpreting the case studies.

The findings from the case study strand are organised around the key headings from the case study template (Appendix G), which was used as a guide to data collection. Table A2 provides an overview of the data obtained for each category in each country/jurisdiction.

Table 2: Case study countries/jurisdictions overview

	Queensland	Sweden	Scotland	North Carolina	Massachusetts
Legislation	Yes	Yes*	Yes*	Yes*	Yes
Prevalence	Some	Yes	Some	Yes	Yes
Diagnosis	Yes	Yes	Some	Some	Some
Education setting types	None	Some	Some	Yes	Some
Specialist provision	Yes	Some	Some	Yes	Some
Intervention	Yes	Some	Some	Some	Some
Professionals involved	Yes	None	None	Some	None
Teacher education	Yes	Some	None	None	None
Outcomes	Some	None	Some	Some	None

Note: The asterisk mark (*) means that only general legislation applied.

Legislation information was available for all case study countries/jurisdictions, and there was full or partial information available for prevalence, diagnosis, specialist provision and intervention for each country/jurisdiction. The most limited sections were those relating to professionals involved in provision, teacher education and outcome data.

As described in the methods section, data for the case studies were sourced from the staff, websites and documents of key agencies and organisations involved in provision for children and young people with ASD. The level of available information for each country/jurisdiction varied. Each case study starts with a summary of the key sources of information, and only references for specific statistics or research papers are included within each case study.

It was initially planned that information collected from each of the case study countries/jurisdictions would be grouped into age categories, providing an overview of provision at different educational stages/ages. Unfortunately, the information available by age group was very limited, and most of the information was general to school-age children, with some limited pre-school information, depending upon the focus of legislation in a given country/jurisdiction. Data relating to 17–19 year olds was extremely limited, and often provision for young people was covered under the more general education legislation and policy. However, where information relating to different age ranges was available, care was taken to present the information separately.

With regards to terminology, 'ASD' has been used throughout the case studies. When ASD is used here, it is used to refer to any of the autism spectrum disorders, including Asperger's syndrome or 'pervasive developmental disorder – not otherwise specified'. In some cases, it has been clarified for a country/jurisdiction whether they too would include all these disorders when allocating provision. The term 'student' has been used to clarify when the provision or outcomes are educational. In cases where the provision is more general, such as that delivered at home, the term 'children' or 'children and young people' is favoured. Each country/jurisdiction has differences in how their educational provision is organised. For example, in Sweden,

the curriculum is determined at the country level, but educational provision is the responsibility of county councils and municipalities. However, in-depth exploration of terminology and variations on provision at these levels was beyond the scope of the current review.

Queensland

Queensland is the most comprehensive case study, which perhaps reflects the number of organisations involved in ASD provision. Information primarily came from staff, websites and documents from the following organisations: Queensland Department of Education, Training and Employment; The Education Adjustment Program; Education Queensland; Autism Queensland; Autism Early Intervention Initiative; AEIOU Foundation; Helping Children with Autism (HCWA) package; Positive Partnerships; More Support for Students with Disabilities; and the Australian Bureau of Statistics.

Legislation

Australia has two key pieces of national level legislation relevant to the education of children and young people with disabilities. These are: The Commonwealth Disability Discrimination Act (1992) and the Disability Discrimination and Other Human Rights Act (2009). These are supported by three national level strategies and standards: The National Disability Strategy (2011), the Melbourne Declaration (2008) and Disability Standards for Education (2005). The overarching premise of these pieces of legislation and policy is that all children and young people with a disability have the right to equal access to education and training opportunities and, where necessary, teachers and schools may be required to make reasonable adjustments for them to ensure they can participate in education on the same basis as their peers. At the teacher level this may include adjustments such as providing special equipment or differentiating curriculum content, whilst at a school level typical adjustments include appointing specialist teachers and implementing therapy programmes.

Policies are developed at the state level to enact the national level legislation and policies. To this end, the Queensland government has two relevant pieces of legislation: the Queensland Disability Services Act (2006) and the Education (General Provisions) Act (2006). Education Queensland, a department within the Department of Education, Training and Employment, enacts this legislation through the Inclusive Education Policy Statement (2005). This statement lays down the expectation that inclusive educational practices will be embedded within all of Education Queensland's policies and initiatives. One such initiative is the Education Adjustment Program (EAP), which is responsible for the identification and support of the needs of students with a disability. There are six EAP disability categories, of which ASD is one.

Children with a diagnosis of ASD are not automatically placed on the EAP. To access this, the child must firstly have been diagnosed by a child psychiatrist, development paediatrician or paediatric neurologist (not a psychologist). Secondly, school personnel have to apply for funding by outlining the educational impact of the diagnosis and the educational adjustment required to address this. The curriculum adjustments required by students with ASD are determined by the completion of an Education Adjustment Profile (EAP). It is this, together with an EAP placement group meeting and development of an Individual Education Plan (IEP), that determines the best support provision and placement for individual children and young people with ASD. The IEP is not a legal requirement, and children without an IEP may have a learning plan instead. Currently, funding from the EAP goes directly to schools according to the number of children with disabilities on the EAP in that school.

Prevalence rates

The estimated prevalence rate of ASD amongst children and young people in Australia is 0.6:100 (MacDermott et al., 2007). This figure is based on data from children aged between six and 12 years using a range of data sources. MacDermott et al. note that there is variation in the prevalence rates between different states. Prevalence is expected to be higher in Queensland due to their different diagnostic practices (explained below), but Queensland does not collect data on the number of children with a diagnosis of ASD.

Diagnosis

Diagnosis of ASD in Queensland is likely to include establishing the child's developmental history, observing the child play and interviews with parents/caregivers. The process of gaining a diagnosis can vary greatly. In some cases, a child may first be seen by a speech pathologist due to delays in communication, and then be referred to a paediatrician if ASD is suspected. In other cases, a speech and language assessment may form part of the process if the diagnosis is being made by a multidisciplinary team. Other children may be referred to a speech pathologist only after a diagnosis of ASD has been obtained, and/or as a precursor to intervention. However, typically, pre-school children are most likely to be seen by a paediatrician, whilst school-age children are more likely to be diagnosed by a psychiatrist or psychologist using the DSM-IV, although the DSM-5 is becoming widely used.

Diagnosis may be carried out by a multi-disciplinary team, but this is dependent on what medical specialists decide needs to be assessed; for instance, whether the child may also need to see a speech and language therapist. Education Queensland adopts the term autism spectrum disorder for any condition defined as a pervasive development disorder (PDD) according to the DSM-IV criteria, although diagnosis under DSM-5 is now required for education. Furthermore, the education system does not accept a diagnosis by a psychologist.

Queensland is currently the only state in Australia that accepts a diagnosis from all the PDD categories for support in the area of ASD.

Education setting types

Education Queensland currently provides an array of services and supports for students with ASD. Within mainstream schools there is likely to be a graded approach in response to the child's needs, ranging from standard support staff (learning support, teacher, guidance), to advisory teacher support (although this is being phased out over the next two years), through to special education units or specialist classes. A number of mainstream primary or secondary schools in Queensland now have special education programmes for students with a low incidence disability, including ASD. The length of time a child with ASD spends on a programme is likely to be determined by each school's philosophy (e.g. whether they promote full versus partial inclusion). Children and young people with ASD in Queensland typically attend their education setting for 40 weeks of the year, in line with the standard length of the school year.

Specialist provision

Specialist provision is provided on the basis of educational need or intellectual impairment, rather than on a diagnosis of ASD. A child with ASD is eligible to attend their local school, or closest school with a unit (dependent on need). However, if deemed appropriate, a child or young person with ASD may be placed in a special school. In line with practice for all children with disabilities, a child with ASD is likely to attend a special school if they have a comorbid intellectual disability, is unlikely to attain the levels of development of which they are capable unless they receive special education, and/or their educational programme is best delivered in a special school.

There are two independent schools specifically for children with ASD. These are operated by Autism Queensland, which has been delivering early intervention, education and therapy since 1967. These are the Brighton School, located on the north side of Brisbane, and Sunnybank School, on the south. Both schools offer tailored education and therapy programmes to children with ASD from the first year of primary school (age four) to year 12 (age 18), with up to six children per class. The typical staff to student ratio is 1:3, with one teacher and one teacher aide to six students, although some groups with higher support needs have two teacher aides to six students. Other professionals working at the school include occupational therapists, speech pathologists, a social worker and a psychologist. Attendance at these schools is part-time for either one, two or three days a week, for up to two years. This programme enables students to also attend a mainstream school for the remainder of the week, with the aim being that they will develop the skills that they need to be successfully included in mainstream schools.

To attend one of the schools, the child or young person must have a diagnosis of ASD, autistic disorder, Asperger's syndrome, pervasive developmental disorder-not otherwise specified (PDD-NOS), Rett's disorder or childhood disintegrative disorder from a paediatrician, child psychiatrist or paediatric neurologist. In addition, they must be an ASD Queensland registered client, be verified by an approved educational authority and currently be attending an alternative educational programme or setting. There is also the expectation that the child or young person will be able to maintain placement in a small group setting. Combined, the two schools currently have 63 children aged five to 10 years on roll, 45 children aged 11 to 16 years, and four young people aged 17–18 years (Sunnybank School only). Two students have a comorbid disability, and two more attend a special, rather than mainstream school as their ongoing educational placement. These schools are funded in the manner all independent schools are funded in Australia: through a combination of Commonwealth and State funding and school fees. The gap between funding and actual cost of services is bridged by parents, who pay a daily fee for their child to attend the schools. Autism Queensland also provides early intervention at their centres, in the child's home, in the child's early childhood setting or any other relevant setting, and most commonly a combination of these settings. The Brighton and Sunnybank schools also have early intervention programmes co-located with the schools.

Children and young people with ASD in Queensland may also be eligible to attend The Glenleighden School. This school receives state government funding under the auspices of The Association for Childhood Language and Related Disorders (CHI.L.D.), and is the only school in Australia specifically for students with language disorders. The school offers four key education programmes from preschool to secondary school. These are early childhood, junior school, middle school and senior school. In the senior school programme, students follow individualised education programmes focusing on literacy, numeracy and life and work skills, rather than subjects leading to the typical high school leaving certificate (The Queensland Certificate of Education). To gain a place at the school, a student must have a diagnosis of a severe primary communication disorder (which can include ASD), or a verified disability category of speech language impairment, approved by an educational authority, such as the Queensland Department of Education, Training and Employment. Meeting this criteria will not guarantee a place, however, as places are also dependent on other factors such as the number of vacancies and the availability of government funding. To enrol a student, parents, educators or other professionals must apply directly to CHI.L.D. by completing a referral form, accompanied with supporting documentation such as cognitive assessment tests and recent educational reports.

Some families may have access to individual funding for respite care or may be able to access state-funded respite services. Autism Queensland operate two centre-based respite facilities and provide some in-home respite.

Intervention

There is a wide range of interventions available for children with ASD in Queensland. The state government's Autism Early Intervention Initiative provides early intervention services for children with ASD up to six years of age and their families. Services under this initiative are provided by Autism Queensland and The AEIOU Foundation (AEIOU). Autism Queensland provides multidisciplinary centre-based education and therapy programmes, home and community-based programmes, remote-technology programmes and family support programmes that provide links with other families. Parent coaching and support are a significant component of Autism Queensland services. Centre-based programmes operate at each of Autism Queensland's centres in Brisbane and regional centres, with children attending between two to four days per week. All other programmes are available to families throughout Queensland. AEIOU is an approved childcare provider, delivering an intensive multidisciplinary early intervention programme for children with ASD. Children can access this programme part-time (2.5 days a week) or full-time (5 days a week). These and other interventions can also be funded through a combination of the Helping Children With Autism (HCWA) package, childcare rebates and parent fees.

HCWA provides access to funding of up to \$12,000 (with \$6,000 being the maximum that can be spent per financial year, and \$2,000 extra for those in more remote locations), up until a child's seventh birthday. A child is eligible for funding if they have an ASD diagnosis and are registered with the Autism Advisor Program before their sixth birthday. HCWA does not require diagnosis under DSM-5 and, as they do not specify a diagnostic tool, diagnosis under DSM-IV still acceptable.

HCWA funding is used to support access to multidisciplinary early intervention programmes and therapy services (speech language pathology, occupational therapy and psychology services) and resources considered essential for the child's therapy. A family/child can only access interventions eligible for HCWA funding. Eligibility is determined by the presence of established or emerging research evidence to support its use (Prior et al., 2011). The interventions currently eligible under the HCWA package include: ABA; Early Start Denver model (ESDM); TEACCH; LEAP; Pre-School Autism Communication Trial (PACT) Building Blocks; Social-Communication, Emotional Regulation and Transactional Support (SCERTS); DIR/Floortime approach; the Developmental Social-Pragmatic (DSP) model; Relationship Development Intervention (RDI); and the P.L.A.Y project. These interventions are delivered by allied health professionals in the child's home, therapy clinics or early years setting.

Educational support for children and young people with ASD is guided by good practice documents, including the 'Australian Good Practice Guidelines for Early Intervention' (Prior and Roberts, 2012) and 'Education and ASD Spectrum Disorders in Australia' (2010). These two documents are discussed in more detail in the chapter on good practice guidance. Schools can draw on funding from Education Queensland, through the EAP. Autism Queensland also provides state-wide outreach advisory support to children and young people with ASD and their schools (state, Catholic or independent). The service, delivered by a team of teachers, speech pathologists and occupational therapists, focuses on supporting educational outcomes. This programme is funded by Autism Queensland along with supplementary funding from the Department of Education and Training.

A small number of children and young people with ASD aged 7–17 years have access to individualised state funding, under the Autism Initiative Funding programme, which is administered by the Department of Communities, Child Safety and Disability Services. The Autism Queensland outreach team are able to deliver individualised programmes and support to children with this funding or on a fee for service basis. All programmes are individualised to meet the needs of the child and family. Eligibility for funding is determined through assessment by the Department of Communities, Child Safety and Disability Services.

Professionals

The type of professionals involved in provision will vary depending on what services the child and family access. Similarly, schools are allocated resources with principals responsible for supporting the educational programmes of all students with a disability. It is likely that the child will come into contact with speech pathologists, occupational therapists, psychologists and social workers. For children and young people at school, the amount of time they access from each professional is dependent on their need, alongside the school prioritisation process. Mandatory and discretionary training for professionals varies, but in general they are expected to meet the minimum requirements required by the appropriate registration or professional body, and this need not be specific to ASD.

Teacher education

A number of universities in Queensland offer ASD content within their teacher training courses, but only Griffith University was identified as offering a course specifically aimed at supporting people/pupils with ASD. This multidisciplinary programme can be studied to postgraduate certificate or master's level. Autism Queensland also deliver targeted professional development for schools throughout Queensland, in each education sector (i.e. state, Catholic and independent).

Mandatory training for teachers of children with ASD varies within each education sector. Positive Partnerships is a national programme funded through the HWCA package, which provides professional development training for teachers, school leaders and other education professionals about how to best support students with an ASD in the classroom, and how to create an 'ASD friendly' school culture. This five-day programme is available to up to two teachers per school throughout Australia. Positive Partnerships also provides workshops and information sessions for parents and carers of school-aged students with ASD, to assist them to work with their child's teachers, school leaders and other staff. Parents can attend free workshops and access online workshops and information. Schools and teachers can also access training through the More Support for Students with Disabilities (MSSWD) National Partnership, a Commonwealth government initiative that aims to ensure that Australian schools and teachers are better able to support students with disabilities. The Department of Education, Training and Employment will receive \$32.9 million (AUS) between 2012 and 2015, and alongside training, part of this funding will be used to set up two centres of expertise in Queensland, addressing the educational needs of students with ASD.

Outcomes

Outcome data for specific groups of students within state-level education is not collected by Education Queensland. Outcome data is also limited at the national level. Limited attainment data from 2009 indicate that 79 per cent of people with ASD across Australia were reported to have no non-school qualifications (compared with 44 per cent of the general population). This suggests that people with ASD are less likely than the general population to continue their studies beyond compulsory schooling (Australian Bureau of Statistics, 2013a). Participation in the labour force was taken as a measure for independence-related outcomes. The labour force participation rate for people with ASD across Australia is reported to be 34 per cent (compared with 54 per cent of people with disabilities and 83 per cent of people without disabilities) (Australian Bureau of Statistics, 2013b). Caveats are needed here as information on the characteristics of the sample included, such as how they were diagnosed with ASD, and how the data was collected could not be obtained.

Sweden

Detailed information was available for some categories, such as prevalence and diagnosis, but less so for other categories such as education setting types. This is reflective of the types and levels of data that are routinely collected in Sweden. Information primarily came from staff, websites and documents from the following organisations: The National Agency for Special Needs Education and Schools; The Swedish National Agency for Education; and The European Agency.

Legislation

The Swedish Education Act (2010) is the key piece of legislation covering the education of all children and young people in Sweden. Its central tenet is that education should be equivalent for all, and that students who require special support in order to access the curriculum should not be defined or treated as a separate group. As a result, Sweden does not have any legislation specific to the education of children with SEN, nor does it have a legal definition of what constitutes SEN. However, the National Agency of Special Needs Education and Schools has been set up to provide countrywide support and services for the education of children and young people with SEN.

The educational needs of a child or young person are established by the school, through the completion of an individual development plan (IDP). All students have the right to an IDP in their first five years of schooling (or longer for students in special schools or on special programmes). These plans detail any barriers a student may face when encountering the curriculum, along with educational goals for them to work towards. The IDP will also state the measures that a student will require to overcome their barriers and achieve their goals, such as specific teaching strategies or classroom adaptations. If a pupil needs special support to reach his or her goals, an Action Provision Plan (APP) is drawn up by school staff; in cases where there is more significant need, external professionals such as nurses, psychologists, counsellors, or SEN teachers will also be involved. The Swedish Education Act states the importance of parental participation in the planning of a child's education, and therefore parents are always involved in the development of the APP. School principals are responsible for the assessment of their students' needs, and for ensuring that appropriate support is put in place. The National Agency of Special Needs Education and Schools offers support to schools and county councils through the provision of accessible teaching materials, access to government funding and the running of special needs schools.

Prevalence rates

A cohort study (Idring et al., 2012) that included all children aged 0–17 years living in Stockholm County for at least four years between 2001 and 2007 (n. 444,154) identified 5,100 children and young people with a diagnosis of ASD, giving a prevalence rate of 1.15 in 100. Information relating to diagnoses was ascertained using four national and regional registers covering all the pathways to ASD diagnosis in Stockholm County. A child was included if they had a recorded diagnosis of ASD on ICD-9, ICD-10 or DSM-IV, and a diagnosis of any of the pervasive developmental disorders outlined in ICD-10 or DSM-IV. Thus, children with ASD, Asperger's syndrome, 'pervasive developmental disorder – not otherwise specified', childhood disintegrative disorder and Rett disorder were all included. This study provides a higher prevalence rate than that reported by Zander (2004), who estimated that 0.6 in 100 children and young people in Sweden have a diagnosis of ASD. However, children with a diagnosis with Asperger's syndrome were excluded from their study.

Diagnosis

Diagnosis of ASD in preschool children begins with a meeting between a child's parents and the child's doctor and/or a psychologist, who makes an initial assessment regarding the likelihood of the child having ASD. If deemed appropriate, the child will be referred on for a more comprehensive evaluation. Referrals for diagnosis are also commonly made by child healthcare centres, which come into contact with 99.8 per cent of all children of preschool age through the countrywide health and developmental surveillance programme. Diagnostic evaluations are made by a team comprising a doctor, a child psychologist and, in some cases, a speech therapist, an occupational therapist and/or a physiotherapist. Diagnosis is made according to the DSM or ICD classification system.

For children of school age, the school will normally be the first point of contact regarding a diagnosis. Referrals can be made by parents, or by the child themselves. If the school thinks it is likely that the child may have ASD, a comprehensive investigation will be carried out by a physician, a psychologist and a special education teacher to determine diagnosis. As with preschool children, diagnosis is generally made in accordance with ICD or DSM criteria. DSM-IV-TR is most commonly used, with ICD-10 classification being favoured in cases where a child's diagnosis will be reported as part of a study, for instance in a nursing journal.

Education setting type

In Sweden all students have the right to choose the school they wish to attend, and this can be either a municipal or independent school. The only criterion for placement is that the school must demonstrate that they can meet a student's educational needs. Special education support is generally delivered in mainstream schools, or in specialist provision for those with intellectual impairments. The National Agency of Special Needs Education and Schools runs three national and five regional special schools. The national schools cater for students with visual impairments combined with additional disabilities; students who are deaf or have hearing impairments combined with learning disabilities; and students with severe speech and language disorders.

General educational provision, including special needs support provided by the school, is funded at the municipal level. Many municipalities delegate budgets directly to individual schools, and part of this funding comes from money that is specifically allocated to the individual student (either municipal or independent). Schools or municipalities may be able to access additional state level funding to support students with SEN through the National Agency of Special Needs Education and Schools. The length of the standard school year is 42 weeks, with some slight variation between different municipalities.

Specialist provision

Municipalities in Sweden are independent in terms of how they identify and assess students with SEN, and how they organise their specialist provision. The National Agency for Special Needs Education and Schools, however, provides some recommendations for the organisation of special needs education, and it is likely that a municipality's provision will include some or all of the following: supporting teachers of students with SEN through the provision of local resource centres, which may be supported by an advisor from the National Agency for Special Needs Education and Schools; employing specialist teachers to work alongside individual students in order to help them access whole class activities; and withdrawing the student from their class for limited periods to work with a specialist teacher.

A child with a diagnosis of ASD (excluding those labelled 'high-functioning' or with a diagnosis of Asperger's syndrome) and their families may access additional support under the Act Concerning Support and Services for Persons with Certain Functional Impairments (LSS). The LSS entitles people with considerable and permanent functional impairments to special support and services that they may need over and above that which they can obtain via other legislation. This support is provided by the individual's county council and municipality. Children and their families can access advice and support through county level rehabilitation and habilitation services. At the municipal level, support can include respite care; afterschool and school holiday childcare for those over 12 years of age; and home stays for children who attend a school in an area different to the one in which they normally reside. Support is provided on the request of the individual with the disability or, in the case of children under 15 years of age, their parents or guardians. Requests are dealt with by the municipality's LSS officer, who determines what additional support the child is entitled to. This decision is largely determined by the assessment made during the ASD diagnosis process. As part of the support, children are also entitled to an 'individual plan' that details their needs and the services that will be provided to address them. The municipality has responsibility for coordinating the measures described in the plan.

Intervention

Habilitation services are offered to all children with a diagnosis of ASD and include interventions such as special education, parental education programmes, school-based interventions and staff training, occupational therapy, social care, or other services as relevant. Decisions about what intervention or supports a student will access are normally made at the school level. A school's 'pupil welfare team', consists of a representative from the local school board, pupil welfare staff (e.g. school doctors, nurses, psychologists or counsellors) and special education needs teacher. Staff from other services the child accesses, such as afterschool or youth clubs, will also be involved. This is so as to provide as complete a picture as possible of the child's needs. Parents must give their approval before their child can participate in any interventions or special education programmes. Parents are informed of any decisions regarding their child's education, and given the opportunity to comment, through a consultation organised by the school principal. The school principal is responsible for ensuring any decisions made by the school and parents are fulfilled. Funding for any necessary interventions or adjustments tends to come from the school, which is funded by the municipality.

Teacher education

Teachers working with students with SEN can study for a postgraduate diploma in special needs training. This includes specialisations in deafness or hearing impairments, vision impairments, serious language impairments and learning disabilities. The course aims to meet the needs of special needs schools and schools catering for children with disabilities, and for special needs teachers with specific knowledge about the groups of pupils in these schools.

Outcomes

Due to the Personal Data Act, it was not possible to locate outcome data for children and young people with ASD.

Scotland

Individual pupil data are collected in Scotland. This made it possible to obtain information such as the numbers of children with ASD attending school and some outcome data. However, information is limited in other areas. Much of the information sought is not collected in a routine way and/or is not easily accessible. This is primarily due to the fact that educational processes and resources differ between different local education authorities. As a result, an article recently published in *Good ASD Practice*, entitled 'Autism and Scottish education: Information from data' (Meikle and Watt, 2013) had many of the same limitations as the case study presented here. Information primarily came from staff, websites and documents from the following organisations: The Scottish Government; Education Scotland; ASD Network Scotland; and Dumfries and Galloway Council.

Legislation

There are three major pieces of legislation currently relevant to the education of children and young people with ASD in Scotland. These are: The Education (Scotland) Act, (1980); Standards in Scotland's Schools Act, (2000); and the Education (Additional Support for Learning) (Scotland) Act, (2009). The latter is of most relevance to students with ASD, as it provides the legal framework underpinning the system for supporting students in their school education, as well as their families. With regards to terminology, 'additional support needs' is used in place of 'SEN'. A child or young person is defined as having additional support needs if they are, or are '...likely to be, unable without the provision of additional support to benefit from school education provided...' The definition of additional support provided by the Act is designed to be as inclusive as possible. As a result, specific groups or categories of children are not specified under the Act. Instead, four areas are identified that might present barriers to learning: the learning environment; social and emotional factors; family circumstances; and health and disability. Students with ASD are not specifically identified as being likely to require additional education support, but would fall under the health and disability category.

Section 15 of the Standards in Scotland's Schools Act (2000) gives young people the right not to attend a special school and attend mainstream provision, unless doing so would not be suited to the child's ability or aptitude, be incompatible with the education of the other children with whom the child would be placed, and/or would result in a unreasonable level of public expenditure. In order to achieve this aim, education authorities are legally required to identify and assess any children or young people who may require additional support needs, and to make the necessary provisions to help them access their education and achieve their potential. The additional support provided is likely to fall into three overlapping, broad headings: approaches to learning and teaching, support from personnel and provision of resources. Education Scotland, the improvement agency for education, both inspects schools and also promotes innovative practice to better meet learners' needs.

To assist education authorities and schools in providing additional support, the Act is accompanied by the 'Supporting Children's Learning Code of Practice' (2010), which outlines the duties of education authorities and other agencies to support children's and young people's learning. The code provides guidance on the Act itself, as well as information around identifying and providing for additional support needs, developing a co-ordinated support plan and resolving disagreements. It does this through identifying examples of good practice, although the code itself is designed to support decision-making, rather than to dictate what should occur in each individual case.

Every education authority is required by the Act to keep a record of all the children in their jurisdiction between the ages of two and 16 years who have any form of additional support needs, and identify, implement, and review the provisions for their additional support needs. Typically, an Individualised Educational Programme (IEP) will be drawn up for a student, although this is not a legal requirement. IEPs not only outline the child's additional needs and the measures needed to support them, but also include targets for the child and can be used to monitor progress. In this way, they can be used as a planning, teaching and reviewing tool.

If a child, including those with ASD, requires input from a range of agencies then education authorities are legally required to produce a Co-ordinated Support Plan (CSP), which outlines what support will be provided by each agency. Education authorities must ensure that any services and provisions outlined in the plan are delivered. A CSP will only be prepared in cases where a student has complex or multiple additional support needs that have a 'significant adverse effect' on most areas of their learning, for at least 12 months, and where these needs can only be met through agencies outside of education, such as speech and language therapy. In order for a child to be placed on a CSP, their school or parents must be able to prove that they meet the above criteria. Generally, the student will undergo further assessment by the education authority to confirm this, and parents will be involved in the process.

Prevalence rates

The estimated prevalence rate of ASD in Scotland is 1:100 (Batten and Daly, 2006), although prevalence varies across education authorities. A 2013 report to parliament reports a range of 0.45 per cent to 2.45 per cent of the population affected by ASD across all the educational authorities in Scotland (2013).

Diagnosis

Diagnosis of ASD in Scotland typically begins with a GP or educational psychologist referral to a paediatrician. Children are likely to be diagnosed by developmental paediatricians, although psychiatrists and psychologists (often based in Child and Adolescent Mental Health (CAMHS) centres, regional ASD teams or hospitals) can also give a diagnosis. Alternatively, diagnosis may be carried out by local authority teams designated with diagnosing children with ASD and/or other communication disorders. These multidisciplinary teams can include educational psychologists, speech and language therapists and other National Health Service (NHS) staff including a paediatrician. The teams undertake an assessment that covers all aspects of the child's development including language and cognitive development, and then discuss the findings together before deciding whether the child meets the criteria for diagnosis.

Education setting types

In total, 9,946 children and young people attending schools in Scotland are receiving additional support for the primary reason of ASD (Scottish Government, 2013). This equates to 7.56 per cent of all students identified as having additional support needs, and 1.47 per cent of the school population as a whole. Over two-fifths (84 per cent) of identified students are male. A caveat is needed here, however, as children can be counted twice under different additional support needs headings; for example, a child can be reported under both ASD and physical disabilities. Furthermore, at the local authority level, the reported incidence of ASD as a proportion of all children with additional support needs ranges from 4 per cent for some local authorities to 14 per cent for others. This variance is likely to reflect the slight differences in reporting and diagnosis systems used across different education authorities in Scotland, with these differences tending to be stable over time.

There is a range of provision available for pupils with ASD in Scotland, including mainstream schools, mainstream schools with units and special schools, as well as schools specifically for children and young people with ASD. A total of 94 per cent of children with additional support needs attend mainstream schools, while approximately six per cent of children with additional support needs attend special schools (Scottish Government, 2013). Of all students attending special schools, 28 per cent have a diagnosis of ASD. A proportion of children – 8.5 per cent of the school population according to the Scottish Government (2013) – do not attend mainstream schools all the time, and (excluding those in special schools) may receive some of their education in learning centres, units attached to mainstream schools or resourced classrooms.

The Scottish Government has been actively engaged in building Scotland's capacity to support children and young people with ASD in educational settings. Two key activities to promote this are the commissioning of a literature review of best practice and the development of the ASD Toolbox, which is freely available to anyone working with children with ASD, including parents and professionals. The toolbox includes, amongst other things, links to good practice examples and recommended approaches or interventions. All schools were sent hard copies of the original toolbox, and an online version is also available.

The average school year in Scotland is 38 weeks long.

Specialist provision

There are 153 special schools or provisions in Scotland (Scottish Government, 2014), many of which are units or centres attached to mainstream primary or secondary schools. Local authority special schools typically cater for students with ASD alongside students with other learning difficulties/disabilities, and there are no state special schools specifically for students with ASD.

There are eight independent special schools in Scotland that indicate on their admissions criteria that they cater for students with ASD, but only two cater specifically for students with ASD. These are: New Struan School (run by Scottish Autism) and Daldorch House (run by the NAS). New Struan School has 42 places for students aged 5–19 years. Alongside bespoke educational programmes, they offer a 24-hour residential service for 39 weeks of the year. They have a range of residential accommodation options available, including some independent living arrangements for older students to help prepare them for the transition to adulthood. Daldorch has 31 places available for students aged 8–21 years. They offer both day and residential places, and residential places can be accessed for up to 52 weeks of the year. The school also offers outreach support for children and young people aged 5–25 years. In addition, Daldorch operates a satellite school on another site, which has five places available for children aged 5–19 years (although at time of writing they had only four children on roll). All places are residential and available for 52 weeks of the year.

In addition, Falkland house is accredited by the NAS, but is not solely for pupils with ASD. It is a school for boys with ASD; social, emotional and behavioural difficulties; ADHD and Tourette's syndrome. The school is for students aged from approximately five to 18 years. They offer day-long, 39 week and 52 week programmes, with the week programmes including residential care. All children follow a personalised learning plan that is developed to meet their learning needs. There is a maximum of six children per class. The school also offers an outreach programme to improve communication between the child's home and the school.

Students are typically referred to the specialist schools by their local authority, who will in most cases also pay the school fees. The process for determining if and how much of the fees will be paid differs between local authorities.

Intervention

The Autism Toolbox was first introduced in 2009 as 'an autism resource for Scottish schools'. Developed on behalf of the Scottish Government, the Autism Toolbox combines recent research findings and examples of good practice to provide a practical resource for education authorities, schools, teachers and professionals working with children and young people with ASD. Specifically, the Toolbox is designed to form the basis of support and provision for students with ASD. The ASD Toolbox is divided into three main parts. Part one outlines relevant legislation and policy, part two offers practical guidance, such as how schools can best work with parents and other agencies, and part three provides details of interventions and resources. In 2010, the third section was withdrawn, and later launched as part of a wider relaunch of the Toolbox in 2014. Information about different interventions can now be found on the Autism Toolbox website, including: alternative and augmentative communication (AAC); ABA; cognitive behaviour therapy; social stories; son-rise options; TEACCH; and video modelling. The website also provides links to other organisations that collate information about different interventions, as well as signposting people to the Scottish Strategy for Autism 'Menu of Interventions'. This document is intended to act as a guide to families, teachers and other professionals working with children and young people with ASD regarding the types of interventions available. The menu is organised around the different 'challenges' people with ASD may experience across their lifespan, and then provides strategies, information about service providers, referral processes and expected outcomes for each challenge. It is important to note that in both the Autism Toolbox and the Menu of Interventions, all interventions come with the caveat that they are not recommendations and that they may not be effective for all children and young people with ASD. Rather, those working with students with ASD are asked to consider the needs and profile of the individual before selecting and trying out a particular intervention.

Outcomes

In Scotland, academic attainment data is collected at the individual student level, making it possible to examine some key outcomes for students with ASD, and to compare their outcomes with those of their typical peers. However, it is important to note that a student will only be categorised as having ASD if ASD has been identified as their primary reason for requiring additional support. Students with a diagnosis of ASD who do not have additional support needs, or students whose primary reason for additional support is a co-occurring disorder, would not be included in the ASD category.

The number of young people achieving the minimum qualification level required for further education (receiving five or more awards at SCQF level 3) was selected as a measure of attainment-related outcome for inclusion in this case study. In total, 93.5 per cent of all school leavers from the 2011–2012 school year achieved this benchmark, compared with 58 per cent of school leavers with ASD (The Scottish Government, 2013).

Alongside attainment data, attendance-related data is also routinely collected. Two types of attendance-related data are reported here: authorised and unauthorised absences, and placement at the end of compulsory schooling. With regards to the former, figures from 2011–2012 indicate that children with ASD missed 6.9 per cent of the school year due to authorised and unauthorised absences, compared with 5.2 per cent of all primary school students and 8.8 per cent of all secondary students (The Scottish Government, 2011). In terms of placement, 89 per cent of all school leavers from the 2011–2012 school year were in education, training or employment, including 38.2 per cent in higher education and 19.7 per cent in employment. A similar percentage of young people with ASD – 84.3 per cent – were also in education, training or employment, but of them just 17.6 per cent were in higher education and only 4.1 per cent in employment (Scottish Government, 2013).

North Carolina

North Carolina is one of the more comprehensive case studies. Detailed information was readily available for some categories, such as prevalence rates and education setting types. Other information, such as the types of interventions offered, was more difficult to obtain. This is perhaps a reflection of the fact that decisions regarding educational provision and data collection are made at the school district level, and these data are not collated at a state level. Therefore, data was not collated in a way that would inform this review. Information primarily came from staff, websites and documents from the following organisations: North Carolina Department of Health and Human Services; Infant-Toddler Program; State Board of Education; Exceptional Children Division; and North Carolina Department of Public Instruction.

Legislation

The Individuals with Disabilities Education Act (IDEA, 2004) is a federal level piece of legislation that governs how states and public agencies provide early intervention for children with disabilities under three years of age (Part C), and special education and related services for children and young people with disabilities aged 3–21 years (Part B). The Act gives all children and young people the legal right to a free and appropriate education in the least restrictive environment possible that will prepare them for further education and employment. Thirteen categories of disability are recognised under the Act, and ASD is one of them. States are responsible for monitoring how local school districts implement IDEA, and they receive federal funding to assist with this. A proportion of the federal funding is allocated to the school districts directly and the remainder is used to fund state-level initiatives to build capacity amongst the school districts. Two examples of this are the Infant-Toddler Programme and the Exceptional Children Division, discussed below. The state also has its own funding for IDEA implementation, which is considerably higher than the federal funding.

The Infant-Toddler Programme (ITP) is the state programme set up to meet Part C of IDEA. The North Carolina Early Intervention Branch (NCEI), part of the North Carolina Department of Health and Human Services, is the lead state agency for monitoring implementation of the ITP. The programme is delivered through 16 Children's Development Services Agencies (CDSAs) across North Carolina, and the NCEI supports them in this. The ITP provides supports and services for families and children with special needs from birth until three years of age. A child and family may be eligible for the ITP if the child has a developmental delay or an established developmental or health condition. A child is regarded as having an established condition if he/she is diagnosed with a physical or mental condition, or has a prematurity or genetic predisposition that has a high probability of resulting in developmental delay. There are eight specific conditions through which a child may be deemed eligible, and ASD is one of them. Diagnosis of an eligible condition alone is not sufficient to receive services from the ITP. A child must first be referred to the local CDSA by either their parents or other professionals such as physicians and social workers. Parental consent is not required to make a referral, but written parental consent is required to proceed with the process of establishing a child's eligibility for the ITP. Once written parental consent is received, the CDSA will conduct a thorough evaluation and assessment of the child's needs, which will involve evaluation of the child's health and development through interviews and discussion with families and observations of the child during typical routines in home or community settings.

The State Board of Education has responsibility for monitoring the implementation of Part B of IDEA, and this is supported through the state level legislative Education of Children with Disabilities (2006) policy. All children with a disability are mandated by IDEA to have an Individualised Education Programme (IEP). The IEP outlines the child's strengths and barriers to accessing the curriculum and goals. The goals chosen are those deemed most important to helping the child access the curriculum. The team working with the child is then responsible for developing a curriculum and/or placing them on a special education programme to help them reach their goals.

The Exceptional Children (EC) Division of the North Carolina Department of Public Instruction is responsible for the funding, supervision, monitoring and professional development of each school district's special education provision. Essentially, their role is to build the capacity of the school districts to successfully implement IDEA. They have three key responsibilities to achieve this: (1) Mediating parent and school district disputes; (2) Collecting data on 20 performance indicators to monitor progress of children with SEN in each school district; and (3) Monitoring how children transition from IDEA Part C provision (e.g. the ITP) to IDEA Part B. In particular they must monitor whether school districts are assessing all children with a disability before their third birthday and placing them on an IEP. The EC Division has specialist consultants and initiatives for each of the 13 disabilities recognised by IDEA.

There are currently two consultants overseeing the educational provision for children and young people with ASD across North Carolina. The team acts as a resource for school districts, schools and teachers. In particular, the programme assists school districts in the training of school and teaching staff working with students with ASD. Emphasis is placed on the use of evidence-based practices and techniques. In this way, the EC Division delivers the State Board of Education goals to host a series of training events, to provide networking opportunities and to promote understanding of evidence-based practice. Further supporting these goals, the Department of Public Instruction has joined in a collaborative effort with the Justice Academy, TEACCH and the ASD Society of North Carolina to provide clarification and training for Administrators and School Resource Officers, for example on issues such as the use of restraint.

Prevalence rates

The Centers for Disease Control and Prevention (CDC, 2014) estimate that about one in 68 children in the US have an identified ASD, Asperger's disorder or PDD-NOS). This estimate is drawn from a sample comprising 8.4 per cent of all the eight-year-old children in the US (n. 337,093) during the year 2008. The data were collected by the ASD Developmental Disabilities Monitoring (ADDM) Network, which is funded by the CDC to determine the number of people with ASD in the US. Looking at 14 communities across the US, the ADDM review records from multiple sources involved in educating, diagnosing, treating and providing services to children with developmental disabilities. Additionally, a panel of clinicians with expertise in diagnosing ASD review assessment information to determine if the identified children meet the (DSM-IV) criteria for a diagnosis of ASD. This includes children with a diagnosis, as well as those presenting behaviours consistent with a diagnosis.

Eleven counties within North Carolina form one of the 14 communities studied by the ADDM. Of the 36,913 eight-year-old children living in the area in 2008, 525 had a diagnosis of ASD (as determined by the ADDM). This gives a prevalence rate of 1.4 in 100, which is slightly above the national average. As noted above, not all the children identified as having ASD had a diagnosis of ASD in their records. Of the 525 children, 66 per cent had a diagnosis of ASD in their records. This is lower than the national average of 79 per cent. Interestingly, however, the median earliest age that ASD was documented in their records was three years and 10 months, which is earlier than the national median of four years and six months. However, when broken down into subtype of ASD spectrum disorder, it is only the median age for documentation of ASD that is lower than the national median (three years and three months, compared with four years and zero months). The median age for documentation of ASD/PDD was four years and seven months in North Carolina, four years and five months nationally. It was six years and seven months for Asperger's disorder, compared with six years and three months nationally.

Diagnosis

Children under three years of age can receive a diagnosis via the North Carolina Infant-Toddler Program, while children aged 3–5 years are referred to county pre-school services for a diagnosis of ASD. Parents of school-age children are required to send a written request to the principal of their child’s school asking for an evaluation based upon the suspicion of ASD. Child psychologists, child psychiatrists, developmental paediatricians and paediatric neurologists are all able to diagnose ASD in school-aged children. Diagnostic services are also available to people of all ages through the University of North Carolina TEACCH ASD Program and at the Duke University Center for Autism Diagnosis and Treatment.

Education setting types

There is information available regarding the educational placement of children and young people with ASD in North Carolina. Data collected about the early education of children with disabilities aged 3–5 years, indicates that there are 1,632 young children with ASD registered for some form of preschool education in North Carolina. The percentage of children aged 3–5 years with ASD in each early education setting is shown in Table A3.

Table A3: Children with ASD, 3–5 years by early education setting, North Carolina

Setting		Percentage	
Children attending a regular early childhood programme	At least 10 hours per week	Receiving majority of hours of services in regular early childhood programme	30% (n. 492)
		Receiving majority of hours of services in some other location	7% (n. 114)
	Less than 10 hours per week	Receiving majority of hours of services in regular early childhood programme	2% (n. 27)
		Receiving majority of hours of services in some other location	1% (n. 19)
Children attending a special education programme	Separate class	50% (n. 830)	
	Separate school	7% (n. 96)	
	Residential facility	0% (n. 0)	
Children attending neither a regular early childhood programme nor a special education programme.	Receiving majority of hours of services in home	< 1% (n. 12)	
	Receiving majority of hours of services in service provider location or some other location	2% (n. 42)	

The Report of Children with Disabilities (IDEA) (2012–2013) indicates that there are 12,717 children or young people with ASD aged six to 21 years attending some kind of education programme in North Carolina. Table 4 shows the percentages of children and young people with ASD in each education setting, organised by age group.

Table 4: Children and young people with ASD aged 6–21 years by education setting, North Carolina

Setting	6–11 years	12–17 years	18–21 years
Inside regular class 80% or more of day	41% (n. 2,724)	41% (n. 2,224)	15% (n. 128)
Inside regular class 40%–79% of the day	16% (n. 1,067)	18% (n. 951)	12% (n. 96)
Inside regular class less than 40% of day	40% (n. 2,616)	36% (n. 1,914)	60% (n. 499)
Separate school	2% (n. 127)	3% (n. 165)	10% (n. 82)
Residential facility	<1% (n. 9)	<1% (n. 18)	1% (n. 10)
Homebound/Hospital	<1% (n. 10)	<1% (n. 37)	1% (n. 13)
Correctional facilities	0% (n. 0)	0% (n. 0)	0% (n. 0)
Parentally placed in private schools	<1% (n. 20)	<1% (n. 5)	<1% (n. 2)
Total	6,573	5,314	830

Specialist provision

Early interventions are typically delivered through the North Carolina Infant–Toddler Program. Services tend to be provided within the child’s natural environment and as a part of their everyday routines, such as at home, at the local park or in their childcare setting. Active parental participation in the programme is strongly encouraged.

The Exceptional Children Division receives federal and state funding for each child or young person that falls under its remit. Exact figures are difficult to calculate, since they vary depending on the number of students who have a disability or have SEN. According to figures published for the school year 2012–2013 (Exceptional Children Division, n.d.), federal funding for pre-school children included the cost of the average salary of a classroom teacher, plus benefits (\$56,159) for each local authority, along with a per child allocation of \$2,979.01. For school-age children (5–21 years), an allocation of \$3,743.48 per child was made. Requests for additional state funding can be made by a school district to the Exceptional Children Division if the supports and services a child requires cannot be covered by their per child allowance. Federal funding provides an additional \$486.19 per preschool child (although this may be more depending on the number of children enrolled in pre-school, and the number of children living in poverty).

Intervention

Children on the ITP are likely to receive an intervention outlined in the ITP guidance document entitled 'Guidelines for Part C Early Intervention Services for Infants and Toddlers with Autism'.

Students with ASD are likely to receive one of the interventions recommended by the EC Division. In 2011, the EC Division produced a paper outlining a number of instructional practices for use with students with ASD (this paper is discussed in the Good Practice Guidance chapter). The interventions had been identified by the National Professional Development Center on ASD as meeting the criteria for evidence-based practice. A range of interventions are recommended to reflect the heterogeneous nature of students with ASD, and these interventions can be broken down into the following four broad categories.

- (1) **Teaching approaches:** Prompting, time delay, task analysis and chaining, computer-assisted instruction, discrete trial teaching, independent work systems, naturalistic interventions, pivotal response training, visual supports.
- (2) **Communication and social approaches:** Picture Exchange Communication Systems (PECS), voice output communication aids/speech generating devices social skills groups, social stories, video modelling.
- (3) **Behavioural approaches:** Reinforcement, shaping, differential reinforcement or other/alternative behaviours, extinction, functional behavioural assessment, functional communication training, positive behavioural intervention and support, response interruption and redirection, self-management, stimulus control and/or environmental modification.
- (4) **Other approaches:** Parent training, peer-mediated instruction/intervention.

At the national level, the National Standards Report from the National Autism Center (2009) states that the majority of interventions resulting in positive outcomes for children and young people with ASD are behavioural in nature. This includes ABA-based approaches, the use of which was also endorsed in an earlier report produced by the United States Surgeon General (US Department of Health and Human Services, 1999). In North Carolina there are several providers of ABA-based interventions for children and young people with ASD in special treatment programmes. The costs of attending these programmes are likely to be covered partially or fully through private health insurance coverage, or through federal health insurance programmes, such as TriCare.

Professionals

The Infant–Toddler Programme (ITP), which provides early intervention for children with ASD under three years of age, offers 'Infant–Toddler Personnel Certification'. Certification is required for all service coordinators and providers of special instruction services for children enrolled in the ITP, and must be renewed every year. Two types of certification are available: the Infant, Toddler and Family Associate Certificate for staff and providers who do not have a bachelor's degree or higher; and the Infant, Toddler and Family Specialist Certificate, for those who do. Certification is based on course work and state-approved accepted professional degrees. Individuals who receive the certificate must obtain ten contact credit hours of continuing professional development each year.

The North Carolina Early Learning Network runs a professional development programme for the diagnostic team (which includes speech and language therapists, occupational therapists and psychologists). It provides training in how to administer the ADOS. This is to help build capacity for school districts to ensure all children with ASD have received an assessment before their third birthday, and before entering preschool.

There are currently over 175 certified behaviour analysts in North Carolina, many of whom are involved in providing direct services or supervision of programmes serving children and young people with ASD. Certified behaviour analysts are accredited by the Behavior Analyst Certification Board (BACB), who offer two key types of accreditation. The first is 'Board Certified Behavior Analyst' (BCBA), which is offered to those educated to at least master's level. The second is 'Board Certified Assistant Behavior Analyst' (BCaBA), which is offered to those educated to bachelor's level. Accreditation is awarded on the basis of applicants passing an exam, which covers a range of topics such as implementation and experimental evaluations of interventions. Professionals intending to take these exams can choose to study at one of 240 universities running courses approved by the BACB.

Teacher education

All preschool children with an IEP must be served by a teacher holding a Birth through Kindergarten Certificate, or served by certified speech-language pathologists or occupational therapists. The Birth through Kindergarten Certificate is a special/regular early childhood education certificate.

The EC Division run a number of professional development programs relevant to the provision of children and young people with ASD. These include the 'autism problem solving initiative', which looks at how multidisciplinary teams can work together to provide the best support possible for the child, and the teaching training for the Social and Emotional Foundations for Early Learning initiative. This package is not specifically for children with ASD, but some state contacts reported that there has been success using this approach with them.

Outcomes

Outcome data for North Carolina is limited to attainment-related outcomes. In the academic year 2011–2012, 65 per cent of children with ASD (aged 5–10 years) and 55.7 per cent of children with ASD (aged 11–16 years) achieved at or above the expected achievement level in an end-of-grade maths test, compared with 82.1 per cent and 55.7 per cent of all children respectively (Department of Public Instruction, 2013). These data suggest that whilst children with ASD may underperform relative to their peers in the earlier stages of their education, they catch up by the time they are in secondary school.

Massachusetts

Information for Massachusetts was limited. Apart from the legislation and prevalence categories, only partial or no information could be found for the remaining categories. This is in part due to the fact that although individual pupil level data are collected, such as education setting types and outcomes, these data are not available in a format that can be readily shared with outside agencies. A report produced by the Autism Commission, which was established on behalf of the Massachusetts Health and Human Services (Autism Commission, 2013) to determine the current status of ASD provision in the state also acknowledged that it was difficult to access relevant data. Information primarily came from staff, websites and documents from the following organisations: The Autism Commission; The Department of Elementary and Secondary Education; The Massachusetts State Department of Education; and the Department of Public Health.

Legislation

The Individuals with Disabilities Education Act (IDEA, 2004) is a federal level piece of legislation that governs how states and public agencies provide early intervention for children with disabilities under two years of age (part C), and special education and related services for children and young people with disabilities aged 3–21 years (part B). The Act gives all children and young people the legal right to a free and appropriate education in the least restrictive environment possible that will prepare them for further education and employment. Thirteen categories of disability are recognised under the Act, and ASD is one of them. Like all states, Massachusetts receives federal funding to support the implementation of IDEA.

IDEA (part C) is delivered through the Department of Public Health's Early Intervention (EI) programme. This is a state-wide, integrated, developmental service that is available to families of children aged three years or under. Children may be eligible to receive EI if they have developmental difficulties due to identified disabilities, or if their typical development is at risk due to certain birth or environmental circumstances. The Department of Public Health will cover any treatment costs that are not covered by the child's insurance, or all costs for those children who do not have insurance. Children with a diagnosis of ASD are automatically eligible for EI services, although children displaying symptoms of ASD may also be eligible. In cases where the child's diagnosis is confirmed by a physician or licensed psychologist, the child may also be able to access ASD speciality services. Such services include intensive programmes designed specifically to target the social, communication and behaviour needs of young children with ASD.

At the state level, IDEA (part B) is enacted through the 'Children with Special Needs' law, a chapter within the general state law (MGLc.71B). ASD is one of 10 disabilities recognised under the state law. The Massachusetts State Department of Education has responsibility for the education of children and young people. A diagnosis of a disability does not automatically entitle a student to support from special education. Instead, they must first be referred to the programme, either by a parent, member of school personnel or other professional. Referrals are made at the district level, and the district must contact the child's parents to obtain consent for the assessment of eligibility to take place. Once parental consent is obtained, the child is evaluated by appropriate, trained specialists. The evaluation can include, but is not limited to, school observations and interviews with teachers, parents and the student themselves, where suitable. Once the evaluation is complete, a decision of eligibility will be made. This decision is made by a team comprised of the student's parent(s), special education and/or general education teacher, a district representative who has knowledge of the resources available and can commit to supports being put in place, and a person qualified to interpret the results from the specialist's evaluations. Students aged 14–22 years are automatically included in the team, and younger students may be included if deemed appropriate. If the student is found eligible, the team will develop an Individualised Education Plan (IEP). All students are typically expected to participate in the state general curriculum, and the IEP represents a formal agreement about the services that the school will provide to enable them to do so. Furthermore, all children and young people in Massachusetts receiving an education at public expense are required to participate in state level testing. The IEP will outline the adjustments and accommodations needed for the student to participate in this testing, and may include the provision of alternative assessment, namely a portfolio of the student's work. In relation to ASD specifically, the ASD IEP Act is a piece of legislation requiring that the team developing a student's IEP explicitly consider and address their communication, social, behavioural, and academic needs resulting from their diagnosis of ASD.

Once the IEP is written, the team will decide on the child's educational placement. Parents must consent to both the IEP and setting. Once this is agreed, the child receives special education and related services from qualified professionals in this setting. It is the school's responsibility to inform parents of their child's progress, and to monitor achievement of IEP goals. Once a year the IEP will be reviewed by the team and amended if necessary, and once every three years the child's eligibility for special education will be re-evaluated. Once the student reaches 18 years of age they are able to make their own decisions about whether or not they receive special educational services.

If parents are unhappy with any of the decisions made during the evaluation process, they can request an independent educational evaluation, the cost of which may be fully or partially covered by the district, dependent on family income. Students not found eligible to receive support may be entitled to some supports and accommodations under section 504 of the Rehabilitation Act (1973), which covers students with mental or physical impairments.

Prevalence rates

As discussed in relation to North Carolina, the ASD prevalence rate for the US is one in 68 (CDC, 2014). This estimate is drawn from a sample comprising 8.4 per cent of all the eight-year-old children in the US (n. 337,093) during the year 2008. The data were collected by the ASD Developmental Disabilities Monitoring (ADDM) Network, which is funded by the CDC to determine the number of people with ASD in the US. Looking at 14 communities across the US, the ADDM reviewed records from multiple sources involved in educating, diagnosing, treating and providing services to children with developmental disabilities. Additionally, a panel of clinicians with expertise in diagnosing ASD reviewed assessment information to determine if the identified children meet the (DSM-IV) criteria for a diagnosis of ASD. This included children with a diagnosis, as well as those presenting behaviours consistent with a diagnosis. Massachusetts is not one of the 14 communities included in the ADDM. However, using the CDC figures, it is estimated that 16,000 (1.1 per cent) of children and young people under the age of 18 living in Massachusetts have a diagnosis of ASD (Autism Commission, 2013). This is supported by data from the 2010–2011 school year, which indicated that 12,000 students aged between six and 17 years were registered as having ASD. It is expected that the remaining 4,000 are children aged five years or under (Autism Commission, 2013). It is interesting to note that the number of students with ASD between the ages of three and 22 years educated in Commonwealth schools in Massachusetts increased 170 per cent between the fiscal years 2003 and 2011, an increase larger than for any other disability category during the same period (Autism Commission, 2013).

Diagnosis

There are many places in Massachusetts where a diagnosis or educational determination of ASD can be sought, including hospitals, medical centres and over 400 school districts. Pre-school-aged children are likely to be diagnosed by a paediatrician in a hospital or medical centre, whilst older children are more likely to be diagnosed in an education setting. When receiving a diagnosis in hospital and/or medical centres, the DSM-IV or 5 is likely to be used as a diagnostic tool. In education settings, documents such as 'Is Special Education the Right Service?', a technical assistance guide developed by the Massachusetts Department of Education, are likely to be used instead.

Education setting types

Figures from the academic year 2007–2008 indicate that 32 per cent of children with ASD in Massachusetts are educated in mainstream schools, whilst 18 per cent are partially educated in mainstream schools (attending special units or classes for part of their education). One-third (33 per cent) are educated separately from the mainstream and 12 per cent attend public and private day centres (Deninger and O'Donnell, 2009).

Specialist provision

Three private special schools specifically for children with ASD in Massachusetts were identified, although it is possible there are more. These schools are run by the May Institute, which is one of the largest providers of education for children with ASD in the US. The three schools offer full day, year-round support for children and adolescents with ASD and other developmental disabilities in Massachusetts. Students attending these schools are placed on individualised academic and vocational programmes, based on ABA. One of the schools also offers residential living arrangements.

Specialist provision is also available via the Children's ASD Waiver Program. This programme is a Medicaid programme that provides intensive in-home and community based services to children nine years of age or younger, who have a diagnosis of ASD and are eligible for MassHealth. MassHealth is a public health insurance programme that receives federal funding. A child must be at risk of being institutionalised to gain a place on the programme. The Waiver Programme is overseen by the Department of Developmental Services' ASD Division, and up to 157 children may participate in the Waiver programme at any given time, or 205 children over the Waiver year. There is considerable demand for the service, and more than 800 families applied for the Waiver during the latest enrolment period (April 2012). Children chosen to participate in the Waiver programme are eligible to services costing up to \$25,000 per year for a three-year period up until their ninth birthday. At the end of the three years they may be able to receive some supplementary services, including respite and home consultation services to assist with the transition from the Waiver Program. Massachusetts has 50 per cent of the costs of the programme reimbursed through federal funding (Autism Commission, 2013).

Intervention

As discussed in the legislation section, early interventions are delivered through the Department of Public Health's early intervention programme. The interventions offered to children with ASD, especially those delivered through the ASD Speciality Service, emphasise the development of social and communication skills, and the management of behaviour that may interfere with learning. Parents are actively involved in their child's intervention, enabling them to develop strategies that they can also use in the home.

Additional interventions are available to children with ASD covered by a private health insurance plan, to which the Act Relative to Insurance Coverage for Autism (ARICA) applies. The ARICA enables families to obtain additional services for children with ASD. The additional services covered by the law included diagnostic evaluations, treatment and care. Within the treatment category, habilitative and rehabilitative care is offered; this can include ABA, supervised by a board of certified behaviour analysts. In ARICA, ABA is recommended as a treatment method for ASD that 'uses positive reinforcement to develop and improve communication, play, social, academic, self-care, work, and community living skills and to reduce problem behaviours in children and adults with autism'.

Whilst the ARICA does not impact on the provision school districts are required to make available, or the range of services they offer, some public and private schools hire 'board certified behavior analysts' (BCBAs) to provide ABA services to individuals within the school setting. The New England Center for Children (NECC), for example, provides services in their private, not-for-profit school for children and young people with ASD and related disorders. Funding is provided by the state and school districts who refer their students to the NECC. NECC currently serves over 200 persons in their central school, but they also collaborate with a number of school districts in Massachusetts to staff and monitor the implementation of ABA services in classroom settings.

Summary of findings

Making direct comparisons between each of the case study countries/jurisdictions is difficult since the type and level of data available for each of the categories varied from place to place and systems and services also differed. However, it is possible to draw some conclusions about different models of education for children and young people with ASD, and the impact such models have on the ability of a country/jurisdiction to track students over time.

In terms of legislation, ASD was either defined as a special educational need in its own right (Queensland, North Carolina and Massachusetts), was included more generally within wider legislative categories such as disability (Scotland), or was not identified at all (Sweden, where there is no legislation specific to children and young people with SEN). The way students are categorised in legislation can have an impact on the way data about them are collected. For example, in Sweden, data protection legislation only allows data to be collected at the group level, and groups can be defined quite broadly so that it is not possible to identify which individuals within a group have a diagnosis of a particular disorder, such as ASD. Furthermore, as special educational support is delivered on the basis of individual need, rather than diagnosis, there is less imperative to collect data at a sub-group level as support is individualised from student to student. In Scotland, North Carolina and Massachusetts, provision and data collection are devolved to a local level and as a result national level data tend to be more limited. These national data are also unlikely to capture the diversity of local provision, such as in relation to special school systems and staffing; professionals involved in the education of pupils with ASD; staff–pupil ratios; funding; interventions provided; availability of extended provision; and training available for teachers. Queensland had the most information available, although it is not clear what procedures are in place to enable this, especially as in some cases their provision was similar to that of other countries/jurisdictions. For example, their Education Adjustment Program resembles North Carolina's Exceptional Children Division.

Prevalence rates of ASD ranged from 0.6 in 100 to 1 in 68. The differences in reported figures seemed to be determined by who was and was not included in the figures. For example, in Sweden, the estimates varied depending on whether or not children and young people with Asperger's disorder were included. Similarly, although exact figures were not given, it was expected that the Queensland prevalence rate would be higher than the 0.6:100 countrywide estimate, as they include all pervasive developmental disorders within the 'ASD' category. This assumption is supported by data from Sweden, where the estimate was 1.15 in 100 when Asperger's was included, but 0.6 in 100 when it was not.

In each of the case study countries/jurisdictions, diagnosis of ASD took the form of a multi-agency assessment, and typically included paediatricians, psychologists and speech and language therapists. Although the diagnostic criteria used could not be established for each country/jurisdiction, the DSM-IV and ICD-10 appeared to be the most popular. It is likely that use of the DSM-IV will be replaced by the DSM-5. Similarities were also evident in the diagnosis of school-age children, in that referrals for further assessment were typically made through the child's school.

In all case studies there was a commitment to the inclusion of children with ASD in mainstream schools, which is likely to reflect the commitment of many of the case study countries to the Salamanca agreement (UNESCO, 1994). Similar to Ireland, a continuum of provision was also emerging or established in most countries/jurisdictions, but only North Carolina had figures relating to placement in different setting types. For each of the case study countries/jurisdictions it was unclear how this provision is organised. The criteria for determining whether or not a child or young person should receive their education in a special school were also very similar in each of the case study countries/jurisdictions. Legislation tended to favour the child or young person receiving their education in a mainstream school wherever possible and the data from North

Carolina seemed to confirm this as the majority of school-age children there attended mainstream settings. It was also interesting that the majority of pre-school children in North Carolina received their education through an early childhood programme rather than home education, again reinforcing a commitment to inclusion within education. However, this pattern was not replicated in Massachusetts, where 33 per cent of children attended specialist provision. Typical circumstances, for all case studies, in which a child would be considered for placement in a special school tended to be include the child having a comorbid intellectual disability, the child's difficulties possibly impact on the education of those around them, and a high financial cost for inclusion in the mainstream setting.

Available information indicated that Queensland, Scotland and North Carolina all make use of available research evidence to determine the best interventions to use, and in the case of Queensland, only those interventions deemed evidence-based were funded via the HCWA package. In Massachusetts there was also a clear commitment to and funding for ABA-based programmes, which is likely to reflect the national endorsement of behaviourally-based approaches in the National Standards report (2009). In Scotland, best practice as well as research evidence informed the guidance.

For each of the case study countries/jurisdictions it was not clear how decisions were made regarding which interventions should be accessed by whom, and for how long. In all of the countries, however, a diagnosis of ASD alone was not enough to access ASD-specific resources. Typically the child would have to undergo further assessment to identify areas of need, with Queensland, North Carolina and Massachusetts all following a categorisation of need approach. In Queensland, North Carolina and Massachusetts, decisions for pre-school provision were linked to available funding through the HCWA package, ITP and the ASD Waiver Program respectively. This focus on pre-school provision was also mirrored in the research literature evaluated in this report. Information about the types of interventions likely to be carried out in school settings was limited for all five case studies. Furthermore no information could be found regarding interventions in the 17–19 year age range. There also appeared to be a significant gap in information on respite and holiday provision in the majority of case study countries/jurisdictions.

Data about the professionals typically working with children and young people with ASD were very limited. There was some information about training, for example the Positive Partnerships programme in Queensland, but over all it could not be established whether professionals working with students with ASD in each of the case study countries/jurisdictions were required to receive any mandatory training, or what other training opportunities were available to them.

Outcome data were also very limited, particularly in relation to more specific outcomes. Data did not appear to have been specifically collected in relation to children and young people with ASD and was often part of larger datasets, making disaggregating ASD specific data difficult or, in some cases, impossible. It was surprising that Queensland did not have any state-specific outcome data, considering their state-wide, coordinated response. Scotland, with three types of outcome data, had the most data available. This is likely to reflect the legislative duty to collect data on outcomes for pupils with SEN and the inclusion of ASD as a category of SEN.

Although the data available from the case studies were more limited than anticipated, a number of aspects of good practice were highlighted. These included clear linking of policy to practice through legislative frameworks, guidance documents and support structures. For instance, clear processes for identifying and supporting the needs of pre-school children with ASD were evident in Queensland and North Carolina and the Free Pre-School Year system in Ireland may have potential to extend its role in relation to children with ASD in a similar way. For school-age children, individualised planning and access to specialist outreach teams where necessary were also common themes across most of the case studies. Several of the countries/jurisdictions also funded national/jurisdiction level bodies to provide training and share good practice, for instance, Exceptional Children in North Carolina and Positive Partnerships in Queensland. The establishment of

the Middletown Centre for Autism appears to be a similar development in Ireland. In North Carolina there was also dedicated training for pre-school practitioners, which is an important area for development alongside the Free Pre-School Year. Another strong theme throughout all of the case studies was partnership with parents, which was seen as crucial to effective provision and intervention decision making. Areas for development identified by previous researchers in some of the case studies included improving data collection to inform provision planning; and systematically collecting outcome data. The Exceptional Children Division's role in relation to monitoring in North Carolina seems to offer a model for providing a coordinated response to these challenges.

Implications

Implications for practitioners

The data available from this strand of the review have tended to be focused at the country/jurisdiction level. The lack of data describing settings, specialist provision and interventions in detail means that the implications for practitioners from this part of the review are limited.

Implications by age range

The data available by age range is limited, particularly for the 17–19 year age group. For some countries/jurisdictions, the focus is very much on early intervention at the pre-school and primary age range. The case study of Queensland is useful in demonstrating how research on early intervention has been translated into practice.

Implications for policy makers

The case studies highlight a number of important areas for policy makers to consider. These include how SEN and ASD are defined in legislation and how these definitions inform data collection processes. Although labelling categories of need can be contentious, defining terms and regularly collecting data regarding categories such as ASD both have advantages as they enable policy makers and providers to more accurately predict levels of need and target resources effectively. These data can also be used to monitor the effectiveness of interventions/policy. The case studies also illustrate a trend towards multi-disciplinary ASD diagnosis, and developments in a continuum of provision, which reflects good practice guidance in a number of countries. As illustrated in the Queensland, Scotland and US case studies, guidance in relation to interventions can also play an important role in describing the best available research evidence and enabling policy makers and providers to make transparent decisions about which interventions to fund or recommend. A coordinated approach to training for pre-school and school-based professionals is also important for embedding evidence-based practice and good practice in education settings and ensuring a skilled workforce that can provide consistently high quality provision within a range of settings.

Implications for research

The case studies have highlighted significant gaps in the translation of research into practice. Although guidance documents based upon systematic reviews of evidence underpin policy and practice, nonetheless in a number of countries/jurisdictions gaps in the evidence base and the way in which research studies are often conducted makes direct translation into educational practice challenging. As Kasari and Smith (2013) point out:

research that increases diversity in research samples, addresses the daily challenges children face in school, and assists school staff in implementing effective and personalised interventions should lead to better outcomes for children with ASD (2013, p.265).

Appendix G: Case Study Template

Prevalence of ASD

	0–4 years	5–10 years (primary)	11–16 years (secondary)	17–19 years
% of children with a diagnosis				
Diagnosis and assessment criteria				
Persons responsible for diagnosis				

Setting type

	0–4 years	5–10 years	11–16 years	17–19 years
% in mainstream schools				
% in special units/classrooms within mainstream schools				
% in special schools (including ASD specific schools)				
% in special classes within special schools				
Placement criteria for specialist or mainstream schools				
Typical length of standard school year				
Typical time within each setting				
Funding arrangements				
Extended provision				
Other supports available e.g. health supports or assistive technology/specialist equipment				

Specialist provision

	0–4 years	5–10 years	11–16 years	17–19 years
What does specialist provision look like?				
Number of each type of specialist provision				
% in each type of specialist provision				
% of children with other disabilities in specialist settings				
Typical teacher (and other professionals) to student ratios				
Funding arrangements				
Funding at family level e.g. respite care, home tuition				
Early intervention settings				

Intervention

	0–4 years	5–10 years	11–16 years	17–19 years
Key interventions on offer				
Persons delivering interventions				
Location of interventions				
Funding arrangements				
Criteria for determining what intervention child receives				

Professionals

	0–4 years	5–10 years	11–16 years	17–19 years
Type of professionals involved in provision				
Criteria for determining which professionals work with a child				
Mandatory/discretionary training for professionals				
Funding arrangements				
Typical time allocation to each child				

Legislation/policy

	0–4 years	5–10 years	11–16 years	17–19 years
Relevant legislation/policy				
Definitions of SEN/ASD				
Implications of legislation/policy for the education of young people with SEN/ASD				
Bodies responsible for implementing the legislation/policy				
How the legislation/policy has been implemented				
Research used to inform the legislation/policy				
Research about the impact of the legislation/policy since its launch				

Teacher education (including early years educators)

	0–4 years	5–10 years	11–16 years	17–19 years
Accredited courses for teachers				
Other types of professional development				
Other initiatives				
Mandatory vs. discretionary training				

Outcomes

	0–4 years	5–10 years	11–16 years	17–19 years
Attainment-related outcomes				
Attendance-related outcomes				
Happiness-related outcomes				
Independence-related outcomes				

Appendix H: Country Scoping Template

Legislation/policy

Relevant legislation/policy	
Definitions of SEN/ASD	
Implications of legislation/policy for the education of young people with SEN/ASD	
Bodies responsible for implementing the legislation/policy	
How the legislation/policy has been implemented	
Research used to inform the legislation/policy	
Research about the impact of the legislation/policy since its launch	

Outcomes

	0–4 years	5–10 years	11–16 years	17–19 years
Meet expected educational attainment				
School exclusions				
School attendance				
Employment/further education				
Criminal justice system				
Access mental health services				
Economic cost				
Other outcomes				

List of potential contacts

