

# The interaction between behaviour and speech and language difficulties: does intervention for one affect outcomes in the other?

Review conducted by the Nuffield Speech and Language Review Group

---

Technical report written by Professor James Law and Charlene Plunkett

---

EPPI-Centre  
Social Science Research Unit  
Institute of Education  
University of London

---

EPPI-Centre report no. 1705 · November 2009



---

**The interaction between behaviour and speech  
and language difficulties: does intervention  
for one affect outcomes in the other?**

**TECHNICAL REPORT**

Review conducted by the Nuffield Speech and Language Review Group

Report by Professor James Law, Queen Margaret University  
Charlene Plunkett, Queen Margaret University

The results of this systematic review are available in  
three formats. See over page for details.

The results of this systematic review are available in three formats:

**SUMMARY**

Explains the purpose of the review and the main messages from the research evidence

**TECHNICAL REPORT**

Includes the background, main findings, and full technical details of the review

**DATABASES**

Access to codings describing each research study included in the review

These can be downloaded or accessed at  
<http://eppi.ioe.ac.uk/cms/Default.aspx?tabid=2461&language=en-US>

The EPPI-Centre reference number for this report is 1705.

This report should be cited as:

Law J, Plunkett C (2009) The interaction between behaviour and speech and language difficulties: does intervention for one affect outcomes in the other? Technical report. In: *Research Evidence in Education Library*. London: EPPI-Centre, Social Science Research Unit, Institute of Education, University of London.

© Copyright

Authors of the systematic reviews on the EPPI-Centre website (<http://eppi.ioe.ac.uk/>) hold the copyright for the text of their reviews. The EPPI-Centre owns the copyright for all material on the website it has developed, including the contents of the databases, manuals, and keywording and data extraction systems. The centre and authors give permission for users of the site to display and print the contents of the site for their own non-commercial use, providing that the materials are not modified, copyright and other proprietary notices contained in the materials are retained, and the source of the material is cited clearly following the citation details provided. Otherwise users are not permitted to duplicate, reproduce, re-publish, distribute, or store material from this website without express written permission.

## CONTENTS

Glossary .....	1
Abstract .....	3
1. Background .....	4
1.1 Aims and rationale for current review .....	4
1.2 Definitional and conceptual issues .....	4
1.3 Policy and practice background .....	7
1.4 Research background .....	7
1.5 Authors, funders and other users of the review .....	8
1.7 Review questions and approach .....	8
2. Methods used in the review .....	9
2.1 Type of review .....	9
2.2 User involvement .....	9
2.3 Identifying and describing studies .....	10
2.4 In-depth review .....	11
3. Identifying and describing studies: Results .....	13
3.1 Studies included from searching and screening .....	13
3.2 Characteristics of the included studies (systematic map) .....	14
3.3 Identifying and describing studies: quality-assurance results .....	18
3.4 Summary of results of map .....	18
4. In-depth review: results .....	19
4.1 Selecting studies for the in-depth review .....	19
4.2 Comparing the studies selected for in depth review with the total studies in systematic map .....	19
4.3 Further details of studies included in the in-depth review .....	19
4.4 Synthesis of the evidence .....	26
4.5 In-depth review: quality-assurance results .....	43
4.6 Summary of results of synthesis .....	43
5. Implications .....	45
5.1 Strengths and limitations of this systematic review .....	45
5.2 Implications .....	45
6. References .....	48
6.1 Studies included in map and synthesis .....	48
6.2 Other references used in the technical report .....	51
6. Appendices .....	53
Appendix 1.1 Authorship of this report .....	53
Appendix 2.1 Inclusion and exclusion criteria .....	55
Appendix 2.2 Search strategy for electronic databases .....	57
Appendix 2.3 Journals handsearched .....	66
Appendix 2.4 EPPI-Centre keyword sheet, including review specific keywords .....	67
Appendix 3 Criteria for the weight of evidence .....	70

## List of abbreviations

ADHD	Attention Deficit Hyperactivity Disorder
ASD	Autism Spectrum Disorder
ASBO	Anti-Social Behaviour Order
BASBO	Baby Anti-Social Behaviour Order
BESD	Behavioural, Emotional and Social Difficulties
CAMHS	Child and Adolescent Mental Health Services
CELF	Clinical Evaluation of Language Fundamentals
CBT	Cognitive Behavioural Therapy
EBD	Emotional and Behavioural Difficulties
EPPI-Centre	The Evidence for Policy and Practice Information and Co-ordinating Centre
EPVT	Expressive One-Word Picture Vocabulary Test - Revised
LEA	Local Education Authority
PDD	Pervasive Development Disorder
PDD-NOS	Pervasive Development Disorder - Not Otherwise Specified
PECS	Picture Exchange Communication System
PRT	Pivotal Response Training
RPVT	Receptive One-Word Picture Vocabulary Test
REEL	Research Evidence in Education Library
SLT	Speech and Language Therapy
SLCD	Speech, Language and Communication Difficulties
SDQ	Strengths and Difficulties Questionnaire
TOLD:1-2	Test of Language Development: Intermediate - 2nd Edition
TOPL	Test of Pragmatic Language
WoE	Weight of Evidence

---

# Glossary

**ABA reversal/withdrawal design** - research methodology that alternates between the non-treatment period and the treatment period in a single participant.

**Articulation** - the process of producing speech sounds, involving the movement of the “articulators”, the tongue, lips, soft palate etc.

**Asperger syndrome** - a type of autism spectrum disorder; people with Asperger syndrome may find difficulty in social relationships and in communicating, and limitations in social imagination and creative play.

**Association studies** - papers that report on studies exploring the association between communication and behaviour.

**Attention deficit hyperactivity disorder** - psychiatric disorder, normally diagnosed in childhood, that affects concentration and behaviour.

**Augmentative/alternative communication** - any method of communicating that supplements or replaces conventional oral means of communication. This may include manual, computerised or visual systems.

**Autism spectrum disorder** - a developmental disorder that limits the person’s ability to relate socially and emotionally to other people.

**Between subjects design** - type of research design that uses more than one group of participants to evaluate an intervention.

**Controlled trial** - type of research design employed to evaluate medical or therapeutic interventions. Participants are assigned to one of two groups, the intervention group or the control group. In the control group participants will either receive no treatment or an alternative to the intervention under evaluation.

**Didactic** - interventions that use behavioural modification alone to improve behaviour or communication skills. Skills are commonly trained within a narrow contingent context.

**Emotional and Behavioural Difficulties (EBD)** - collective term used for a range of symptoms presented by children who have difficulties adjusting, primarily to school. Alternative terms include behavioural, emotional and social difficulties (BESD) and social, emotional and behavioural difficulties (SEBD), reflecting different emphases.

**Externalising difficulties** - a term commonly used to describe impulsive, overactive and aggressive behaviours.

**Functional communication** - verbal and non-verbal communication used to convey a purposeful message to another individual.

**Hybrid** - interventions that teach communication or behavioural skills in within a range of different contexts. Although behavioural methods are used in hybrid interventions the association between the training and the response is less highly constrained to a specific context.

**Internalising difficulties** - a term commonly used to describe shy, anxious and withdrawn behaviours.

**Learning disability** - an umbrella term used to cover a range of intellectual difficulties that can limit an individual’s ability to learn or cope with day-to-day life.

**Mixed experimental design** - type of research design that employs a combination of between within and between subjects designs.

**Multiple baseline design** - type of research design in which more than one potential treatment target is monitored during the baseline phase.

2 The interaction between behaviour and speech and language difficulties: does intervention for one affect outcomes in the other?

After baseline one target behaviour is treated while the others remain at baseline. Given that all behaviours should be equally affected by maturation, if the treated behaviour improves while the others do not it is reasonable to assume that the treatment has had an effect.

**Narrative review** - summary of existing research that is comprehensive but which would be difficult to replicate in a way that would be possible in a systematic review.

**Non-verbal communication** - communication that does not rely on oral communication. Instead meaning is conveyed through movement, "body language", eye contact etc.

**Obsessive compulsive disorder** - type of personality disorder where an individual is preoccupied with control, orderliness and perfection to the extent of interfering with day-to-day routine.

**Open label trial** - a study design in which both researchers and participants know what drug a person is taking and at what dose.

**Oppositional defiant disorder** - conduct disorder commonly diagnosed in children under 9 or 10 years old which characterised by defiant, disobedient, confrontational and uncooperative behaviour.

**Phonology** - relates to the rule-based sound system underpinning verbal communication. All languages have their own phonological rules which allow the production of sounds meaningful to those using that language.

**Picture exchange communication system (PECS)** - specific type of alternative/augmentative communication employed to encourage the initiation of communication in those with SLCD, particularly those with autism spectrum disorder.

**Pivotal response training** - a behavioural treatment that focuses on motivation and responsivity to multiple cues by including components such as child choice, turn-taking, reinforcing attempts and interspersing maintenance tasks. This technique has been used to target language skills, play skills and social behaviours in children with autism.

**Pragmatic language skills** - refers to the way that a person uses their language to express and understand intended rather than literal meaning.

**Pupil Referral Unit (PRU)** - An educational facility for children who have been excluded from school.

**Randomised controlled trial (RCT)** - a study design in which participants are randomly assigned to a control group or intervention group to reduce treatment bias.

**Risperidone** - pharmacological treatment used to improve hyperactivity, temper tantrums and social relatedness in children with Autism Spectrum Disorder.

**Rivastigmine tartrate** - pharmacological treatment normally used to improve language, cognition and global functioning in people with Alzheimer's.

**Single subject design** - type of research methodology where an intervention is evaluated on a single individual.

**SLCD (Speech, Language and Communication Difficulties)** - the umbrella term used in this report for the range of difficulties from immature speech through to major problems interacting with others associated with severe receptive language difficulties and autism spectrum disorders.

**Small N design** - a single subject design replicated on a small number of other participants.

**Socio-dramatic play** - where children play together to a theme - for example, pretending to be part of the same family.

**Social skills** - verbal and non-verbal behaviours that allow an individual to engage and interact with others.

**Speech** - the production of meaningful sounds, commonly separated out into articulation, phonology, fluency and voice.

**Syntax** - the rule system used in constructing sentences.

**Systematic review** - a research summary of primary studies that uses explicit and reproducible methods for identifying, grading and interpreting the results of included studies.

**Within-subjects design** - type of research design used to evaluate an intervention using one group of participants.

---

# Abstract

## **What do we want to know?**

We wanted to identify research which investigated the relationship between speech, language and communication difficulties (SLCD) and emotional and behavioural difficulties (EBD) in children of primary school age (5-12 years) as both are common causes of concern for parents and teachers of young children. We also wanted to identify research which investigated whether intervening within one domain had the potential to influence outcomes in the other.

## **Who wants to know and why?**

Potential users of this review include researchers and practitioners who have regular contact with primary school aged children with SLCD or EBD. These include teachers, speech and language therapists, and those providing child and adolescent mental health services. It is also of direct relevance for policy-makers, parents and carers.

## **What did we find?**

We identified 21 intervention studies for children with either SLCD or EBD and which included both communication and behavioural outcomes. There was considerable variability in the profile of the children described and in both the types of intervention and the outcomes adopted. We grouped the studies under three broad intervention types: didactic, hybrid and pharmacological.

Didactic interventions (8 studies) are those that use behavioural modification alone to improve communication skills on the one hand or behavioural skills on the other.

Hybrid interventions (11 studies) are those that teach communication or behavioural skills within a range of contexts and are of more generic application than didactic interventions.

Pharmacological interventions (2 studies) refer to interventions that employ drug therapy to improve communication and behaviour outcomes.

All studies included in our in-depth review reported evidence of positive effects of intervention on both communication and behavioural outcomes. However, all of the studies identified in this review were small scale and of a low weight of evidence making it difficult to generalise their results or draw firm conclusions as to how children with SLCD and EBD should be managed.

## **What are the implications?**

The overlap between SLCD and EBD should be accounted for in the development of both clinical and educational practice. This would be facilitated by a greater awareness amongst professionals and parents of the interaction between how a child communicates and the way they behave. In terms of research, more interventions need to be developed which address both domains, and this should be reflected in the outcomes used to evaluate those interventions. Much of the research to date has been 'clinical' in nature. It would be of considerable value to develop and evaluate interventions which are directly applicable to the educational context.

## **How did we get these results?**

We looked for research on the relationship between behaviour and speech and language difficulties. We did this through keyword searches of bibliographic databases, and searches of websites and key journals. We then applied inclusion and exclusion criteria to build up a map of relevant studies. Additional criteria were applied to the studies in the map, which produced the 21 studies that were used to address the research question above.

---

## CHAPTER ONE

# Background

Queen Margaret University, Edinburgh, and the EPPI-Centre undertook this systematic review of the interaction between communication and behaviour in response to an invitation to tender from Nuffield. With the agreement of the Nuffield Speech and Language Review Group and the project advisory review group, a broad review question was identified:

*The interaction between behaviour and speech and language difficulties: does intervention for one affect outcomes in the other?*

The way in which the review group worked is described in Chapter 2. Chapter 3 describes the systematic map - the scope and coverage of the research literature. Chapter 4 presents the results of the in-depth review of the findings of a subset of the literature identified. Chapter 5 discusses the strengths and limitations and the policy implications of the findings of this review.

### 1.1 Aims and rationale for current review

Speech, language and communication difficulties (SLCD) and emotional and behaviour difficulties (EBD) are both common causes of concern for parents and teachers of young children. The research literature also shows us that these two groups (SLCD and EBD) overlap to a considerable extent. Children who have SLCD often have EBD and vice versa. This review examines this overlap in children of primary school age (5-12 years) and specifically addresses the issue of whether intervention in one domain has the potential to influence outcomes in the other.

#### *Aims and objectives*

The aim of the review is to assess the interaction between SLCD and EBD and to determine the extent to which an intervention for one affects outcomes in the other.

The objectives are as follows:

- to identify and describe studies which look at the interaction between SLCD and EBD
- to analyse systematically one aspect of the field: does intervention for one affect outcomes in the other?
- to identify gaps in the literature.

### 1.2 Definitional and conceptual issues

This review draws together literature from a number of fields and for this reason it is helpful to summarise some of the key concepts.

#### *Communication*

The term communication is used to describe the exchange of ideas between individuals. It can function through a range of modalities, the most common of which are speech and gesture. Speech includes the sounds a person can make, but it also acts as a conduit for the individual's ability to express themselves - their language skills. Communication also includes the ability to understand both what the other person is saying and what they intend to say. Communication has both an external and an internal dimension. On the one hand, the external dimension refers to what people see and hear when they communicate with someone: speech, language and non-verbal functions that allow us to express what we mean to say, negotiate what we need from others etc. On the other hand, there are also internal language processes, by which human beings access and organise their thought processes. This merging of language and cognition is referred to as 'inner speech' and is key to Vygotsky's socio-cultural perspective, which is widely accepted in the fields of education (Vygotsky, 1986, Winsler *et al.* 2003). It is through inner speech that human beings

perform higher-order mental functioning such as planning activities, problem solving and behaviour regulation. Young children in the early stages of development do not yet have the capacity for inner speech. Instead they often exhibit 'private speech'. This is external speech that is not directed towards others as a form of social communication, in other words they think out aloud. With developmental maturity this type of utterance gradually becomes internalised. Therefore, what was originally a communicative function becomes an inner mental function, allowing the child control over their behaviour (Tappan 1997). Both the external and the internal aspects of communication are key to the understanding of the interaction between communication and behaviour.

A substantial number of children have difficulties acquiring communication in the early years. Reported prevalence estimates have been very diverse, reflecting the way that data were collected and the definitions of difficulties adopted, but something of the order of 6% of children, one or two in every class, have some sort of difficulty (Law *et al.* 1998). These can be difficulties in expression using speech or language, in many cases extending to spoken or written language, and in understanding people's intended meaning.

#### *Emotional and behavioural difficulties*

The Department for Education and Employment in England (DFEE Circular 9/94) (1994, quoted in Evans 2003) defined emotional and behavioural difficulties (EBD) in the following manner:

*Emotional and behavioural difficulties range from social maladaptation to abnormal emotional stresses... They may be multiple and may manifest themselves in many different forms and severities. They may become apparent through withdrawn, passive and aggressive or self-injurious tendencies (DFEE 1994, p 7).*

Such difficulties are sometimes separated out into externalising and internalising difficulties although there is considerable overlap between the two. Similarly there is an acknowledged interaction between social, psychological and child variables that lead to the accumulation of behavioural and emotional problems, hence the term 'social, emotional and behavioural' difficulties. Furthermore, this recognises that children with emotional or behavioural disorders often have difficulty in communicating their physical and emotional needs (Quinn *et al.* 1999).

#### *The association of communication and emotional/behavioural difficulties*

It has been suggested that there are five possible explanations for the commonly identified association between SLCD and EBD as follows (Rutter and Lord (1987), cited in Beitchman *et al.* 1996).

1. Psychiatric development and language problems are integral parts of a common condition. Autism is an example of a condition where communication difficulties and behaviour problems are symptoms of a biological impairment. This biological impairment leads to poor cognitive abilities, resulting in communication difficulty and behaviour problems (Frith 1989, cited in Beitchman *et al.* 1996).
2. Psychiatric disorder and language share a common cause. It is possible that communication difficulties and psychiatric disorders arise from common antecedent mechanisms. For example, low intellectual functioning may produce both difficulties in language and behaviour that are problematic (Scott 1993, cited in Beitchman *et al.* 1996).
3. There are separate but correlated causes of the two disorders. For example, language delay and inattention in children has been associated with maternal depression (Davis *et al.* 1988, cited in Beitchman *et al.* 1996).
4. Language problems arise as a consequence of a psychiatric disorder. ADHD is an example of a neurodevelopmental disorder that impairs the quality of interaction due to attention difficulties and hyperactivity problems. This reduces the frequency of interactions with adults and peers, thus limiting opportunities for language acquisition (Armstrong and Nettleton 2004).
5. Psychiatric disorders arise as a consequence of language disorders. Evidence suggests that children with impaired pragmatic skills (topic selection, turn taking, appropriate word choice, etc.) feel frustrated as a result of these communicative difficulties, which could possibly lead to internalising (social withdrawal) and externalising (aggressive) behaviours (Donahue 1983, cited in Beitchman *et al.* 1996). As indicated above, inner speech acts as a regulator to behaviour. Children with communicative difficulties in the area of language may have a reduced capacity for inner speech and their inability to use their language skills to inhibit their own behaviour may result in aggressive outbursts. These difficulties can impair the quality of interaction with peers. This could potentially lead to rejection and or bullying, both of which may lead to externalising problems.

However, it is important to recognise that not all children who have communication difficulties such as expressive or receptive language disorder go on to develop EBD and vice versa. For example, Rescorla and Achenbach (2002) failed to find a relationship between language problems and behaviour in preschool children and it may be true that the relationship between language and behaviour becomes more pronounced with age. It is probably also true that normally developing

6 The interaction between behaviour and speech and language difficulties: does intervention for one affect outcomes in the other?

communication systems cannot necessarily be considered to be a protective factor in the development of EBD. For example, in a recent study of language impaired and normally developing secondary age children, all at risk of exclusion from school, the severity of emotional and behavioural difficulties did not differ between the two groups (Clegg *et al.* Unpublished).

On balance, the evidence suggests a close association between communication difficulties and emotional and behavioural problems with complex patterns of causation and maintenance between them. It is the premise of the present review that this relationship is instructive in terms of the recommendations that can be made for intervention with both groups of children.

### *Interventions*

This section describes some of the interventions that are commonly provided for children with either communication difficulties or emotional and behavioural difficulties. Interventions for children with communication difficulties have been provided by a number of health and educational professionals, although the best research evidence probably comes from speech and language therapy. Traditionally, intervention has tended to be 'clinical' in nature with children being treated outside the class. A wide range of interventions have been developed, but in order to provide some structure to the discussion these are separated in the present report into three broad types of intervention: didactic, hybrid and pharmacological. Didactic interventions commonly focus on the specific behaviours of the individual child. Therapy is carried out using behavioural modification techniques (modelling, reinforcing etc.). Hybrid interventions usually have a didactic component but place a much greater emphasis on the naturalistic context in which the child is learning to communicate. The research evidence for such clinical intervention has been positive (Law *et al.* 2003) although increasingly there has been a move away from more individualised input towards a more inclusive approach to service delivery, where children are treated in schools and, at least partially, by other people who are able to have routine direct contact with the children in the classroom - teaching assistants, teachers, and so on. Within this inclusive model has come a parallel shift in focus from training specific language or behavioural skills to the development of social communication skills, allowing the child to function effectively with peers in the classroom. To date there has been relatively little in the way of an evidence base to underpin this shift. Children with specialist needs as a result of EBD will often be identified and assessed by the local education authority (LEA), who then make a statement of special educational needs. Once the statement has been completed by the LEA the child may be placed in a specialist EBD school or unit. However, recent changes in service delivery models have led

to children with EBD being included in mainstream schools, often receiving additional support from specialists (Clegg and Hartshorne 2004).

Therapeutic treatment targeted at behavioural problems in children is heavily influenced by social skill interventions (Goldstein *et al.* 1988, cited in Beitchman 1996). This involves procedures such as modelling, role-playing, self-instruction, reinforcement, coaching and problem solving. Social skills consist of verbal and non-verbal behaviours that involve both initiation and responding. Furthermore, social skills are influenced by the context in which the behaviour occurs. These social behaviours are learned through observation, modelling, rehearsal and feedback. Interventions utilising the above techniques can be grouped under the heading of didactic approaches to intervention. Within this approach the adult presents the child with a model, the aim being for the child to imitate the modelled item when prompted. This technique has traditionally been used to teach vocabulary and speech. However, there have been moves towards using these methods to teach social skills such as conversation initiation and turn taking - in other words the social use of language. For example, role play with peers through prompting, modelling and role swapping was found to be beneficial to both social interaction skills and language skills (Goldstein *et al.* 1988, cited in Beitchman 1996).

It is reasonable to assume that all social skills training and all cognitive behavioural therapy programmes are reliant on the communication skills of the child. If the child is not able either to understand the messages conveyed in the therapy programme or to use his language to reflect on those messages it is highly unlikely that those messages will be processed or that they will lead to permanent behavioural change.

Treatment is often multifaceted, consisting of a combination of therapeutic and medical treatments. It is important that, although the association between language and behavioural difficulties has been established, there will be many interventions explicitly targeting one or the other. A good example of this is the pharmacological treatments for behaviour. An eight week trial of Risperidone was found to be effective for severe behavioural problems in children with autism (Research Units in Paediatric Psychopharmacology 2002). Pharmacological treatment often will be provided in conjunction with social and/or behavioural interventions. The challenge presented to researchers in this area is to differentiate between pharmacological effects and behavioural/therapeutic effects. It is important in the context of the present review that such interventions rarely, if ever, use communication as an outcome of intervention.

### 1.3 Policy and practice background

Children with SLCD and or EBD receive services from a variety of sources. Much depends on how and when they are initially identified as being in need of help. It is likely that in the first instance they are managed by parents, and by those providing universal services - for example health visitors in the healthcare system and teachers and carers in early years settings. In the case of children with communication difficulties this may include routine advice from a speech and language therapist. In the case of children with behavioural difficulties this would include help from learning mentors, learning support units and the like. Only when these opportunities have been exhausted will these children then be referred for more specialist services, such as direct speech and language therapy, or to clinical psychology or psychiatry within the Child and Adolescent Mental Health Services (CAMHS).

Speech and language therapy and CAMH services are a part of the health system in the UK, although demarcation between health and educational services remains something of an issue in the case of the former. For example, there has been something of a 'border dispute' between health and education providers about the ownership of services for children with SLCD, as practitioners and managers attempt to distinguish between which aspects of SLCD are a communication or health need (Law *et al.* 2000). Despite an increasing awareness of the overlap between communication skills and behaviour more generally there remains relatively little overlap between the two services. For example, figures indicated that of the 501 specialist staff involved in CAMHS in Scotland, five were speech and language therapists (Child and Adolescent Mental Health Workforce Group 2005). This gap in service delivery suggests that there maybe a group of children with both communication difficulties and emotional/behavioural problems whose needs are overlooked by current policy and practice.

### 1.4 Research background

#### *Intervention research*

A number of narrative reviews have reported positive outcomes from speech and language therapy (Enderby and Emerson 1996, Gallagher 1998, Goldstein and Hockenburger 1991, Guralnick 1988, Leonard 1997, Mclean and Woods Cripe 1997). This evidence is further corroborated by one meta-analysis, (Nye *et al.* 1987), two systematic reviews (Law *et al.* 1998, Law *et al.* 2003) and a 'best evidence' review including both group and single-subject experimental designs (Yoder and McDuffie 2002). With the exception of one practitioner review which attempted to interpret the findings into terms of mental health (Law and Garrett 2004) these reviews focus on speech, language and communication outcomes, effectively

filtering out information about the children's behaviour. In fact very few of the studies make reference to behavioural outcomes at all.

Similarly, there have been literature reviews which have addressed the efficacy of interventions for children with EBD. For example a relatively recent review of social skills training for children with specific learning disabilities, mental retardation, emotional disturbance, and ADHD (Gresham *et al.* 2001) concluded that these interventions were relatively ineffective in producing relevant, long-term social skills that may be transferred across various social settings for students with specific learning disability. To date there have been only two systematic reviews of the effectiveness of interventions for EBD in mainstream education. Both have been published by the EPPI-Centre (Harden *et al.* 2003, Evans *et al.* 2003). While the evidence base was limited, the first of these two reviews found approaches such as nurture groups, Parents and Schools Behaviour Action for Children, Communication Opportunity Group Scheme, therapeutic intervention (the quiet place), and a community-based mentoring scheme to be effective in reducing disruptive behaviour in primary-aged boys and girls. However, again the review did not find multi-session social skills interventions implemented by regular classroom teachers to be effective in reducing the incidence of childhood emotional problems (Evans *et al.* 2003). The second of these two reviews, which examined effective strategies for supporting pupils with EBD and trainee primary school teachers in the use of these strategies, also found a limited evidence base in this area (Harden *et al.* 2003). Neither of these reviews considered the interaction of communication difficulties with EBD.

#### *The association between communication and behaviour*

Various narrative literature reviews in the field of behaviour and language report on the co-occurrence of language difficulty and EBD (Benner *et al.* 2002, Donahue 1994, Gallagher 1999, Toppelberg and Shapiro 2000) although the level of overlap would appear to depend on the skills sampled. For example, children with EBD have been reported, in one review, to be more likely to have pragmatic language difficulties (71%), followed by expressive and receptive difficulties (64% and 56% respectively) (Benner, 2002); but, in another, the association was found to be strongest with receptive language difficulties (Toppelberg and Shapiro 2000). There is a consensus that future research should concentrate on establishing predictive specificity - that is, identifying which language domains are predictive of which outcomes, for example, determining whether expressive language difficulties are related to anxiety (Toppelberg and Shapiro 2000, Aram and Hall 1989).

- 8 The interaction between behaviour and speech and language difficulties: does intervention for one affect outcomes in the other?

### **1.5 Authors, funders, and other users of the review**

The authors and review group members of this current review are listed at the beginning of the report. They include researchers, lecturers and practitioners from the field of speech and language, educational psychology, communication sciences, communicative disorders and health care research. The review group also consists of policy makers involved in inclusion, public health researchers, and parent group representation. Members were also recruited from Higher Education Institutions in Australia and the United States to provide an international perspective throughout the review process.

The Speech and Language Review Group is funded by the Nuffield Foundation. The Nuffield Foundation aims to make improvements to social wellbeing based upon objective and reliable evidence. This is achieved through supporting projects with the potential to influence policy and practice.

### **1.6 Review questions and approach**

The review process is separated into two sections. In the first a systematic map is created of the available literature. There then follows an in-depth review of one or more domains identified in the systematic map. The systematic map and the in-depth review address distinct, albeit related, questions.

*Review question for the systematic map*

*What are the characteristics of the literature that consider the interaction between communication and behaviour?*

To move from the systematic map to the in-depth review, the review question was further refined by selecting a subset of the literature, as follows:

*In-depth review question*

*The interaction between communication difficulties and behavioural problems: does intervention for one affect outcomes in the other?*

Studies included in the in-depth review had to be of one two types:

- Studies with interventions for children with EBD but including communication outcomes or communicative-behavioural outcomes.
- Studies with interventions for SLCD but including behavioural outcomes or communicative-behavioural outcomes.

In both cases children had to be identified as having either SLCD and/or EBD. Outcome measurements could be based upon parental report, observation or direct assessment.

---

## CHAPTER TWO

# Methods used in the review

Throughout this review the review group used the systematic review methods developed by the EPPI-Centre as described in their guidelines and tools for conducting a systematic review. These were accessed from the Methods and Databases section of the EPPI-Centre website at <http://eppi.ioe.ac.uk/>.

### 2.1 Type of review

Refer to the EPPI-Centre review typology dimensions to report

Number of stages

Scope of question (broad/focused)

Search (broad/focused)

Screening limits

Map (descriptive analytic)

Synthesis simple/complex

### 2.2 User involvement

#### 2.1.1 Approach and rationale

Users are defined for the purposes of this review as all those who stand to use the review. In the first instance these are likely to be practitioners with regular contact with children with communication and behavioural difficulties, but this would also include parents, carers and policy makers.

#### 2.1.2 User involvement in designing the review

The Speech and Language Review User Advisory Group included teachers, practitioners, and policy makers, the advisory group provided input and feedback at each stage of the review. There was

also a core group which included up to six members of the advisory group who have a specialist interest in the overall review question. The core group members fulfilled a more involved role within certain aspects of review activities.

The user advisory group were involved in the design and overall scope of the review including specifying the direction of the in-depth review based on the findings of the mapping exercise.

User summaries of the review were written by individuals representing two main user constituencies: parents and practitioners. Practitioners were recruited from the fields of speech and language therapy, education and child psychiatry. In order to gain an objective perspective on the relevance of the review, users summaries were written by individuals not connected to the review group. These user perspectives were used to draw out relevant conclusions and indicate how findings may be taken on board within the above areas.

#### 2.1.3 User involvement in process of conducting the review

The core group participated in several of the review activities such as coding studies to be included in the systematic map. The core group also extracted the data from the studies to be included in the in-depth review.

The advisory group oversaw the work of the core group, offered materials for Chapter 1 of this report and acted as a potential source of unpublished research or research that is not easily obtainable.

#### 2.1.4 User involvement in interpreting the review results

Members of the core group identified salient outcomes and review implications.

- 10 The interaction between behaviour and speech and language difficulties: does intervention for one affect outcomes in the other?

### **2.1.5 User involvement in communication and dissemination of review results**

Advisory group members contributed to the dissemination of review findings. The group also suggested authors of user summaries.

User summaries were written by users external to the review group who wrote up their interpretation of review findings. User summaries of the review highlighted the significance of the review conclusions for the specific user group.

## **2.3 Identifying and describing studies**

### **2.3.1 Defining relevant studies: inclusion and exclusion criteria**

For the mapping stage, the scope of the review covered all research concerned with the interaction of communication difficulties and behavioural problems. The scope of the review was developed further following discussions with the project steering group. Due to constraints on resources, only those papers which were published in English were included in the map. To make the mapping process more manageable within the time allocated to complete the exercise, papers were included only if they were published or unpublished but available within the public domain after 1985. We were interested in children of primary school age (0-12). Many of the studies included children aged 0-12 and 11+, so we decided to include only studies where the mean age group of the children was between 5 and 12 years. We decided to include children with autistic spectrum disorders in the review because they routinely experienced both communication and behavioural difficulties and were considered to be of particular importance from the point of view of school management. The full inclusion/exclusion criteria are presented in Appendix 2.1.1.

### **2.3.2 Identification of potential studies: search strategy**

The following online databases were searched to identify reports focusing on the relationship between communication difficulties and behavioural problems: Medline, Eric, Psycinfo, Cinahl, Language and Linguistics Behavior Abstracts (LLBA) and Web of Science. A combination of free text and thesaurus terms were entered into search engines. Search strings comprised a wide range of terms for communication difficulties and emotional or behavioural problems and children. However, search terms varied according to the requirements of each database (See Appendix 2.2.2). In addition to this, relevant journals were hand-searched and bibliographies of topical textbooks were scanned for further relevant citations (see Appendix 2.2.2b). Review group members were requested

to identify potential sources of unpublished literature.

On initial inspection of the systematic map, it was apparent that although there were a number of studies that examined the level and level of association between SLCD and EBD fewer examined the overlap in intervention. The small number of the intervention studies focused on autistic children. In order to inspect this strand of the literature in more detail a supplementary electronic search strategy targeting autistic participants was entered into the above databases.

All citations identified by the online databases were downloaded into reference management software (Reference Manager) to be screened using the inclusion and exclusion criteria identified above.

### **2.3.3 Screening studies: applying inclusion and exclusion criteria**

The Review Group set up a database system, using Reference Manager, for keeping track of, and coding reports found during the update of the review. Titles and abstracts were imported and entered manually into this database. Inclusion and exclusion criteria were applied successively to (i) titles and abstracts, and (ii) full reports. Full reports were obtained for those papers that appeared to meet inclusion criteria or where there was insufficient information to be sure. The inclusion and exclusion criteria were re-applied to the full reports, and those that did not meet the initial criteria were excluded.

### **2.3.4 Characterising included studies**

The reports remaining after application of the criteria were keyworded using the EPPI-Centre (2002) *Core keywording strategy*. This allows for coding of the broad characteristics of the paper, such as the country in which the study was carried out, the population focus and the study design. In order to capture more specific information, such as the type of communication or behavioural difficulties examined, the nature of the intervention and outcome measures a review specific coding strategy was used to supplement the core keywording strategy. Keyworded papers were then used to create a systematic map of the research activity in this area. For a full description of the keywording strategy see Appendix 2.2.4.

All the keyworded reports were added to the larger EPPI-Centre database, the Research Evidence in Education Library (REEL).

### **2.3.5 Identifying and describing studies: quality assurance process**

Application of the inclusion and exclusion criteria was carried out by one member of the review team. The EPPI-Centre link person also screened

the titles and abstracts of 14 papers as part of the first stage screening process and 9 full reports as part of stage two. For first-stage screening of titles and abstracts, agreement between internal and external screening was fairly good (20 out of 26). Any discrepancies were resolved through discussion. For stage two screening of full reports agreement between internal and external screening was relatively high (7 out of 9). As with first stage screening any disagreement was resolved through discussion.

The coding of papers to be included in the systematic map was conducted by pairs of core group members. Before formal keywording commenced there was a moderation exercise between key reviewers. This involved independent keywording of 10 papers to be included in the map, using a draft version of the review-specific coding strategy. Results were discussed and modifications were added to the review specific coding strategy.

Included papers were coded by pairs of the review team. Each pair worked independently and coded their assigned papers on EPPI-Reviewer. A key member of the review team ran comparisons of coding decisions for each pair on EPPI-Reviewer to check for inter-coder agreement. Overall there appeared to be agreement between each pair; however, there were minor disparities in the amount of descriptive detail entered to supplement the coding categories. In these instances the more detailed answers to the coding questions were used as final versions. The review group's EPPI-Centre link person coded a random sample of five papers as part of the quality assurance process.

## 2.4 In-depth review

### 2.4.1 Moving from broad characterisation (mapping) to in-depth review

The review examined the interaction between SLCD and EBD and the extent to which this is reflected in intervention outcomes. The initial searching and keywording exercise led to the creation of a systematic map with an over-representation of association reports rather than evaluation reports. The few evaluation reports that were represented in the map appeared to apply interventions that looked at the secondary outcomes of communication or behaviour to samples with a diagnosis of autism.

When this was brought to the attention of the steering group, it was proposed that the lack of intervention studies represented a distinct gap in the research literature. To reduce the risk of missing potential studies broad electronic search strategy was adopted. We are therefore confident that the low number of evaluation studies was not due to shortcomings in the electronic search strategies. As a result of the findings from the initial mapping procedure, it was agreed that

it would be appropriate to develop a narrow electronic search strategy to supplement the original broad electronic searches. This allowed for exploration of the possibility that intervention research in the field of communication and behaviour may be concentrated within the autism literature.

Inspection of the systematic map (after the supplementary electronic search had been carried out) indicated that there were 22 intervention studies, the majority of which appeared to focus on language difficulties as opposed to speech difficulties in relation to behaviour problems. A degree of difficulty was encountered when reading the map, due to the varied nature of the intervention studies. Many of the intervention studies could not be easily classified as either a Speech and Language Therapy (SLT) intervention or a behavioural intervention. Organising the interventions under the headings of didactic, hybrid and pharmacological therefore represented a more appropriate classification system for this review. Working definitions for these three labels are provided in an outline of the synthesis framework provided in Chapter 4.

After close inspection of the systematic map, it was agreed that, to be included in the in-depth review, reports must:

- I. be evaluations of either a communicative or behavioural intervention; and
- II. report the effect of a either intervention on behavioural or communication outcomes.

Studies were included in the map if they reported an association between speech and language and behaviour. However, papers that only reported on the association between SLCD and EBD and those intervention studies which only reported speech outcomes were excluded from the in-depth review.

### 2.4.2 Detailed description of studies in the in-depth review

Reports identified as meeting the inclusion criteria were analysed in depth, using the EPPI-Centre's detailed data-extraction software, EPPI-Reviewer. EPPI-Reviewer is a web-based application that enables researchers to manage the entire life cycle of a review in a single location. Users are able to upload studies for screening, complete keywording and data extractions and analyse the results over the internet.

Data was extracted systematically from each report included in the in-depth review, using review-specific guidelines (see Appendix 2.3.2), and entered into EPPI-Reviewer. Two people independently extracted data from each paper in order to compare and agree on a final version. The EPPI-Centre link person data-extracted a sample of five reports and moderated these against the review group version.

- 12 The interaction between behaviour and speech and language difficulties: does intervention for one affect outcomes in the other?

### **2.4.3 Assessing quality of studies and weight of evidence for the review question**

Three components will be identified to help in making explicit the process of apportioning different weights to the findings and conclusions of different studies. Such weights of evidence are based on:

- A. the soundness of studies (internal methodological coherence), based upon the study only;
- B. the appropriateness of the research design and analysis used for answering the review question, and
- C. the relevance of the study topic focus (from the sample, measure, scenario, or other indicator of the focus of the study) to the review question; plus
- D. an overall weight taking into account (A), (B) and (C).

For full details of the weighting criteria see Appendix 2.3.3.

### **2.4.4 Synthesis of evidence**

#### **2.4.4.1 Overall approach to and process of synthesis**

Through careful reading of each study, specific themes (relating to either one or more study) emerged; these formed our framework for synthesis. The themes were coded against each study, where they applied. The themes and outcomes of the synthesis are discussed in detail in Section 4.5. The data was then synthesised to bring together the studies that answered the review questions and met the quality criteria relating to appropriateness and methodology.

### **2.4.5 In-depth review: quality assurance process**

Data-extraction and assessment of the weight of evidence brought by the study to address the review question was conducted by pairs of Review Group members, working first independently and then comparing their decisions before coming to a consensus. The EPPI-Centre link person assisted in data extraction and quality appraisal of a sample of studies.

One of the reports included in the in-depth review was authored by the principal investigator of this review. This paper was data-extracted and weighted independently in the first instance by two members of the core review group, who then compared their decisions and discussed any discrepancies before coming to consensus.

### **2.4.6 Deriving conclusions/implications**

One member of the review group synthesised the results. The framework for synthesis was the three intervention themes running through the studies. These are discussed in detail in section 4.3.1. The draft synthesis was shared and discussed with all members of the review group and amended in the light of these discussions. The draft report was then shared with members of the advisory group and the EPPI-Centre who provided further comments for consideration by the review group. The report was also externally peer reviewed which provided further comment on how the conclusions were derived and how implications were drawn.

---

## CHAPTER THREE

# Identifying and describing studies: results

This chapter focuses on the systematic map, i.e. a descriptive report of the types of studies that were found that are relevant to the initial research question. Section 3.1 describes studies included from searching and screening, Section 3.2 summarises the characteristics of the included studies and Section 3.3 describes the quality assurance process undertaken by the review group.

### 3.1 Studies included from searching and screening

Figure 3.1 illustrates the process of filtering from searching to mapping and finally to synthesis. Table 3.1 below gives the origin of all reports found and those subsequently included in the systematic map.

A total of 5,183 citations were identified through systematic searches of seven electronic databases. The number of citations identified in each database is documented in Table 3.1. Of the 5,183 citations identified, 842 were duplicates and were excluded when citations were uploaded on to EPPI-Reviewer (Thomas and Brunton 2006).

The largest yield of the 5,183 citations identified came from MEDLINE (n=2,925) and Psycinfo (n=989).

After excluding duplicates, titles and abstracts were screened using the exclusion criteria described in section 2.2.1. The majority of papers excluded at this stage (n=3,451) did not meet our first inclusion criterion: that is, they did not focus on the relationship between behaviour and communication. The second most common exclusion criterion was on age of study participants (criterion 4, n=357)

The initial screening yielded 196 papers potentially relevant to our review. A further 35 papers were identified through handsearching of journals and bibliographies of books, and through personal contacts. All 196 papers were obtained and went through to full screening.

At this second, more detailed stage of screening, a further 118 papers were excluded. Again, the majority of studies at this stage were excluded as they did not focus on the relationship between behaviour and communication (criterion 1, n=38).

The remaining 78 papers were included in the review. There were 4 primary papers reporting on studies that were linked to 14 other papers. These 14 'linked' papers were not included in the systematic map. The systematic map therefore describes 64 studies of 78 papers. After applying the in-depth exclusion criteria, 21 of the 22 evaluation studies identified from the map were included in the in-depth review.

#### *Exclusion criteria corresponding to Fig 3.1*

1. Not a study about the relationship between behaviour and communication difficulties
2. Not about children with communication difficulties and related behavioural problems or children with behavioural problems and related communication difficulties
3. English is a foreign or additional language
4. Not about groups of children whose mean age was between 5 and 12 years
5. Does not report empirical data
6. Evaluation of a behavioural/social intervention but does not measure speech/language outcome
7. Evaluation of a speech/language intervention but does not measure behavioural/social outcomes
8. Not published in English
9. Not within the public domain before 1985 (whether published or unpublished)

- 14 The interaction between behaviour and speech and language difficulties: does intervention for one affect outcomes in the other?

Table 3.1 below provides an indication of the numbers and source of papers identified in the initial search strategy. Table 3.2 refers to those studies retrieved in the supplementary search. In both cases results were entered into Reference Manager and duplicates were eliminated.

**Table 3.1:** Source of papers retrieved in initial search strategy

Database	Found
ERIC	332
CINAHL	92
PSYCHINFO	989
MEDLINE	2,925
LLBA	42
Web of Science	62
Handsearching	35
<b>Total</b>	<b>4,477</b>

**Table 3.2:** Source of papers retrieved in the supplementary electronic search

Database	Found
ERIC	31
CINAHL	6
PSYCHINFO	120
MEDLINE	152
LLBA	394
Web of Science	38
<b>Total</b>	<b>741</b>

### 3.2 Characteristics of the included studies (systematic map)

The 64 studies included in the map have been analysed using the EPPI-Centre (2003) Core Keywording Strategy and a set of review-specific keywords (both attached in Appendix 2.4).

Many of the studies could be coded under overlapping keywording categories. For example, some of the studies were conducted across a variety of settings, focused on children in overlapping age categories, involved children with multiple speech and language difficulties, sampled children from both speech/language and EBD populations and measured both speech/language and behaviour outcomes. In these instances the label 'not mutually exclusive' is applied. Examples of mutually exclusive coding categories are the publication status of papers, the type of study and the gender of participants.

**Table 3.3:** Identification of included reports (N=64, mutually exclusive)

Attribute	Number
Citation	3
Contact	3
Handsearch	7
Electronic database	51

The majority of included studies were identified through electronic databases (80%), followed by systematic handsearching of journals (10%), while a small proportion of included studies were identified through contacts (5%) and searching citation lists (5%).

**Table 3.4:** Publication status of included reports (N = 64, mutually exclusive)

Status	Percentage
Published	90
In press	2
Unpublished	8

Almost all included papers were of published status (90%) with a small number of unpublished theses (8%) and one article in press at the time of the mapping exercise (2%).

**Table 3.5:** Linked studies included in the map (N=64, mutually exclusive)

Status	Percentage
Linked	6
Not linked	94

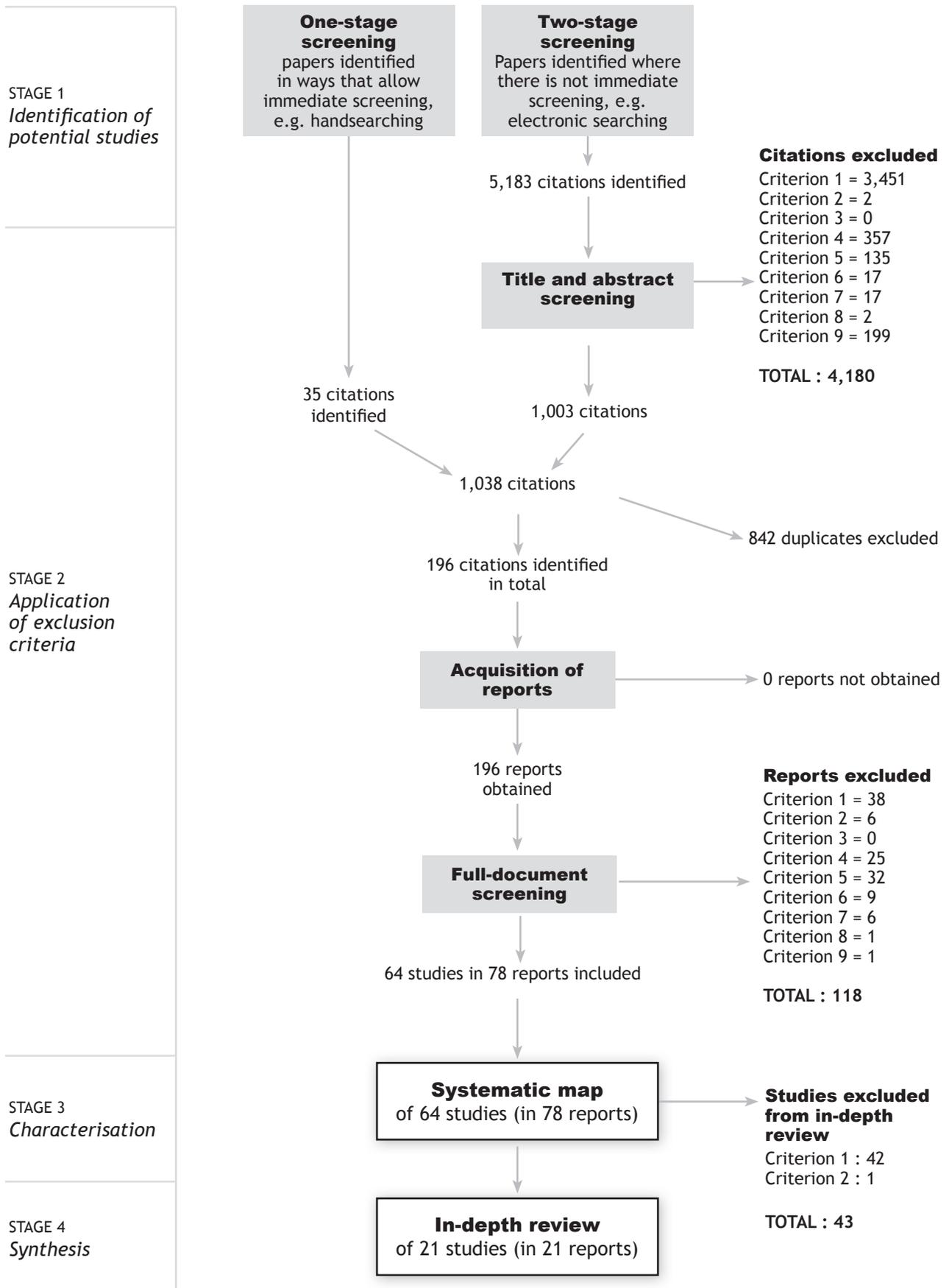
A minority of the reports included in the map were linked (6%), while 94% were not linked. Linked reports are those papers which appear to report on the same study, i.e. same group of participants and outcomes.

**Table 3.6:** Study types included in the map (N=64, mutually exclusive)

Status	Percentage
Exploration of relationships	66
Evaluation: Researcher manipulated	34

Of the 64 papers included in the systematic map, 66% (42) were association studies, 34% (22) were evaluations.

**Figure 3.1** Filtering of papers from searching to map to synthesis



### 3.2.2 Characteristics of association studies

**Table 3.7:** Assessment settings of studies included in the map (N = 42, not mutually exclusive)

Attribute	Number
Clinic	10
Mainstream school	19
Home	5
Don't know	5
Language Unit	2
Other (please specify)	9

Included studies that explored the relationship between communication difficulties and behaviour problems were conducted across a range of educational settings. The above table shows that the majority of assessments were carried out in mainstream school settings, followed by assessments in clinics, while only two of the studies included in the map carried out assessments in language units.

**Table 3.8:** Age of participants (N=42, not mutually exclusive)

Attribute	Number
0-4	8
5-10	36
11-16	23

Table 3.8 illustrates that 36 of the 64 association studies assessed children aged 5-10 years. Twenty three studies included children aged 11-16 years and eight studies included children whose age just fell into the 0-4 category.

**Table 3.9:** Sex of participants (N=42, mutually exclusive)

Sex of participants	Percentage
Male only	12
Mixed sex	88

Table 3.9 illustrates that 88% of the association studies included in the map assessed both males and females, in contrast to 12% of this overall figure which assessed males only. It is interesting to note that there appeared to be no studies which assessed only females.

**Table 3.10:** Primary population focus (N = 42, not mutually exclusive)

Attribute	Number
Speech/language population	18
EBD population	12
Representative population	5
Autism	1
Other	5

Table 3.10 shows that association studies mainly sampled from speech/language populations (43%) and EBD populations (29%). Twenty percent of the included studies employed representative sampling techniques. Five of these studies sampled from populations that could not be easily classified into the categories used. One of the association studies sampled only from the autistic population.

**Table 3.11:** Language difficulties of included association studies (N = 42, not mutually exclusive)

Attribute	Number
Pragmatic	8
Expressive/receptive	11
Expressive	24
Receptive	19
Literacy	4
Semantics	3
Syntax	2
Auditory verbal memory	2
Other	16

Table 3.11 indicates that problems in expressive language (57%) appeared to be the main focus of association studies in the map. Receptive language problems were explored in 45% of the association studies, while an expressive/receptive language disorder was examined in 26% of the mapped studies. Pragmatic language difficulties were looked at by 19% of studies; problems in auditory verbal memory were considered by 5% of the studies. Few studies in the map looked at difficulties in literacy (10%), semantics (7%) and syntax (5%). Again, many studies did not examine specific language difficulties, but concentrated on general language functioning or used measures of language that did not fit in the classification system used in the mapping exercise (38%). These difficulties were categorised as 'other'.

**Table 3.12:** Speech difficulties of included studies (N=42, not mutually exclusive)

Attribute	Number
Articulation	7
Fluency	3
Phonology	1
Voice disorder	2
Not applicable	23
Other	13
Not stated/unclear	1

The majority of studies included in the map did look at speech in their exploration of the relationship between communication and behaviour but not specifically at speech difficulties (55%). A high proportion of studies looked at speech problems in general, rather than specific domains or speech difficulties that did not fit in with the review specific

classification system (31%). In such cases these difficulties were classified as 'other'. However, among the included studies that looked at specific areas in speech, the main focus was on problems in articulation (17%), with the minority of studies examining difficulties in voice disorder (5%).

**Table 3.13:** EBD problems of included association studies (N=42, mutually exclusive)

EBD problems	Percentage
Internalising	3
Externalising	20
Both	77

Of the 42 studies included in the map, 77% looked at a combination of both externalising and internalising disorders, while 20% considered externalising problems alone and 3% exclusively examined only internalising problems.

### 3.2.3 Characteristics of evaluation studies

**Table 3.14:** Trials Included in the map

Attribute	Number
Randomised controlled trial (RCT)	0
Controlled trial (non-randomised)	1

Table 3.14 shows that of the 22 evaluation studies there was only 1 controlled trial and no randomised controlled trials. The labels used in Table 3.14 refer to EPPI-Reviewer core keywording categories. A further breakdown of study methodology of evaluation included in the in-depth review is provided in Chapter 4.

**Table 3.15:** Age of participants of included evaluations (N=22, not mutually exclusive)

Attribute	Number
0-4	6
5-10	19
11-16	4

The criteria for being included in the study was for the mean age of the population to be between 5 and 12 years old. However, the majority of evaluation studies included participants in the 5-10 age group (83%) rather than 5-12. There was also a small proportion of studies that examined participants whose age fell just outside this category and into either 0-4 years (26%) or 11-16 years (17%).

**Table 3.16:** Sex of participants of included evaluations (N=22, mutually exclusive)

Sex of participants	Percentage
Male only	45
Mixed sex	55

Figure 3.16 illustrates that almost half of the evaluations were concerned with interventions

administered to males (45%) and 55% of the evaluations included participants of both sex. Similar to the association studies, there appeared to be no evaluations looking at females only.

**Table 3.17:** Primary population focus of included evaluations (N=22, not mutually exclusive)

Attribute	Number
Speech/language population	4
EBD population	5
Autism	15
Not stated/unclear	1

The majority of evaluation studies appeared to focus primarily on participants from the autistic population (65%), 22% were concerned with EBD populations, and 17% primarily focused on the speech/language populations, while there was one study which could not easily be classified.

**Table 3.18:** Interventions (N = 22, mutually exclusive)

Attribute	Number
Didactic	11
Hybrid	8
Pharmacological	2
Other	1

As mentioned earlier, the evaluations used interventions that could not easily be classified using the categories in the mapping size. Therefore studies have been quantified under the category labels used to organise the interventions in the narrative synthesis. The table above illustrates that 50% of the evaluations used the didactic approach to intervention, 36% involved hybrid approaches to intervention, and 9% of studies evaluated pharmacological interventions. The other category refers to one evaluation (5%) that was included in the map but not the in-depth review.

**Table 3.19:** Treatment setting (N=22, not mutually exclusive)

Attribute	Number
Clinic	8
Mainstream school	8
Other	7
Home	4

With regards to treatment setting, the table above demonstrates that most of the evaluation studies administered interventions in either a clinic or a mainstream setting. Thirty percent of the studies continued in settings that did not fit into the categories used. For example, treatment may have been conducted in special needs classrooms or in research centres within higher education institutes. Lastly a small number of studies applied the intervention in participants' homes (17.3%).

**Table 3.20:** Outcomes reported in the study (N=22, not mutually exclusive)

Attribute	Number
Speech/language	18
Behaviour	20
Both	16

Table 3.20 shows that 81% of evaluations measured outcomes in speech/language, 90% measured behavioural outcomes, and 73% of evaluations measured outcomes in both these areas.

**Figure 3.9:** Outcomes by type of intervention (N=22, not mutually exclusive)

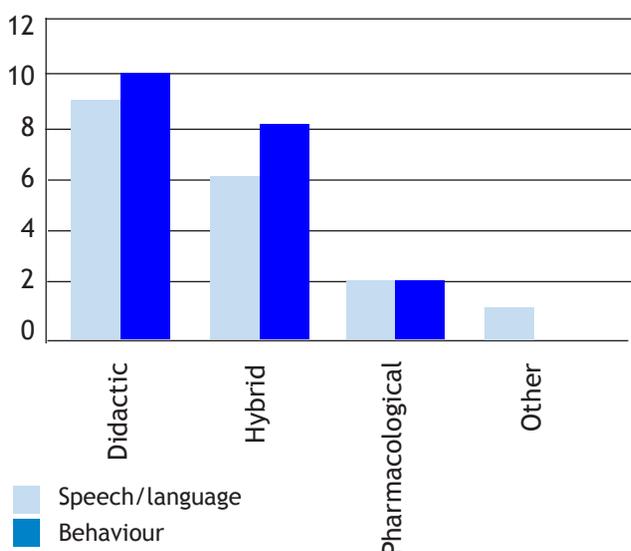


Figure 3.9 illustrates that 9 of the 11 interventions in the didactic category measured speech/language outcomes and 10 of these studies measured outcomes in behaviour. Furthermore, 2 of the didactic interventions did not measure speech/language outcomes and 1 did not measure behavioural outcomes, and 9 of the studies measured outcomes in both these areas. Within the group of interventions classified as hybrid, 6 measured outcomes in speech/language and 8 measured behavioural outcomes; 2 of these evaluations did not assess outcomes in speech/language. Therefore, 6 of the 8 studies measured both speech/language and behavioural outcomes. The two pharmacological interventions measured outcomes in both these areas. One of the interventions classified as 'other' measured only speech outcomes.

### 3.3 Identifying and describing studies: quality assurance results

First stage screening (titles and abstracts) was primarily carried out by one reviewer. However, a random sample of 26 studies were double-screened by the EPPI-Centre link person as part of the external quality assurance process. Agreement was acceptable (20 out of 26) and any discrepancies were resolved by discussion. The EPPI-Centre link person double screened nine full reports as part of stage 2 screening, agreement was relatively high (7 out of 9) and once again disagreement was resolved through discussion.

### 3.4 Summary of results of map

There were 64 studies of 78 papers included in the map: 42 associations and 22 evaluations. Within the evaluations there was one controlled trial. Fifty-eight of the mapped studies were published, one was pending publication and five were unpublished. Four of the mapped studies were linked studies and the remaining 60 were not linked. Twenty-two of the studies included in the map were identified in the keywording as focusing primarily on a speech and language population, twelve were mapped as EBD, one as autism, five as representative sampling, and four as 'other'. Thirty-seven of the studies dealt with males and females while five sampled males only.

---

## CHAPTER FOUR

# In depth review: results

This chapter explores the results of a subset of the studies in the systematic map. It asks the question:

*The interaction between communication difficulties and behavioural problems: does intervention for one affect outcomes in the other?*

### 4.1 Selecting studies for the in-depth review

Twenty-one studies from the systematic map were identified for inclusion in the in-depth review. In-depth review studies were evaluations of either a communicative or social/behavioural intervention. Association studies exploring the relationship between SLCD and EBD were excluded from the in-depth review as were evaluations of speech and language therapy interventions that measured speech outcomes as the only form of communication outcome.

### 4.2 Comparing the studies selected for in-depth review with the total studies in systematic map

The mapping activity identified 42 studies that explored the relationship between communicative difficulties and behavioural problems. Studies were classified as having a sample whose primary presenting problem consisted of speech and language difficulties, emotional and behavioural difficulties or a diagnosis of autism. The other category refers to studies that consisted of children with a diagnosis that did not fit any of these categories, for example Pervasive Development Disorder (PDD)/Pervasive Development Disorder Not Otherwise Specified (PDD-NOS). Also included in this category are studies where the sample was mixed - for example a number of children within the sample were diagnosed as autistic and others as having a developmental language delay; these were also classified as 'other'. A number of studies carried out represented sampling of children of a certain age

within a geographical area and applied a battery of assessments to investigate the association between communicative difficulty and behavioural problems; these were also categorised as 'other'.

The majority of the mapped studies reported data on children with SCLD (22). The remainder, included in the systematic map but not the in-depth review, consisted of children with a primary diagnosis of emotional/behavioural difficulties (12), and of children with other developmental disorders or mixed samples with both autistic children and children with language difficulties (5). Only one of the mapped association studies included only autistic children. One study was included in the systematic map but excluded from the in-depth review because it was an evaluation of a behavioural intervention measuring speech rather than language outcomes.

All the studies included in the in-depth review were evaluation studies. In contrast, the studies included in the systematic map were mainly association studies (42) that explored the relationship between communication and behaviour in terms of the prevalence rates of co-morbid behaviour and communication difficulties. Studies in the in-depth review focused mainly on applying the intervention to children with autism (13), autistic spectrum disorder (1), or autistic spectrum disorder (1) and associated social communication difficulties (2); with a small number of studies dealing with children with emotional/behavioural problems (3), co-morbid language difficulties and emotional/behavioural problems (2).

### 4.3 Further details of studies included in the in-depth review

The 21 studies included in the in-depth review can be summarised as follows: 13 studies evaluated interventions for children with autism, three studies had samples which comprised of children with emotional/behavioural problems as the primary

diagnosis, two studies focused on children with co-morbid language difficulties and emotional/behavioural problems, one study included children described as having an autistic spectrum disorder, and two studies looked at intervention for children with autistic spectrum disorder and communication difficulties.

In terms of study design there were two open label trials, four pre-test-post-test designs, two reversal designs, five single-subject experimental designs, six studies incorporating a multiple baseline design, one mixed quasi-experimental design, and one controlled trial. There was an unequal distribution in terms of weight of evidence, with three studies weighted as medium evidence and the remaining 18 papers weighted as low evidence for this review.

#### **4.3.1 Framework for the in-depth review**

The studies included in the in-depth review were grouped according whether their interventions were classified as *didactic*, *hybrid* and *pharmacological*. These labels are working definitions drawn up for this review. The outcomes measured by each study were also classified under two headings: *speech and language outcomes* and *behaviour outcomes*. The synthesis terminology is defined in the glossary and the synthesis framework is outlined below:

##### *Didactic*

Didactic studies are those that use behavioural modification techniques to improve communication or behaviour. Such techniques include shaping and modelling, reinforcement and contingent rewards. The defining feature of interventions in this classification is that they teach very specific communicative behaviours and tend not to focus on the generalisation of skills or the use of communication in context or to encourage the individual in receipt of the instruction to reflect explicitly on the target skills.

##### *Hybrid*

Hybrid interventions are those that include behavioural techniques but concentrate on the generalisation of the communication or behaviour skills to other contexts and to help the individual in receipt of the instruction to relate socially to other people and to reflect explicitly on the target skills.

##### *Pharmacological*

This term refers to interventions that employ drug therapy to improve language and behaviour outcomes.

##### *Outcomes*

The outcomes measured by each study were also classified as speech and language and behaviour.

##### *Speech and language*

Examples of these types of outcomes are: echolalic speech, imitative speech, spontaneous speech, expressive language, mean length of utterance, number of appropriate words and sentence length, receptive language and pragmatic language, initiating and maintaining conversation and turn taking.

##### *Behaviour*

Examples of outcomes included under this heading are: oppositional, inattentive, hyperactive behaviours, maladaptive behaviours, aggressive behaviours, peer group entry behaviour, social skills, conflict resolution skills, play initiation/maintenance, joint attention, progression through cognitive levels of game formats and autistic behaviour.

The details of participants and participant outcomes vary according to the different study methodologies and written formats of the papers included in the in-depth review. Therefore the amount of detail provided in the narrative synthesis of the review relating to these variables in the review varies.

#### **4.3.2 Didactic interventions**

##### ***Beilinson JS, Olswang LB (2003) Facilitating peer-group entry in kindergartners with impairments in social communication***

Beilinson and Olswang (2003) examined the efficacy of a peer group entry intervention in children with social interaction and communication difficulties. Authors used an ABA reversal design in three children aged between 5.6 years and 6.3 years. The small sample consisted of two boys and one girl. One of the boys had been diagnosed with an autistic spectrum disorder, while the other two children were described as having impairments in social communication. The intervention is described as peer group entry, which consisted of a package to instruct teachers to prompt children to use the props (toys) to facilitate the production of high-risk peer group entry behaviours. A second-year master's student in speech-language pathology served as the primary treatment provider. After one week of treatment, the three classroom teachers were involved in the implementation of the treatment. The sequence was taught using a combination of direct instruction, modelling, and prompting. Children were provided with approximately eight (range = 5-8) opportunities for peer group entry. Target children were asked to choose a host peer and instructed to try to play with him/her. Each target child was given approximately two minutes to attempt peer group entry and play with the host peer, in the case of a successful entry. If the target child did not make an entry attempt, the treatment provider used a prompt, to assist the child. Prompts were provided as needed until the child successfully made a peer-group entry attempt.

**Carter CM (2001) Using choice with game play to increase language skills and interactive behaviors in children with autism**

Carter (2001) investigated the effect of providing choice during natural language interventions and monitoring the extent to which this reduces disruptive behaviours and improves adaptive social play and pragmatic skills, and the acquisition of grammatical morphemes. The intervention was evaluated using a single-subject experimental design with three children with autism (one male and two female), mean age 6 years (5.4-7.0 years). The intervention consisted of three conditions; a choice condition, a no choice condition and a no choice condition which included yoked control. With the exception of the presence of choice (independent variable) both conditions were identical. The choice condition allows the child to select 10 games out of 35. The actual session relied heavily on pivotal response training (PRT). In the yoked control condition the child is provided with 10 games from the proceeding choice condition. The no choice condition consisted of toys and games preferred by the child; however, the interventionist selected the toys to be used as stimulus items during the intervention. In the choice condition the child selected the games and the order of games played during the intervention session.

**Charlop-Christy MH, Carpenter M, Le L, LeBlanc LA, Kellet K (2002) Using the Picture Exchange Communication System (PECS) with children with autism: assessment of PECS acquisition, speech, social-communicative behavior, and problem behavior**

Charlop-Christy *et al.* (2002) aimed to determine the effectiveness of the Picture Exchange Communication System (PECS) with children with autism using a single-subject experimental design with a multiple baseline across participants. The sample consisted of three boys with a diagnosis of autism with a mean age of 7.2 years (3.8-12.0 years). PECS is an alternative communication system which uses pictorial material and behavioural techniques (e.g. shaping, differential reinforcement and transfer of stimulus control via delay) to teach functional communication. This intervention involves six phases: physical exchange, expanding spontaneity, picture discrimination, sentence structure, 'What do you want?' and commenting. Training was implemented in children's classrooms and homes and in the clinic in order to promote generalisation. During each session, play or academic, the therapist provided five spontaneous speech opportunities and five verbal initiation opportunities.

**Garrison-Harrell L, Kamps D, Kravits T (1997) The effects of peer networks on social-communicative behaviors for students with autism**

Garrison-Harrell *et al.* (1997) aimed to determine the effects of a peer network of five typical peers across multiple natural settings for three students with autism. The objectives were to measure the effects of the peer network strategy on the language and social interaction skills of the students with autism. This single-subject design consisted of two boys and one girl, each with a diagnosis of autism. The mean age was 7.0 years (6.7-7.2 years). The intervention consisted of five typically developing peers using an augmentative communication system (communication board with symbols) with the one target child during 20 minute co-operative play sessions 3-4 times a week. Interactive games were played during these sessions. Peer network sessions took place during scheduled play and academic times in regular education settings in the elementary schools attended by the target child. Peers were trained in use of the augmentative communication system, social skills (initiation, turn-taking, responding etc.) and understanding autism. Activities took place during language art lessons, lunchtime and at break, or during a computer session.

**Nientemp EG, Cole CL (1992) Teaching socially valid social interaction responses to students with severe disabilities in an integrated school setting**

Nientemp and Cole (1992) evaluated the use of a constant time delay procedure by a classroom teacher to teach students socially valid interaction responses to teacher-initiated and non-handicapped peer-initiated social greetings. The study used an ABA withdrawal design and the sample consisted of three participants with autism (two boys and one girl) with a mean age of 12.7 years (12.0-13.4 years). The intervention relied on a behavioural instruction approach known as Constant Time Delay. Participants' responses to five socially validated greetings were assessed. A social greeting was initiated with the child, and the target response was immediately prompted. Response contingencies were determined for a range of verbal responses. This was implemented during discrete training sessions with a teacher; generalisation tasks were conducted with typically developing peers.

**Pierce K, Schreibman L (1995) Increasing complex social behaviors in children with autism: effects of peer-implemented pivotal response training**

Pierce and Schreibman (1995) examined the effects of peer-delivered pivotal response training (PRT) on the social behaviours of children with autism. Additionally they assessed changes in collateral

behaviours such as language and attention using a multiple baseline across participants design. The sample consisted of two autistic boys aged 10 years. A speech and language therapist trained peers in PRT covering the following areas: paying attention, child's choice, varying toys, model appropriate social behaviour, reinforcing attempts, encouraging conversation, extending conversation, turn-taking, narrating play and teaching responsivity to multiple cues. PRT took place in 10 minute play sessions where toys were used to encourage interaction using the techniques learned by peers. These play sessions took place in a little-used classroom in the target child's school. A novel third grade classroom was used as a generalisation setting. Generalisation peers were not trained in PRT strategies and were chosen at random from a fourth grade classroom.

**Pierce K, Schreibman L (Unpublished) Effects of multiple-peer implemented PRT on the social behavior of children with autism: investigating cross-peer generalization and peer trainer characteristics**

Pierce and Schreibman (Unpublished) aimed to extend earlier work by assessing the effectiveness of multiple peer-implemented PRT for increasing social behaviour of children with autism in the mainstream, the degree of generalisation across untrained peers, novel settings and toys. In addition to this, the study aimed to assess peer characteristics which might be related to high rates of treatment success and the degree to which PRT affects rates of repetitive play in children with autism. The sample consisted of two boys aged 7 and 8 years with a diagnosis of autism in a multiple baseline design. The intervention consisted of training normally developing peers in the implementation of PRT strategies, using a manual representing strategies in pictorial cues and written formats. Strategies represented were: paying attention, child's choice, varying toys, model appropriate social behaviour, reinforcing attempts, encouraging conversation, extending conversation, turn-taking, narrating play and teaching responsivity to multiple cues. PRT took place in a classroom during recess for one child and a recreation room for the other. The generalisation setting was a novel third grade classroom.

**Sigafoos J, Meikle B (1996) Functional communication training for the treatment of multiply determined challenging behavior in two boys with autism**

The Sigafoos and Meikle (1996) study aimed to investigate the feasibility of concurrent functional communication training to replace multiple challenging behaviours in two boys (aged 8 years) with autism. Researchers used a multiple baseline across participants. This study comprised of two experiments, the first of which identified the participants' challenging behaviour,

the second consisting of implementation of the intervention to replace these challenging behaviours. Authors describe the intervention as functional communication. For each participant two communication responses were selected as functionally equivalent alternatives to their attention and object motivated behaviours. Intervention consisted of two phases, the first involving a one second delay before the child received prompts for appropriate communicative behaviour to request attention or an object. The second phase involved increased time delays to fade out prompts.

**Thorp DM, Stahmer AC, Schreibman L (1995) Effects of socio-dramatic play training on children with autism**

The study by Thorp *et al.* (1995) aimed to establish whether socio-dramatic play training, using PRT, would increase socio-dramatic play in children with autism who were developmentally ready to learn this skill. In addition, the effect of treatment on the children's language and social skills was assessed to determine if socio-dramatic play training could be a useful technique targeting multiple behaviours in children with autism. The multiple baseline design consisted of three boys with a diagnosis of autism, mean age 7.8 (5.4-9.9 years). The PRT consisted of the following basic steps: presentation of toys and child selection; varying toys according to child's group; modelling appropriate socio-dramatic play; modelling response if child fails to respond; reinforcement of correct response or close approximation; previously mastered play themes interspersed with novel plots; active role of experimenter in play to promote social interaction. Setting varied according to the child: for one child the intervention took place in the home and the clinic, for another in the home and for the third at school.

**Zercher C, Hunt P, Schuler A, Webster J (2001) Increasing joint attention, play and language through peer supported play**

Zercher *et al.* (2001) evaluated the efficacy of a peer-supported play intervention on joint attention, symbolic play and language use by implementing a multiple baseline design across participants. The sample consisted of identical twin brothers with a diagnosis of autism, aged 6.3 years. The intervention consisted of an integrated play group of five children, two with autism and three typically developing peers. Their peers were trained in 'play' strategies to use with the target children. This involved training the peers in developing joint attention, symbolic play and adapting behaviour of the autistic children. These sessions took place in a Sunday school classroom.

### 4.3.3 Hybrid interventions

#### **Cooper J, Smith C, Smith V (Unpublished) Enhancing student social skills through the use of cooperative learning and conflict resolution strategies**

Cooper *et al.* (Unpublished) implemented a classroom based intervention aimed at increasing kindergarten children's ability to work co-operatively and manage conflict resolution without adult intervention. The pre-test-post-test design involved 43 children of kindergarten age (three classrooms) with language and behavioural difficulties. Intervention consisted of a teaching programme with the following components: explicit teaching of social skills, implementation of a violence prevention programme, and development of co-operative learning.

#### **Heneker S (2005) speech and language therapy support for pupils with behavioural, emotional and social difficulties (BESD): a pilot project**

Heneker (2005) evaluated the impact of a short period of speech and language therapy for pupils with behavioural, emotional and social difficulties (BESD). The pre-test-post-test design consisted of 11 pupils aged 5 to 11 years who attended a Pupil Referral Unit. The intervention was tailored to meet the needs of each child. The following areas were covered by the intervention: understanding and use of vocabulary (word category membership, giving accurate definitions of words; words with more than one meaning, other words that mean the same thing as a given word) - this was administered to three pupils; general language (tenses and plurals) - two pupils received this element; all pupils received training in social skills (good looking, listening, sitting, turn-taking, identifying and expressing basic emotions); and one pupil received speech therapy (identifying and producing specific speech sound and words containing the target sound).

#### **Hyter YD, Rogers-Adkinson DL, Self LS, Simmons BF, Jantz J (2001) Pragmatic language intervention for children with language and emotional/behavioral disorders**

Hyter *et al.* (2001) investigated the effectiveness of a pragmatic, classroom-based intervention for children with language and emotional-behavioural problems. The pre-test-post test design used six boys between the ages 8.6 years and 12.11 years. Pragmatic classroom-based intervention focused on: ability to use semantic and syntactic skills to produce connected and organised texts or units of talk; ability to use language for different purposes; developing methods for participating in discourse; and developing the ability to understand the communicative needs of others. Each lesson

started with step-by-step instructions, group rules, a role-play of the activity, and the activity itself. Through the role-play activity the speech and language therapist and the special education teacher modelled the appropriate and inappropriate responses. Activities from the session were then rehearsed at the start of the next session.

#### **Ivey ML, Heflin LJ, Alberto P (2004) The use of social stories to promote independent behaviors in novel events for children with PDD-NOS**

Ivey *et al.* (2004) aimed to determine if the use of a social story prior to a novel event within a routine setting would lead to independent behaviour during the actual event for children with ASD. Authors used a single subject design with three boys with a diagnosis of Pervasive Development Disorder - Not Otherwise Specified (PDD-NOS), with a mean age of 6.1 years (5.1-7.5 years). The intervention is described as 'social stories' - these are short structured stories that are used to introduce environmental information in a format that is understandable to an individual with ASD. The story can be used to answer questions individuals with ASD do not ask or do not ask correctly, thereby helping them to gain information. They are a medium for explaining what is happening and expected within environmental setting. They are not a form of social skills instruction, but one by-product of the intervention is that they can lead to an increase in socially acceptable behaviour. Prior to the actual novel event, a training session was provided to parents to introduce the theory of social stories, with instructions on presenting the social story. During the intervention phase parents were given two books for the following weeks' target activities. Parents were instructed to introduce the stories and read them to their child once a day for five days prior to the events. These were read to the child at a point in the day when the child was calm and most receptive for listening to the story. Parents were also instructed to read the stories just prior to the therapy. Reading times, questions and responses were documented by the parents.

#### **Law J, Sivyer S (2003) Promoting the communication skills of primary school children excluded from school or at risk of exclusion: an intervention study**

Law and Sivyer (2003) aimed to investigate the impact of a communication intervention for children with behavioural problems on their language skills (lexical organisation, reasoning, inference, verbal problem-solving and narrative), social communication skills (social use of language programme and circle time), behaviour management (promoting positive behaviour), self-esteem and perceived emotional and behavioural difficulties. Twenty children excluded or at risk of exclusion from school with a mean age of 10.8 years (9-11 years) participated in this controlled trial. The group

intervention targeting language, communication, self-esteem, behaviour and emotional wellbeing was administered in 30 minute sessions on a weekly basis over a period of 10 weeks. Sessions were implemented by a speech and language therapist and speech and language therapy assistants. In the pupil referral unit (PRU) the intervention was also administered by the class teacher and the learning support assistant.

**Pasiali V (2004) *The use of prescriptive therapeutic songs in a home-based environment to promote social skills acquisition by children with autism: three case studies***

Pasiali (2004) investigated the effect of music therapy combined with social stories on behavioural problems in children with autism, using a single subject design. The three children in this study (two males and one female) had a mean age of 8 (7-9 years). The individual child's behaviour is analysed to determine an inappropriate behaviour to be the focus of the intervention. A social story is then written to target the behaviour, i.e. reduce the frequency of this inappropriate behaviour. The social story is then set to music so it is a song that can be sung to and with the child in the context in which the behaviour occurs. This procedure not only familiarises the child with the music and singing but involves passive listening and extends to active involvement.

**Smith C, Goddard S, Fluck M (2004) *A scheme to promote social attention and functional language in young children with communication difficulties and autistic spectrum disorder***

Smith *et al.* (2004) assessed the efficacy of an intervention that utilised children's existing skills to promote social attention and functional language in young children with communication difficulties and autism spectrum disorder (ASD). Researchers employed a mixed experimental design with 20 participants (15 autistic and 5 language impaired) with ranging in age of 3-5 years. This approach to intervention involved using the child's existing ability to manipulate objects into a shared turn-taking game. Games are created from the child's existing skills. Children are encouraged to interact within each shared game, thus improving their understanding and use of language in the interpersonal and action-based context. The intervention consisted of three phases. In phase 1 a range of age-appropriate games were established for each child. The focus in this phase was shared attention. Phase 2 consisted of the establishment of triadic attention and role exchange through a turn-taking game to foster more complex interactions and communication. In phase 3 more complex role exchanges were used to foster the child's role as an initiator.

**Stringer H (2006) *Intervention to facilitate narrative and social skills in secondary school students with language and behaviour difficulties***

Stringer (2006) investigated the efficacy of speech and language therapy (narrative skill development and social skills training) aimed at facilitating the expressive language skills, assertive behaviour and communication skills of secondary school students with language and behaviour difficulties. The pre-test-post-test design involved 12 male students with language difficulties and emotional/behavioural problems, mean age 12.4 years (11.8-13.2 years). The intervention consisted of two strands, the first dealing with narrative language skills and the second with social skills, in particular assertive behaviour as an alternative to aggressive or passive behaviour. Participants were split into two groups for reasons of manageability rather than comparisons. There were no differences between the groups.

**4.3.4 Pharmacological interventions**

**Chez MG, Aimonovitch M, Buchanan T, Mrazedk S, Tremb RJ (2003) *Treating autistic spectrum disorders in children: utility of cholinesterase inhibitor rivastigmine tartrate***

The study by Chez *et al.* (2003) assessed the effectiveness of rivastigmine tartrate on the language and behaviour functioning of ASD. The intervention (Rivastigmine) was administered twice daily over a 12-week period to 32 children with a mean age of 6.91 years. Within this sample 11 children had an ASD diagnosis, 21 were diagnosed as PDD-NOS and 13 had a previous diagnosis of epilepsy.

**McDougle CJ, Scahill L, Aman MG, McCracken JT, Tierney E, Davies M, Arnold LE, Posey DJ, Martin A, Ghuman JK, Shah B, Chuang SZ, Swiezy NB, Gonzalez NM, Hollway J, Koenig K, McGough JJ, Ritz L, Vitiello B (2005) *Risperidone for the core symptom domains of autism: results from the study by the Autism Network of the Research Units On Pediatric Psychopharmacology***

McDougle *et al.* (2005) investigated the effect of Risperidone on repetitive behaviour, social relatedness and communication in children with autism. The sample consisted of 63 children with autism who were involved in an 8-week randomised control trial (RCT) of Risperidone and had now entered the 16-week open label continuation phase. The children's age ranged from 5 to 17 years with a mean age of 8.8 years. Risperidone at a mean dosage of 1.8mg a day was administered over a 16 week continuation period of an 8-week RCT.

**Table 4.1:** Quality and relevance of studies included in the in-depth review

Study	WoE A	WoE B	WoE C	WoE D
<b>Didactic (11 studies)</b>				
Beilinson and Olswang (2003)	High	Low	Low	Low
Carter (2001)	Medium	Low	Medium	Low
Charlop-Christy <i>et al.</i> (2002)	Low	Low	Medium	Low
Garrison-Harrell <i>et al.</i> (1997)	Low	Medium	Low	Low
Keen <i>et al.</i> (2001)	Low	Low	Low	Low
Nientemp and Cole (1992)	Low	Low	Low	Low
Pierce and Schreibman (1995)	Low	Low	Low	Low
Pierce and Schreibman (Unpublished)	Low	Low	Low	Low
Sigafoos and Meikle (1996)	Low	Low	Low	Low
Thorp <i>et al.</i> (1995)	Low	Low	Low	Low
Zercher <i>et al.</i> (2001)	Low	Low	Low	Low
<b>Hybrid (8 studies)</b>				
Cooper <i>et al.</i> (Unpublished)	Low	Low	Low	Low
Heneker (2005)	Low	Low	Medium	Low
Hyter <i>et al.</i> (2001)	Low	Low	High	Low
Ivey <i>et al.</i> (2004)	Low	Low	Low	Low
Law and Sivyer (2003)	Medium	Medium	Medium	Medium
Pasiali (2004)	Low	Low	Low	Low
Smith <i>et al.</i> (2004)	Medium	Medium	High	Medium
Stringer (2006)	Low	Low	High	Low
<b>Pharmacological (two studies)</b>				
Chez <i>et al.</i> (2003)	Low	Low	Low	Low
McDougle <i>et al.</i> (2005)	Medium	High	Medium	Medium

## 4.4 Synthesis of the evidence

### 4.4.1 Didactic interventions

**Table 4.2:** Didactic interventions

Carter (2001) Using choice with game play to increase language skills and interactive behaviours in children with autism				
Study details	Intervention	Outcomes measured (and tools used)	Findings	WoE
<p><b>Design:</b></p> <p><b>Sample</b></p> <p><b>N:</b> 3</p> <p><b>Age:</b> 5.4, 5.3, 7</p> <p><b>Sex:</b> 2F, 1M</p> <p><b>Diagnosis:</b> Autism</p>	<p>Choice condition in natural language intervention that heavily relies on PRT</p>	<p><b>Outcomes:</b></p> <p>Speech/language: expressive language and grammatical morpheme.</p> <p>Behaviour: Disruptive behaviours, play behaviours.</p> <p><b>Assessment:</b> Systematic observations - coding of video tapes of therapists and child sessions and generalisation with participants and family peers.</p>	<p><b>Results:</b></p> <p>Speech/language: improvements in expressive language and generalisations of targeted grammatical morpheme</p> <p>Behaviour: reductions in disruptive behaviours and improvements in play initiations and maintenance</p> <p><b>Conclusions:</b> choice intervention is a practical and effective intervention to increase language and social play skills and decrease disruptive behaviour in language intervention for children with autism.</p>	Low
Beilinson and Olswang (2003) Facilitating peer-group entry in kindergartners with impairments in social communication				
Study details	Intervention	Outcomes measured (and tools used)	Findings	WoE
<p><b>Design:</b> ABA reversal design</p> <p><b>Sample</b></p> <p><b>N:</b> 3</p> <p><b>Age:</b> 5.6-6.3</p> <p><b>Sex:</b> 2M, 1F</p> <p><b>Diagnosis:</b> 1 ASD, 2 impaired in social-communication</p>	<p>Peer group entry intervention, which consisted of a package to instruct teachers to prompt children to use the props (toys) to facilitate the production of high risk peer group entry behaviours.</p>	<p><b>Outcomes:</b></p> <p>Speech/Language: N/A</p> <p>Behaviour: peer group entry behaviour and cooperative play.</p> <p><b>Assessment:</b> Systematic observations - behaviour coded using Dodge <i>et al.</i> (1983) coding system.</p>	<p><b>Results:</b></p> <p>Speech/Language: N/A</p> <p>Behaviour: increases in high-risk behaviours and cooperative play behaviours.</p> <p><b>Conclusions:</b> Treatment effectively produced small changes in social interaction among peer in a relatively short time with intensive training. This is an effective strategy when implemented by speech-language pathologist and teachers.</p>	Low

Charlop-Christy *et al.* (2002) Using the Picture Exchange Communication System (PECS) with children with autism: assessment of PECS acquisition, speech, social-communicative behaviour and problem behaviour

Study details	Intervention	Outcomes measured (and tools used)	Findings	WoE
<p><b>Design:</b> Multiple baseline design across participants</p> <p><b>Sample</b> N: 3 Age: 12.0, 3.8, 5.9 Sex: 3M Diagnosis: Autism</p>	<p>PECS training involves six phases: physical exchange, expanding, spontaneity, picture discrimination, sentence structure, 'What do you want?' and commenting.</p>	<p><b>Outcomes:</b> Speech/language: spontaneous speech, imitative speech and mean length of utterance. Behaviour: Social communicative behaviour. <b>Assessment:</b> Systematic observations - coding of video recordings of sessions.</p>	<p><b>Results:</b> Speech/language: Post-intervention gains in spontaneous speech, imitative speech and mean length of utterance. Behaviour: Intervention effective in promoting social communicative behaviour. <b>Conclusions:</b> Within a short time period PECS increased speech and socio-communicative behaviour in all three children and decreased problem behaviour.</p>	Low

Garrison-Harrell *et al.* (1997) The effect of peer networks on social-communicative behaviours for students with autism

Study details	Intervention	Outcomes measured (and tools used)	Findings	WoE
<p><b>Design:</b> Small-N design</p> <p><b>Sample</b> N: 3 Age: 7.2, 7, 6.7 Sex: 2M, 1F Diagnosis: Autism</p>	<p>Peer networks consisting of five normally developing peers using an augmentative communication system with the target child during 20 min cooperative play sessions 3-4 times a week.</p>	<p><b>Outcomes:</b> Speech/language: Functional communicative verbalisations Behaviour: Social interaction, use of augmentative communication system and peer acceptance. <b>Assessment:</b> Systematic observations, sub-test of Autism Instructional Educational Program (expressive vocalisations), peer nominations and friendships rating scales.</p>	<p><b>Results:</b> Speech/language: Functional verbalisations increased post-intervention and unintelligible articulations decreased. Behaviour: Improvements in frequency and duration of social interaction and use of augmentative communication system. <b>Conclusions:</b> Trained peer networks including communication systems are a functionally effective intervention for students with autism in public school settings, both in terms of communicative behaviour and peer acceptance.</p>	Low

Keen *et al.* (2001) Replacing prelinguistic behaviors with functional communication

Study details	Intervention	Outcomes measured (and tools used)	Findings	WoE
<p><b>Design:</b> Multiple baseline across behaviours</p> <p><b>Sample</b> N: 4 Age: 7.7, 3.7, 4.5, 4.5 Sex: 3M, 1F Diagnosis: Autism</p>	<p>Functional communication training.</p>	<p><b>Outcomes:</b> Speech/language: N/A Behaviour: Pre-linguistic behaviours. <b>Assessment:</b> Systematic observations.</p>	<p><b>Results:</b> Speech/language: N/A <b>Behaviour:</b> Reduced pre-linguistic behaviour and increased replacement behaviours. <b>Conclusions:</b> Authors conclude that intervention was effective in replacing pre-linguistic behaviours with functional communicative behaviours.</p>	Low

**Nientemp and Cole (1992) Teaching socially valid social interaction responses to students with severe disabilities in an integrated school setting**

Study details	Intervention	Outcomes measured (and tools used)	Findings	WoE
<p><b>Design:</b> ABA withdrawal design</p> <p><b>Sample</b></p> <p><b>N:</b> 3</p> <p><b>Age:</b> 12, 13.4, 12.8</p> <p><b>Sex:</b> 2M, 1F</p> <p><b>Diagnosis:</b> Autism</p>	Constant Time Delay.	<p><b>Outcomes:</b></p> <p>Speech/language: social greetings.</p> <p>Behaviour: N/A</p> <p><b>Assessment:</b> Systematic observations.</p>	<p><b>Results:</b></p> <p>Speech/Language: intervention increased instances of correct responding (appropriate social greeting) for all participants, while echolalic or error responses decreased for all participants.</p> <p>Behaviour: N/A</p> <p><b>Conclusions:</b> Authors concluded that this study showed that independent appropriate social interaction responses increased.</p>	Low

**Pierce and Schreibman (1995) Increasing complex social behaviours in children with autism: effects of peer-implemented pivotal response training**

Study details	Intervention	Outcomes measured (and tools used)	Findings	WoE
<p><b>Design:</b> Multiple baseline across participants</p> <p><b>Sample</b></p> <p><b>N:</b> 2</p> <p><b>Age:</b> 10</p> <p><b>Sex:</b> 2M</p> <p><b>Diagnosis:</b> Autism</p>	Peer implementation in Pivotal Response Training (PRT), a behavioural intervention which utilises modelling, role play and didactic instruction in naturalistic settings.	<p><b>Outcomes:</b></p> <p>Speech/Language: expressive language.</p> <p>Behaviour: joint attention, social behaviour and school behaviour.</p> <p><b>Assessment:</b> Interaction/attention: coding of video recordings of 10 min play sessions.</p> <p>Appropriate words/sentence length: scored in 30 sec intervals.</p> <p>Walker-McConnel Scale of Social Competence.</p>	<p><b>Results:</b></p> <p>Speech/Language: improvements in expressive language post intervention.</p> <p>Behaviour: improvements in social behaviour, joint attention with mixed effects for school behaviour.</p> <p><b>Conclusions:</b> PRT training delivered to children with autism by trained typical peers in an appropriate social environment with minimal supervision is effective in teaching complex social behaviours such as initiations, enhancing joint attention behaviours, with evidence of response generalisation, and increasing language skills. Teachers also reported changes, particularly in peer preferred social behaviour.</p>	Low

**Pierce and Schreibman (Unpublished) Effects of multiple-peer implemented PRT on the social behaviour of children with autism: investigating cross-peer generalisation and peer trainer characteristics**

Study details	Intervention	Outcomes measured (and tools used)	Findings	WoE
<p><b>Design:</b> Multiple baseline</p> <p><b>Sample</b></p> <p><b>N:</b> 2</p> <p><b>Age:</b> 7, 8</p> <p><b>Sex:</b> 2M</p> <p><b>Diagnosis:</b> Autism</p>	Peer implemented PRT.	<p><b>Outcomes:</b></p> <p>Speech/Language: Expressive language.</p> <p>Behaviour: social interaction, play behaviour and peer/teacher preferred behaviour.</p> <p><b>Assessment:</b> Systematic observations: coding of video recordings of dyads during 10 min play, during and after PRT.</p> <p>Generalisation measures obtained with untrained peer, novel stimuli and in non-training environment.</p>	<p><b>Results:</b></p> <p>Speech/Language: improvements in expressive language post intervention.</p> <p>Behaviour: increased interaction initiations, increases in teacher/peer preferred behaviour, increased variation in play behaviour.</p> <p><b>Conclusions:</b> Naturalistic interventions such as PRT are effective in producing positive changes in the social behaviour of children with autism.</p>	Low

**Sigafoos and Meikle (1996) Functional communication training for the treatment of multiply determined challenging behaviour in two boys with autism**

Study details	Intervention	Outcomes measured (and tools used)	Findings	WoE
<p><b>Design:</b> Multiple baseline across participants</p> <p><b>Sample</b></p> <p><b>N:</b> 2</p> <p><b>Age:</b> 8</p> <p><b>Sex:</b> 2M</p> <p><b>Diagnosis:</b> Autism</p>	<p>Functional communication training to reduce challenging behaviours.</p>	<p><b>Outcomes:</b></p> <p>Speech/language: functional requests</p> <p>Behaviour: challenging behaviour</p> <p><b>Assessment:</b> Systematic observations. Independent observers collected reliability on presence/absence of outcomes during intervention. Data was also collected at follow up sessions two and four weeks after final intervention session, then once per month over a three-month period.</p>	<p><b>Results:</b></p> <p>Speech/language: improvements in functional requests.</p> <p>Behaviour: intervention reduced instances of challenging behaviour.</p> <p><b>Conclusions:</b> Authors conclude that results imply that fairly sophisticated behavioural techniques may be applied in a classroom setting by the teacher with some success with children with restricted abilities.</p>	Low

**Thorp et al. (1995) Effects of sociodramatic play training on children with autism**

Study details	Intervention	Outcomes measured (and tools used)	Findings	WoE
<p><b>Design:</b> Single subject multiple baseline across subjects</p> <p><b>Sample</b></p> <p><b>N:</b> 3</p> <p><b>Age:</b> 5.4, 9.9, 8.2</p> <p><b>Sex:</b> 3M</p> <p><b>Diagnosis:</b> Autism</p>	<p>Socio-dramatic play training using PRT.</p>	<p><b>Outcomes:</b></p> <p>Speech/language: Spontaneous speech and language skills.</p> <p>Behaviour: Play behaviour and social behaviour.</p> <p><b>Assessment:</b> Systematic observations: Videos were taken for 12 minutes and tapes were coded in continuous 30 second intervals.</p>	<p><b>Results:</b></p> <p>Speech/language: improved language skills and spontaneous speech, decreased inappropriate language.</p> <p>Behaviour: improvements in social and play behaviour, increased imaginary play at home.</p> <p><b>Conclusions:</b> Socio-dramatic play training may be an effective treatment package for increasing play, language and social skills in children with autism with the appropriate developmental prerequisites.</p>	Low

**Zercher et al. (2001) Increasing joint attention, play and language through peer supported play**

Study details	Intervention	Outcomes measured (and tools used)	Findings	WoE
<p><b>Design:</b> Multiple baseline design across participants</p> <p><b>Sample</b></p> <p><b>N:</b> 2</p> <p><b>Age:</b> 6.3</p> <p><b>Sex:</b> 2M</p> <p><b>Diagnosis:</b> Autism</p>	<p>An integrated play group, consisting of five children, two with developmental disabilities/PDD-NOS (novices) and three with no disabilities. Peers trained in 'play' and the strategies to use with the novices.</p>	<p><b>Outcomes:</b></p> <p>Speech/language: language</p> <p>Behaviour: initiation behaviours, joint attention behaviours and symbolic play behaviours.</p> <p><b>Assessment:</b> Systematic observations: Behaviours coding at 15 second intervals.</p>	<p><b>Results:</b></p> <p>Speech/language: increased number of verbal utterances and improved language skills.</p> <p>Behaviour: improvements in initiations, joint attentions and symbolic play behaviours.</p> <p><b>Conclusions:</b> This sort of intervention can be used with younger children in community settings. Non-disabled peers can be trained to facilitate behaviour in a joint setting. Authors argue that this intervention can facilitate joint attention, symbolic play and language use.</p>	Low

### **Beilinson and Olswang (2003)**

#### SPEECH AND LANGUAGE OUTCOMES

No outcomes that can clearly be classified as speech or language outcomes as opposed to behaviour outcome were reported in this study.

#### BEHAVIOUR OUTCOMES

Beilinson (2003) facilitated high risk peer group entry behaviours and co-operative play by administering a teacher-implemented peer group entry intervention to children with social communication difficulties. Post-treatment results showed that there was little change in low risk behaviours (imitating peer play), while high risk behaviours (making a group-orientated statement, e.g. telling an idea) increased. Data analysis shows that for two of the children high risk behaviour increased two standard deviations (SD) from baseline to treatment, and for the other child high risk behaviour increased 4.5 SD from baseline to treatment. This was maintained during the withdrawal stage, and the improved performance in social behaviours resembled that of normal developing peers. All three children exhibited slight increases in prop use to accompany high risk peer behaviours. Specifically this increased by 3 SD, 10 SD and 2.5 SD for each child. This continued at withdrawal with very little or no change between withdrawal and treatment conditions. This increase in prop use was comparable to that of normal developing peers. All three children increased in their levels of co-operative play. For two of the children this increase was almost immediate with the intervention. This behaviour increased by 2.5 SD, 13 SD, 1.5 SD from baseline to treatment. This appeared to be maintained at withdrawal, although for two of the children, solitary play increased during withdrawal. For all of the children co-operative play increased to levels similar to that of normally developing peers.

#### CONCLUSIONS AND WOE

Authors concluded that these preliminary findings suggest a way to teach peer-group entry skills to children with social communication deficits or language impairments. Treatment effectively produced small changes in social interaction among peers in a relatively short time with intensive training. This is an effective strategy when implemented by speech-language pathologist and teachers. The evidence weighting for this study was low.

### **Carter (2001)**

#### SPEECH AND LANGUAGE OUTCOMES

The study reported that providing choice opportunities during language intervention improved the generalisation of targeted language skills. Results of the study showed that the

children varied in acquirement of the targeted morpheme in their expressive language across conditions. However, generalisation of the targeted grammatical morpheme to the home environment only occurred after the choice condition for all children included in the study.

#### BEHAVIOUR OUTCOMES

Using choice with game play as a language intervention successfully reduced disruptive behaviours and increased play initiations and play maintenance in children with autism. Specifically disruptive behaviour such as refusal to participate in the games, refusal to stay seated or running out of the room where the intervention was administered was most frequent during the no choice condition. Play initiations (asking to play a game or asking to play a new game) were greatest during the choice condition. In contrast children rarely attempted or made no attempt to initiate play under the no choice condition. The social play/pragmatic behaviour of maintaining play interactions was more varied for all children across conditions. Overall occurrences of play maintenance (turn-taking and compliance) with requests were highest during the choice condition.

#### CONCLUSIONS AND WOE

The author concluded that the choice intervention is a practical and effective intervention to increase language and social play skills and decrease disruptive behaviour in language intervention for children with autism. The evidence weighting for this study was low.

### **Charlop-Christy et al. (2002)**

#### SPEECH AND LANGUAGE OUTCOMES

Results post-intervention showed that all children gained in spontaneous speech, imitative speech, and mean length of utterance. The older child continued to display gains at one-year follow up.

#### BEHAVIOUR OUTCOMES

The PECS training system was found to be effective in promoting social communicative behaviours (joint attention, co-operative play, requesting, initiation and eye contact) in three children with autism. The intervention was also successful in reducing the problem behaviours displayed by the two younger children. In the older child the positive effect on social communicative behaviour was still apparent at one-year follow up.

#### CONCLUSIONS AND WOE

Authors concluded that these primary findings provide the first empirically controlled evidence on the efficacy of PECs for promoting the emergence of speech, with collateral gains in social-communicative behaviour and decreases in problem behaviour in children with autism. Reviewers weighted this study as low evidence.

**Garrison-Harrell et al. (1997)**

## SPEECH AND LANGUAGE OUTCOMES

The study reports that peer networks as an intervention increased functional communicative verbalisations for three children with autism. Specifically, in case one, functional verbalisations increased from a mean of 1 word/minute to 40 words/minute, with a decrease in unintelligible articulations from 2 to 0.5 per session. In case two functional verbalisations increased from 1.2 words/minute to 37 words/minute, with a decrease in unintelligible articulations from 4 per session to 1 per session. The effect of the peer network intervention was less pronounced in case three, with minimal increases in functional verbalisations from 2 words/minute to 3.2 words/minute. However, unintelligible articulations decreased from 3 per session to 0.3 per session.

## BEHAVIOUR OUTCOMES

Peer networks as an intervention improved social interactions in three children with autism. The duration of the interactions increased for all three children; the frequency of this interaction increased for one of the children. The pattern of frequency change was inconsistent for two of the children. This type of intervention also resulted in increased use of an augmentative communication system with trained peers for all three target children. The intervention was also successful in promoting peer acceptance for all three children by both trained and untrained peers.

## CONCLUSIONS AND WOE

Authors concluded that peer networks including communication systems are a functional, effective intervention for students with autism in public school settings. , Particularly particularly for communicative behaviour and peer acceptance (social relationships). The evidence weighting for this study was low.

**Keen et al. (2001)**

## SPEECH AND LANGUAGE OUTCOMES

No speech and language outcomes that can be clearly differentiated from behaviour outcomes are reported in this study.

## BEHAVIOUR OUTCOMES

Functional communication training was an effective intervention for reducing pre-linguistic behaviours and increasing replacement behaviours in autistic children. Specifically the intervention increased the frequency of replacement behaviours for greetings, requests, choice-making and turn-taking. For all of the children participating in the study, the intervention was effective in increasing replacement behaviour and decreasing

the corresponding pre-linguistic behaviour for greetings, choice-making and requesting. For one of the children the intervention was not effective in increasing replacement behaviour for turn-taking.

## CONCLUSIONS AND WOE

Authors concluded that this intervention was effective in replacing pre-linguistic behaviours. The evidence weighting for this study was low

**Nientemp and Cole (1992)**

## SPEECH AND LANGUAGE OUTCOMES

Constant time delay was an effective intervention for teaching social interactions responses thought to be socially valid by normal developing peers to children with a diagnosis of autism or pervasive development disorder. The intervention increased instances of correct responding across all participants, in the range of 0-39% to 8-100%, while echolalic or error responses decreased as a consequence of the intervention for all participants. Furthermore, the effects of the intervention were found to generalise to normally developing peers for all children involved in the study.

## BEHAVIOUR OUTCOMES

No outcomes that can be clearly classified as behavioural outcomes are reported in this study.

## CONCLUSIONS AND WOE

Authors conclude that this study showed that independent appropriate social interaction responses increased and echolalic responding decreased for all participants following the constant time delay technique. Reviewers weighted this study as low evidence for this review.

**Pierce and Schreibman (1995)**

## SPEECH AND LANGUAGE OUTCOMES

The effect of peer-implemented PRT on expressive language was measured in terms of word use and sentence length. Child 1's language increased in terms of word use and sentence length after training and at follow up. Child 2's word use improved at training and follow up; however, sentence length remained the same throughout.

## BEHAVIOUR OUTCOMES

The study found peer implemented PRT to have been beneficial for social behaviour outcomes in autistic children. Results showed that levels of maintaining interaction and levels of initiation improved over time following the introduction of PRT for both children. However, the effect on maintaining interaction was more pronounced for

32 The interaction between behaviour and speech and language difficulties: does intervention for one affect outcomes in the other?

child 1 than child 2. Child 1's initiations were more of conversations than of play. For Child 2 initiation was more evenly split.

The effects on joint attention and social behaviour are mixed. Following the introduction of PRT the first child engaged in both supported and co-ordinated joint attention with the peer trainer, while the second child engaged in more supported joint attention with some co-ordinated joint attention. For the first child, scores for teacher-preferred behaviour increased over training but levelled out at follow up, while peer preferred-behaviour and school adjustment scores increased over both training and follow-up.

The effect of the intervention for outcomes in school behaviour is mixed. For the second child, there was a smaller increase in teacher-preferred scores after training, which dropped below baseline at follow up. Peer-preferred behaviour increased during training and levelled off at follow up. School adjustment for this child showed a numerical decline after training and at follow up.

#### CONCLUSIONS AND WOE

It was concluded by authors that PRT training delivered to children with autism by trained typical peers in an appropriate social environment with minimal supervision is effective in teaching complex social behaviours such as initiations, enhancing joint attention behaviours with evidence of response generalisation, and increasing language skills. The evidence weighting for this study was low.

#### *Pierce and Schreibman (Unpublished)*

##### SPEECH AND LANGUAGE OUTCOMES

Both children included in the study showed gains in expressive language skills (average number of words spoken). For child 1 the intervention increased the average number of words spoken from 1-3 words per 30 seconds to 6-17.2 words per 30 seconds. For child 2 expressive language improved from 1.7-3.9 words per 30 seconds to 7.9-9.9 words per 30 seconds.

##### BEHAVIOUR OUTCOMES

Peer implemented PRT led to improvements in maintaining interactions, play behaviour and peer/teacher preferred behaviour.

For child 1 initiations increased from 0-30% across peers at baseline to 10-50% across peers post-training. Authors do not report data on maintaining interactions for child 1. However, inspection of graphs suggests that maintaining interactions varied 0-100% across peers, post treatment this maintenance ranges from 70-100% across peers. For child 2 initiations ranged 0-17% across peers; this variability improved 3-30% across peers post

treatment. Maintaining interactions increased from 0-82% across peers pre-treatment to 71-100% across peers post-treatment.

On the Walker-McConnell Scale of Social Competency, both the teachers 'noticed a substantial increase' in both peer and teacher preferred behaviour. However, there was no attempt made to quantify this change, either descriptively or inferentially. This change was maintained at follow-up for one child, but not the other.

During baseline child 1 played with on average 4 toys per session, while child 2 played with 3 toys per session. Variation across baseline for both children was seven. At post-test the number played per session remained the same but the range increased to 15 for child 2 and 20 for child 1.

#### CONCLUSIONS AND WOE

It was concluded by the authors that the PRT intervention is an effective means of producing positive changes in the social behaviour of autism. The evidence weighting for this study was low.

#### *Sigafoos and Meikle (1996)*

##### SPEECH AND LANGUAGE OUTCOMES

Functional communication training was found to be efficient in replacing challenging behaviour and increasing correct requests (functional communication). Request for tangible objects were found to be more reinforcing than requests for an individual's attention. Functional requests for tangible objects were maintained 100% at follow-up, with no instances of challenging behaviour. However, functional requests for attention began to decline at follow up.

##### BEHAVIOUR OUTCOMES

In three of the four cases the initial intervention phase (1 second delay) was effective in pre-empting the display of challenging behaviour. At the 3 second delay, challenging behaviour remained infrequent. Results at follow-up showed no instances of challenging behaviour.

#### CONCLUSIONS AND WOE

Authors conclude that, while these results are limited in generalisation, they imply that it is possible for fairly sophisticated behavioural techniques to be applied in a classroom setting by the teacher with some success with children with restricted abilities. The evidence weighting for this study was low.

**Thorp et al. (1995)**

## SPEECH AND LANGUAGE OUTCOMES

This variation of PRT (socio-dramatic play training) was found to be effective at improving language skills in three children with autism. All the children increased their spontaneous speech after training, a change that generalised to new settings and people. This effect was maintained during follow up. For the two children who used inappropriate language at baseline both showed decreases after training which were maintained at follow-up

## BEHAVIOUR OUTCOMES

Socio-dramatic play training improved outcomes in play behaviour and social behaviour for autistic children. Role-playing (real/fictitious character - fireman/superhero) increased for all three children and generalised across settings. However, generalisation was not maintained at follow up for two of the children. Persistence (of a play theme) increased after training and generalised across settings. However, generalisation decreased slightly during follow up for two of the children. Make-believe transformations (i.e. use a building block as a telephone) increased for all three children, although again this tended to decrease at follow up. An increase in imaginary play at home was reported by the parents of all three children. Although two of the children still preferred parallel play in the classroom, they would participate in socio-dramatic play at home if encouraged. The percentage of time engaged in positive social behaviour increased for all three children. Negative responses decreased dramatically after training and were non-existent at follow-up. There were mixed results regarding the effect on the intervention initiations. One child's initiations increased slightly after intervention and this was maintained at follow-up. The second child initiated at high rates post training and this was maintained at follow-up. The third child did not initiate during post-training but did initiate a few times during follow-up assessments.

## CONCLUSIONS AND WOE

Authors conclude that results suggest that socio-dramatic play training may be an effective treatment package for increasing play, language and social skills in children with autism with the appropriate developmental prerequisites. Generalisation of these skills to novel situations indicate that play training may be an efficient way to improve multiple behaviours across a variety of settings. This form of intervention may be a simple and unobtrusive way to bring about dramatic behaviour changes in children with autism. The evidence weighting for this study was low.

**Zercher et al. (2001)**

## SPEECH AND LANGUAGE OUTCOMES

Peer-supported play interventions were effective in improving language in autistic twin brothers. The number of verbal utterances increased for both children. For the first child utterances increased from 13 to 23 and from 3 to 15 for the second child.

## BEHAVIOUR OUTCOMES

Peer-supported play interventions improved joint attention behaviours, symbolic play behaviours and initiation behaviours in autistic children. Instances of joint attention increased from 4.8 (baseline average) to 21 (intervention average) in the first intervention session for one of the children. For the second child joint attention behaviours also increased dramatically and rapidly from 3.7 (baseline average) to 18.6 (intervention average). The effect of the intervention on symbolic play was more varied in comparison to that of joint attention. The number of symbolic play acts increased from a baseline average of 1.8 to an intervention average of 14 acts per session one child and from 2.6 (baseline average) to 8.8 (intervention average) acts for the other child. The intervention was effective in increasing initiation behaviour for one of the children. Attention directing behaviours increased from 2.25 at baseline to 4.37 at intervention for one child, while they remained at 2.3 across conditions for the other.

## CONCLUSIONS AND WOE

Authors concluded that this type of intervention can be adapted for non-school settings. Typically developing peers can be trained to guide an autistic child at this level, without direct guidance from an adult. Intervention is capable of producing high levels of peer interaction consisting of shared attention, talk and pretend play. However, the intervention was less successful in improving joint attention. The evidence weighting for this study was low.

*Summary of didactic interventions*

Eleven of the studies included in the in-depth review were classified as didactic interventions. These comprised of the PECS training (1), peer intervention (2), pivotal response training (2), socio-dramatic play training (1), functional communication training (2), time delay (1), choice with language intervention (1) and peer group entry training (1). Nine of the 11 studies measured outcomes in speech/language and 10 of the studies measured behaviour outcomes. Generally speaking the studies in this group positively impacted upon the speech, language and behaviour of children with autism.

In terms of speech and language, PECS training was found to be effective in improving spontaneous speech, imitative speech and expressive language as measured by the mean length of utterance in autistic children. Peer interventions (2) effectively taught functional communication to autistic children; there were also improvements to language as measured in terms of the number of verbal utterances. Functional communication interventions increased the number of correct responses in autistic children. Constant time delay improved social responses and reduced echolalic speech in autistic children. Social dramatic play training and introducing choice with language intervention employed variations of pivotal response training. These variants of pivotal response training improved spontaneous speech and expressive language in autistic children, while reducing inappropriate language. Peer-implemented pivotal response training improved expressive language as measured by word use and sentence length.

With regards to behavioural outcome, PECS training improved social communicative behaviour and reduced problem behaviour in autistic children. Peer interventions improved peer acceptance, joint attention, symbolic play and social interactions in terms of duration and frequency. For autistic children, functional communication improved the occurrences of functional behaviours and was effective in reducing challenging and pre-linguistic behaviours. The peer group entry intervention successfully taught high-risk behaviours as a means of accessing peer group play. This approach also increased co-operative play in autistic children. The two variations of pivotal response training mentioned above improved social behaviour, play behaviour and reduced problem behaviour. Peer-implemented pivotal response training improved initiative and maintenance behaviours in social interactions. They also improved peer/teacher preferred behaviour.

### *Cooper et al. (Unpublished)*

#### SPEECH AND LANGUAGE OUTCOMES

There were improvements in language measures pre and post intervention. Classroom A increased correct receptive responses from 71.4% to 90% pre- and post-test measures. For classroom B this improved from 55.6% to 100% and for classroom C this was 57.1% to 97.4%. Correct expressive responses improved from 70.2% to 86.7% for classroom A, from 16.7% to 97.2% for classroom B and from 70.2% to 96.2% for classroom C.

#### BEHAVIOUR OUTCOMES

The intervention improved social skills in kindergarten aged children. The improvements were reported for all three classrooms in the

following areas: listens to others, shares with other, completes their job and talks appropriately. For classroom A social skills improved in all four areas; pre-test observations showed an 'often' rating 49.7% of the time increasing to 83.7% at post-test observations. For classroom B this increased from 68.4% to 95.3% and for classroom C this improved 95.3% to 100%.

#### CONCLUSIONS AND WOE

Authors conclude that the intervention strategies positively impacted upon all three classrooms. This was evident in student's desire for co-operatively working, and co-operative behaviour during activities that were not co-operatively structured. The authors also state that the four elements of the intervention that led to success were the small number of social skills targeted, students were led step by step through the conflict resolution strategies, the co-operative groups that the students worked in and the reflection period that allowed the student's to consider their learning. The evidence weighting for this study was low.

### *Heneker (2005)*

#### SPEECH AND LANGUAGE OUTCOMES

Findings of this study report that a short period of speech and language therapy administered to school age pupils in a pupil referral unit improved language and vocabulary skills for this group. Pupils receiving intervention for understanding and vocabulary use improved from having severe/moderate difficulties to mild/within the normal range. Two pupils receiving language intervention for general grammar, made limited progress on formal assessments. Speech and language therapy records demonstrated that both pupils made progress in learning specific grammatical elements. This skill was not generalised and therefore not evident in formal assessments. Two pupils received intervention for grammar and social skills. Their understanding of language increased by one category, although it is not clear if this is a result of the language component or the social skills element of intervention.

#### BEHAVIOUR OUTCOMES

This short period of speech and language therapy was also found to improve behaviour and social skills. Staff perceptions and speech and language clinical records indicated that those children receiving social skills made progress in seven areas. Progress improved by at least two increments in three of these areas. Specifically, improvements were recorded in listening, sitting, looking skills and focusing on the same thing as other people (joint attention). Participants also improved in their ability to identify basic facial expressions. Examination of emotional and behavioural profiles maintained by staff indicated improvements in conduct, emotional and learning behaviours, although this varied between pupils.

## 4.4.2 Hybrid interventions

**Table 4.3:** Hybrid interventions

Cooper *et al.* (2000)

Enhancing student social skills through the use of co-operative learning and conflict resolution strategies

Study details	Intervention	Outcomes measured (and tools used)	Findings	WoE
<p><b>Design:</b> Pre-test-post-test</p> <p><b>Sample</b></p> <p><b>N:</b> 43</p> <p><b>Age:</b> Kindergarten</p> <p><b>Sex:</b> Not stated</p> <p><b>Diagnosis:</b> Language and behaviour difficulties</p>	Classroom based co-operative learning and conflict resolution and co-ord.	<p><b>Outcomes:</b></p> <p><b>Speech/language:</b> expressive language and receptive language</p> <p><b>Behaviour:</b> social skills</p> <p><b>Assessment:</b> Teacher observation checklist</p> <p>Student survey</p> <p>Sawyers test of awareness of language segments</p> <p>Parent survey</p>	<p><b>Results:</b></p> <p><b>Speech/language:</b> improvements in expressive and receptive language post intervention</p> <p><b>Behaviour:</b> improved social skills</p> <p><b>Conclusions:</b> Intervention was successful - caused improvements in the pupils' behaviour</p>	Low

Heneker (2005)

Speech and language therapy support for pupils with behavioural, emotional and social difficulties (BESD): a pilot project

Study details	Intervention	Outcomes measured (and tools used)	Findings	WoE
<p><b>Design:</b> Pre-test-post-test</p> <p><b>Sample</b></p> <p><b>N:</b> 11</p> <p><b>Age:</b> 5-11 yrs</p> <p><b>Sex:</b> Not stated</p> <p><b>Diagnosis:</b> EBD</p>	Speech and Language Therapy	<p><b>Outcomes:</b></p> <p><b>Speech/Language:</b> language, vocabulary and grammar</p> <p><b>Behaviour:</b> behaviour and social skills</p> <p><b>Assessment:</b> CELF - UK3, Semel, Wiig and Secord (2000)</p> <p>The communication skills rating chart from the Social Use of Language Programme (SULP), Rinaldi (1992)</p> <p>Understanding Ambiguity, Rinaldi (1996)</p> <p>South Tyneside Assessment of Phonology (STAP), Armstrong and Ainley (1988)</p> <p>Inspection of emotional and behavioural profiles</p>	<p><b>Results:</b></p> <p><b>Speech/Language:</b> improvements in language, vocabulary and grammar Behaviour: increases in high-risk behaviours and cooperative play behaviours.</p> <p><b>Behaviour:</b> improvements in behaviour and social skills, also indication of improvements in emotional and learning behaviour</p> <p><b>Conclusions:</b> Overall the authors concluded that the findings of this study provide evidence that speech and language therapy is required in order to diagnose the communication difficulties of pupils with BESD and to provide intervention to reduce the impact of communication difficulties within this group of children.</p>	Low

Hyter *et al.* (2001)

Pragmatic language intervention for children with language and emotional/behavioral disorders

Study details	Intervention	Outcomes measured (and tools used)	Findings	WoE
<p><b>Design:</b> Pre-test-post-test</p> <p><b>Sample</b></p> <p><b>N:</b> 6</p> <p><b>Age:</b> 8.6-12.11</p> <p><b>Sex:</b> 6M</p> <p><b>Diagnosis:</b> EBD</p>	Pragmatic classroom-based intervention	<p><b>Outcomes:</b></p> <p><b>Speech/language:</b> pragmatic language, expressive language and receptive language</p> <p><b>Behaviour:</b> overall behaviour functioning</p> <p><b>Assessment:</b> Test Of Language Development –Intermediate second edition</p> <p>Test of Pragmatic Language</p> <p>Behaviour Evaluation Scale</p> <p>Discourse Skills Checklist: a molar analysis</p> <p>Prutting and Kirchner’s pragmatics protocol</p>	<p><b>Results:</b></p> <p><b>Speech/language:</b> improvements in pragmatic language, expressive language and receptive language</p> <p><b>Behaviour:</b> improved behavioural skills</p> <p><b>Conclusions:</b> The authors argue that the study findings suggest that the classroom based pragmatic language intervention may have positively influenced the ability of all participants to describe objects to a naive listener to provide sequenced directions.</p>	Low

Ivey *et al.* (2004)

The use of social stories to promote independent behaviours in novel events for children with PDD-NOS

Study details	Intervention	Outcomes measured (and tools used)	Findings	WoE
<p><b>Design:</b> Single subject design</p> <p><b>Sample</b></p> <p><b>N:</b> 3</p> <p><b>Age:</b> 7.5, 5.1, 5.8</p> <p><b>Sex:</b> 3M</p> <p><b>Diagnosis:</b> (PDD-NOS)</p>	Social Stories Intervention	<p><b>Outcomes:</b></p> <p><b>Speech/Language:</b> N/A</p> <p><b>Behaviour:</b> participation skills in novel situations.</p> <p><b>Assessment:</b></p> <p>Systematic observations - data on the occurrence or non-occurrence of specific behaviours were collected during all target sessions on a recording checklist.</p> <p>Parents were asked to complete a social validity instrument after the intervention</p>	<p><b>Results:</b></p> <p><b>Speech/Language:</b> N/A</p> <p><b>Behaviour:</b> intervention increased participation skills in unfamiliar situations and novel events.</p> <p><b>Conclusions:</b> The use of social stories with children with ASD is effective for preparation of a novel event. The authors also state that this method of social stories may be generalised to other novel events.</p>	Low

Law, and Sivyver (2003)

Promoting the communication skills of primary school children excluded from school or at risk of exclusion: an intervention study

Study details	Intervention	Outcomes measured (and tools used)	Findings	WoE
<p><b>Design:</b> Controlled trial</p> <p><b>Sample</b></p> <p><b>N:</b> 20</p> <p><b>Age:</b> M 10.8 (9-11 yrs)</p> <p><b>Sex:</b> Not stated</p> <p><b>Diagnosis:</b> EBD</p>	<p>Communicative intervention</p>	<p><b>Outcomes:</b></p> <p><b>Speech/language:</b> language and social communication skills</p> <p><b>Behaviour:</b> overall behaviour functioning</p> <p><b>Assessment:</b> School Age Oral Language Assessment (narrative skills and semantic organisation sub-tests)</p> <p>Social Use of Language Programme: Primary and Preschool Assessment used in video recordings of children in structured activities</p> <p>Strengths and Difficulties Questionnaire</p> <p>Self esteem questionnaire - 'What I Think About Myself'</p>	<p><b>Results:</b></p> <p><b>Speech/language:</b> improvements in language and social communication skills.</p> <p><b>Behaviour:</b> improvements in behaviour and emotional and behavioural status.</p> <p><b>Conclusions:</b> The intervention was successful at improving the language and social communication skills of children with emotional and behavioural problems. The study also provides evidence of the benefits of close collaboration between teachers, learning support assistants and speech and language therapists for the generalisation of skills gained in therapy to the classroom.</p>	<p>Medium</p>

Pasiali (2004)

The use of prescriptive therapeutic songs in a home-based environment to promote social skills acquisition by children with autism: three case studies

Study details	Intervention	Outcomes measured (and tools used)	Findings	WoE
<p><b>Design:</b> Single subject design</p> <p><b>Sample</b></p> <p><b>N:</b> 3</p> <p><b>Age:</b> 7, 9, 8</p> <p><b>Sex:</b> 2M, 1F</p> <p><b>Diagnosis:</b> Autism</p>	<p>Music therapy combined with social stories</p>	<p><b>Outcomes:</b></p> <p><b>Speech/Language:</b> N/A</p> <p><b>Behaviour:</b> problem behaviours</p> <p><b>Assessment:</b> Systematic observations, the point of data collection varied with each child.</p>	<p><b>Results:</b></p> <p><b>Speech/Language:</b> N/A</p> <p><b>Behaviour:</b> : intervention was successful in reducing problem behaviours.</p> <p><b>Conclusions:</b> Some effectiveness - the frequency of the target behaviour for each participant remained at lower levels than it had been prior to the intervention - further research needed</p>	<p>Low</p>

Smith *et al.* (2004)

A scheme to promote social attention and functional language in young children with communication difficulties and autistic spectrum disorder

Study details	Intervention	Outcomes measured (and tools used)	Findings	WoE
<p><b>Design:</b> Mixed experimental design</p> <p><b>Sample</b></p> <p><b>N:</b> 20</p> <p><b>Age:</b> 3-5 yrs</p> <p><b>Sex:</b> Not stated</p> <p><b>Diagnosis:</b> 15 Autism, 5 Language impaired</p>	<p>Social attention and functional language intervention</p>	<p><b>Outcomes:</b></p> <p><b>Speech/language:</b> pragmatic language and expressive language.</p> <p><b>Behaviour:</b> social involvement</p> <p><b>Assessment:</b> Wechsler Preschool and Primary Scales of Intelligence (WPPSI), British Ability Scales II, Scales of Pragmatic Communication, four stages of roles in game formats, five cognitive levels of game</p>	<p><b>Results:</b></p> <p><b>Speech/language:</b> statistically significant improvements in expressive and pragmatic language.</p> <p><b>Behaviour:</b> improvements in social involvement in shared games.</p> <p><b>Conclusions:</b> Intervention was successful at improving language and game participation by utilising children's existing skills</p>	<p>Medium</p>

Stringer (2006)

Intervention to facilitate narrative and social skills in secondary school students with language and behaviour difficulties

Study details	Intervention	Outcomes measured (and tools used)	Findings	WoE
<p><b>Design:</b> Pre-test-post-test</p> <p><b>Sample</b></p> <p><b>N:</b> 12</p> <p><b>Age:</b> M 12.4 (11.8-13.2)</p> <p><b>Sex:</b> 12M</p> <p><b>Diagnosis:</b> LD and EBD</p>	<p>Speech and language therapy</p>	<p><b>Outcomes:</b></p> <p><b>Speech/Language:</b> expressive and receptive language</p> <p><b>Behaviour:</b> overall behaviours and classroom behaviour</p> <p><b>Assessment:</b></p> <p>Raven's Coloured Progressive Matrices</p> <p>Strengths and Difficulties Questionnaire</p> <p>CELF-3 (subtest; concepts and directions, word classes, formulated sentences, listening to paragraphs</p> <p>TOWK (subtests; expressive vocabulary and receptive vocabulary)</p>	<p><b>Results:</b></p> <p><b>Speech/Language:</b> improvements in expressive and receptive language post intervention</p> <p><b>Behaviour:</b> Mixed results for behaviour; improvements in classroom behaviour, however children rated behaviour worse in self reports.</p> <p><b>Conclusions:</b> Adolescents with language difficulties and behaviour difficulties can continue to benefit from appropriately targeted and structured speech and language intervention in a group setting. Significant improvement in expressive and receptive language can be achieved with some seven hours' input.</p>	<p>Low</p>

## CONCLUSIONS AND WOE

The conclusions reached by the author was that the findings of this study provided evidence that speech and language therapy is required in order to diagnose the communication difficulties of pupils with BESD and to provide intervention to reduce the impact of communication difficulties within this group of children. The evidence weighting for this study was low.

### *Hyter et al. (2001)*

#### SPEECH AND LANGUAGE OUTCOMES

The classroom wide pragmatic language intervention improved pragmatic, expressive and receptive language in six boys with a diagnosis of EBD. Statistical significant improvements were observed on the Test of Pragmatic Language (TOPL) and the Test of Language Development: Intermediate, 2nd Edition (TOLD:I-2). Pre-test measures of the TOPL indicated that all the boys in this study were in the below average category. Post-test assessment scores for half of the participants to average and above average for the remainder of the sample. Similarly, pre-test measures on the TOLD:I-2 demonstrated that 50% of the sample's performance was within the poor range and the remaining sample had scores in the below average range. Post-test assessments showed an increase in the average range for all participants. Independent samples t-test indicated improvements in participant's interactive communication with regards to describing objects and giving step-by-step instructions. The ability to describe objects improved from not being able to describe any attributes to describing four. Slight increases in children's ability to negotiate was also observed, children increased their negotiating arguments from two to three, in order to achieve a desired outcome.

#### BEHAVIOUR OUTCOMES

The intervention led to improved behavioural scores on the Behaviour Evaluation Scale-2 in six boys with EBD. However, these improvements did not reach statistical significance.

#### CONCLUSIONS AND WOE

The authors argue that the study findings suggest that the classroom-based pragmatic language intervention may have positively influenced the ability of all participants to describe objects to a naive listener to provide sequenced directions. Furthermore, it is argued that this study provides preliminary evidence of the efficacy of classroom-based intervention for the certain aspects of the pragmatic language skills in children with emotional-behavioural difficulties and language disorders. Reviewers weighted this study as low evidence for this review question.

### *Ivey et al. (2004)*

#### SPEECH AND LANGUAGE OUTCOMES

No outcomes that can clearly be classified as speech or language outcomes as opposed to behaviour outcome were reported in this study.

#### BEHAVIOUR OUTCOMES

The social stories intervention increased participation skills in three boys with a diagnosis of PDD-NOS when presented with unfamiliar situations or novel events. For all three children the social stories intervention increased participation skills in novel situations in the range of 15%-30%. When the intervention was withdrawn all three boys demonstrated a decrease in participation skills ranging from 10%-35%. Reintroduction of the social stories resulted in an increase for all participation skills for all children. Increases in participation skills include increases in attention, making choices, targeted vocabulary and making requests. Requests consisted of asking for directions, asking an adult their food preference, requesting missing pieces to complete a game and asking for instructions for operating equipment.

#### CONCLUSIONS AND WOE

Authors concluded that the use of social stories with children with ASD is effective for preparation of a novel event. However, within the five target behaviours the intervention had the least success with attention. The authors propose that this skill should be addressed directly with focused intervention techniques as opposed to indirectly with social stories. The authors also state that this method of social stories may be generalised to other novel events. The evidence weighting for this study was low.

### *Law and Sivyer (2003)*

#### SPEECH AND LANGUAGE OUTCOMES

Results showed that the intervention positively impacted upon children's language and social communication skills. Improvements in the treatment group were significantly greater than that of the comparison group. Language improved in terms of narrative and semantic skills.

#### BEHAVIOUR OUTCOMES

The communication intervention improved behaviour and self esteem in children excluded or at risk of exclusion from school. The increased scores in self esteem between pre-test and post-test measures were significantly greater for the treatment group than the comparison group. Parents and teachers reported increased improvements in children's emotional and behavioural status. However, analysis of the SDQ did not reach statistical significance.

## CONCLUSIONS AND WOE

The authors concluded that the intervention was successful at improving the language and social communication skills of children with emotional and behavioural problems. The study also provides evidence of the benefits of close collaboration between teachers, learning support assistants and speech and language therapists for the generalisation of skills gained in therapy to the classroom. The evidence weighting for this study was low.

### *Pasiali (2004)*

#### SPEECH AND LANGUAGE OUTCOMES

No outcomes that can clearly be classified as speech or language outcomes as opposed to behaviour outcome were reported in this study.

#### BEHAVIOUR OUTCOMES

Prescriptive therapeutic songs reduced problem behaviours in three children with autism. Specifically aberrant vocalisations at family meal times were reduced on average from 27.07 to 15.08; however this change did not reach statistical significance. In the second case study, problem behaviours were significantly reduced on average from 35.56 to 10.15. For the third participant the intervention reduced problem behaviour from 2.29 to 1.21. However, this improvement was not found to be statistically significant.

#### CONCLUSIONS AND WOE

The author concluded that although there was some evidence for the effectiveness of the intervention (in reality there was a decrease in the frequency of inappropriate behaviours), future research is needed to decipher if the effect is due to the music or the social story embedded in the therapeutic song. The evidence weighting for this study was low.

### *Smith et al. (2004)*

#### SPEECH AND LANGUAGE OUTCOMES

The intervention was effective for young children with an ASD diagnosis in addition to delays in language and communication. There were statistically significant improvements to children's pragmatic and expressive language (mean length of utterance). Children's language improved from no or very few words of expressive language to the use of short sentences.

#### BEHAVIOUR OUTCOMES

The effectiveness of the intervention in terms of the level of social involvement displayed by the child, depended on the combination of role complexity and cognitive game level. Involvement

in shared games at the simplest level of observer present in some participants during baseline, particularly in the less complex games. In contrast participation at the most complicated role level (negotiator) was not achieved at intervention regardless of game complexity. Children's level of social involvement increased from that of brief observers to competent actors. In some cases participants exhibited intention to initiate. Lastly, there was a significant correlation between results of role changes in shared games and language development. Therefore improvements in social involvement appear to be related to improvements in language scores.

#### CONCLUSIONS AND WOE

Authors concluded that the intervention successfully improved game participation and language development. Therefore interventions that utilise the children's existing skills can be used to improve their understanding of language within the social context. Enabling them to apprehend the rules of social exchange and turn taking, which enabled them to cope with play situations at home and in educational settings. The evidence weighting for this study was medium.

### *Stringer (2006)*

#### SPEECH AND LANGUAGE OUTCOMES

Small improvements were reported across all language measure for all of the children with the exception of the expressive vocabulary sub-test from the Test of Word Knowledge. The intervention was significantly effective for receptive and expressive language measures on the Clinical Evaluation of Language Fundamentals (CELF-3). Statistical significant improvements were made on the concepts and directions (receptive) sub-test and the formulated sentences subtest (expressive) of the CELF-3. Two participants performed significantly lower on the listening to paragraphs subtest at post-test than pre-test. Nine of the participants improved scores on this sub-scale between pre- and post-test measure, however this difference did not reach significance.

#### BEHAVIOUR OUTCOMES

Pre and post-test data on teacher and parent ratings of the Strengths and Difficulties Questionnaire (SDQ) could not be evaluated due to poor response rate. However, anecdotal reports from teacher's on children's behaviour indicated an increase in classroom appropriate behaviour. All but one of the boys in this sample completed self report versions of the SDQ with the teacher. Six of the children rated their behaviour as worse overall, however these differences did not reach statistical significance. Furthermore, descriptive analysis failed to show any correlation between self report behaviour scores and the parents and teacher's scores.

## CONCLUSIONS AND WOE

The author concluded that adolescents with language difficulties and behaviour difficulties can continue to benefit from appropriately targeted and structured speech and language intervention in a group setting. Significant improvements in expressive and receptive language can be achieved with some seven hours' input. The evidence weighting for this study was low.

### *Summary of hybrid interventions*

There were eight hybrid interventions included in the in-depth review: these consisted of social stories (2), a classroom wide intervention (1) and speech and language interventions (5). Within this group 6 studies measured outcomes in speech/ language and 10 studies measured behavioural outcomes. In contrast to the didactic interventions, which reported on intervention for autistic children. The studies in this group reported on interventions implemented with children with a range of difficulties including language difficulties, emotional and behavioural difficulties and a diagnosis on the autistic spectrum disorder.

Specifically pragmatic language intervention was effective in improving expressive and pragmatic language in children with autism, children with communication difficulties and children with language difficulties and emotional/behavioural problems. The expressive and receptive language of children with language and behavioural difficulties improved following speech and language therapy intervention. Language and vocabulary of children with emotional/behavioural problems improved with speech and language therapy intervention. Language intervention was effective in improving narrative and semantic language skills of children with behavioural difficulties. A co-operative skills co-ord implemented classroom wide was effective for improving expressive and receptive language in children with language and behaviour difficulties.

The social stories intervention improved participatory behaviour in children with a diagnosis of PDD-NOS. The prescriptive therapeutic songs (variant of social stories) was effective in reducing disruptive behaviour in autistic children. Pragmatic language intervention resulted in improved levels of social involvement in two groups of children; those with a diagnosis of autism and children with communication difficulties. Behavioural improvements were also reported in children with language difficulties and EBD with this type of intervention. Speech and language therapy improved the classroom behaviour of children with language and behavioural difficulties. Speech and language therapy was also reported to be effective in improving behaviour and teaching social skills to children identified with emotional and behavioural difficulties. Language intervention was also effective for improving the behaviour and self

esteem of children with behavioural difficulties. A classroom wide intervention successfully taught social skills to children with language and behaviour difficulties.

### ***Chez et al. (2003)***

#### SPEECH AND LANGUAGE OUTCOMES

Rivastigmine had a statistical significant effect on expressive language outcome. After 12 weeks of the medication there were significant improvements in the Expressive One-Word Picture Vocabulary Test - Revised (EPVT). However, improvements on measures on the Receptive One-Word Picture Vocabulary Test (RPVT) did not reach statistical significance.

#### BEHAVIOUR OUTCOMES

Rivastigmine was found to be significantly effective in improving behavioural outcomes in children with autism, such as oppositional, hyperactive and inattentive behaviours after 12 weeks. There were statistically significant improvements identified on the Childhood Autism Rating Scale and the Connors Parent Rating Scale.

## CONCLUSIONS AND WOE

Authors concluded that this drug has potential to improve outcomes in expressive language and autistic behaviours in children with autism spectrum disorder. The evidence weighting for this study was low.

### ***McDougle et al. (2005)***

#### SPEECH AND LANGUAGE OUTCOMES

This study did not find Risperidone to be effective in improving language outcome in children with autism. There was no significant improvement on measures of language on the Ritvo-Freeman Real Life Rating Scale.

#### BEHAVIOUR OUTCOMES

Risperidone was also found to be an effective pharmacological intervention for improving behavioural outcome in children with autism. Risperidone significantly decreased the overall score on Ritvo-Freeman and subscales for sensory motor behaviours, affectual reactions and sensory responses. For the Yale Brown, there was a significant interaction between study group and time during the 8 week RCT. This did not change during the 16 week continuation. For the Vineland Maladaptive Behaviour Scale there was a significant effect of treatment group and time for both parts 1 and 2. There was no significant change in scores over the 16 week continuation phase. There was no significant improvement on measures of social relatedness on the Ritvo-Freeman scale.

**4.4.2 Pharmacological interventions**  
**Table 4.4:** Pharmacological interventions

Chez *et al.* (2003)

Treating autistic spectrum disorders in children: utility of the cholinesterase inhibitor rivastigmine tartrate

Study details	Intervention	Outcomes measured (and tools used)	Findings	WoE
<p><b>Design:</b> Open Label Trial (Pre-test-post-test)</p> <p><b>Sample</b></p> <p><b>N:</b> 32</p> <p><b>Age:</b> M = 6.91 (2.85 - 12.0)</p> <p><b>Sex:</b> 24M, 8F</p> <p><b>Diagnosis:</b> 11 ASD, 21 PDD-NOS (13 previously diagnosed with epilepsy)</p>	<p>Rivastigmine administered twice daily over a 12 week period.</p>	<p><b>Outcomes:</b></p> <p><b>Speech/language:</b> expressive and receptive language</p> <p><b>Behaviour:</b> autistic behaviours</p> <p><b>Assessment:</b> Expressive One-Word Picture Vocabulary Test - Revised (EPVT)</p> <p>Receptive One-Word Picture Vocabulary Test (RPVT)</p> <p>The childhood autism rating scale</p> <p>Conners' Parent Rating Scale</p>	<p><b>Results:</b></p> <p><b>Speech/language:</b> statistical significant improvements in expressive language but not receptive language</p> <p><b>Behaviour:</b> statistical significant improvements in autistic behaviours</p> <p><b>Conclusions:</b> Rivastigmine Tartrate may have positive pharmacological effects in reducing autistic behaviours and increasing language.</p>	<p>Low</p>

McDougle *et al.* (2005)

Risperidone for the core symptom domains of autism: results from the study by the autism network of the research units on pediatric psychopharmacology

Study details	Intervention	Outcomes measured (and tools used)	Findings	WoE
<p><b>Design:</b> 16 week open label follow up to RCT</p> <p><b>Sample</b></p> <p><b>N:</b> 63</p> <p><b>Age:</b> M = 8.8 (5-17)</p> <p><b>Sex:</b> Not stated</p> <p><b>Diagnosis:</b> Autism</p>	<p>Risperidone at a mean dosage of 1.8mg/day was administered over a 16 wk continuation period of an 8wk RCT</p>	<p><b>Outcomes:</b></p> <p><b>Speech/Language:</b> language</p> <p><b>Behaviour:</b> behaviour and social relatedness.</p> <p><b>Assessment:</b> Ritvo-Freeman Real Life Rating Scale</p> <p>Children's Yale Brown Obsessive Compulsive Scale</p> <p>Maladaptive Behaviour Domain of Vineland Adaptive Behaviour Scales</p>	<p><b>Results:</b></p> <p><b>Speech/Language:</b> no improvements in language post intervention</p> <p><b>Behaviour:</b> statistical significant improvements in behaviour but not social relatedness.</p> <p><b>Conclusions:</b> Risperidone is more efficacious than placebo for improving autistic behaviour. However, the medication was not found to be significantly better for improving social relatedness and language.</p>	<p>Medium</p>

## CONCLUSIONS AND WOE

Authors concluded that Risperidone was more efficacious than placebo for improving maladaptive and repetitive behaviour but not for social relatedness and language. As the study measured clearly differentiated outcomes the evidence weighting for this study was medium.

### *Summary of pharmacological interventions*

Two of the studies included in this review were grouped under the heading of pharmacological interventions. These consisted of an evaluation of risperidone and rivastigmine in the management of communication and behavioural difficulties of children with a diagnosis of autistic spectrum disorder.

Rivastigmine significantly improved expressive language of children with a diagnosis on the autistic spectrum. There were also improvements in receptive language for this group, however these improvements did not reach statistical significance. Risperidone was not found to be effective in improving language in autistic children.

In terms of behavioural outcome both pharmacological interventions reported positive effects for autistic spectrum disorder children. Specifically Rivastigmine significantly improved oppositional, hyperactive and inattentive behaviours in this group of children. Risperidone significantly improved sensory motor behaviours, affectual reactions and sensory responses and maladaptive behaviours in autistic children. However, there was no significant improvement in measures of social relatedness.

## **4.5 In-depth review: quality assurance results**

Data extraction was undertaken by eight reviewers working in four pairs. All 21 studies in the in-depth review were double data extracted by each pair. Reviewers data extracted independently then discussed disagreements either face to face or via email. As part of the quality assurance process the EPPI-Centre link person data extracted a small sample of papers. Data extractions of these in-depth review papers were compared against those of review team members. Any discrepancies between the EPPI link person and review members were resolved by discussion.

## **4.6 Summary of results of synthesis**

Twenty-one evaluations, the majority of which were judged to be low on weight of evidence D for this review (n=20) described a range of interventions. These included: (1) drug therapy (2), Picture Exchange Communication System (PECS) training (1), pivotal response training (2), peer interventions (4), behavioural interventions (2)

functional communication training (2), classroom wide intervention (1) and social stories (2) speech and language interventions (5). As mentioned previously in this report, in-depth review studies have been organised under the following headings: didactic, hybrid and pharmacological. In summary, there were 2 pharmacological interventions, both measuring outcomes in speech/language and behaviour. There were 11 didactic interventions (9 measuring speech/language outcomes and 10 measuring behaviour outcomes) and 8 hybrid interventions (6 measuring outcomes in speech/language outcomes and 8 measuring behaviour outcomes) were included in the in-depth review. For details of speech/language and behaviour outcomes measured by each intervention included in the in-depth review, see Appendix 4.7.1.

Didactic interventions have beneficial impact on speech, language and behaviour in children with autism. Specifically, one study found the PECS training to be successful in improving, spontaneous speech, imitative speech and expressive language as measured by mean length of utterance in autistic children. Improvements in social communicative behaviour and a reduction in problem behaviour were also reported. Two studies reported peer interventions to be effective for autistic children in teaching functional communication and improving language (increased number of verbal utterances. This type of intervention also improved social interactions (duration and frequency), peer acceptance, joint attention, symbolic play. The two functional communication interventions increased correct requesting, improved functional behaviours and reduced challenging and pre-linguistic behaviours in children with autism. The behavioural technique of constant time delay improved social responses and reduced echolalic speech in autistic children. Intervention to teach peer group entry was effective in teaching high-risk peer group entry behaviours and increasing co-operative play in children with autism. The two variations of Pivotal Response Training (PRT) used with the autistic children improved spontaneous speech and expressive language, while reducing inappropriate language. In terms of behavioural outcomes, these studies reported improvements in social behaviour, play behaviour and a reduction in disruptive behaviour. Peer implemented PRT was found to improve expressive language (word use and sentence length), social interactions (initiations and maintenance) and peer/teacher preferred behaviour in autistic children. These findings were reported by two studies evaluating this type of intervention.

The didactic techniques such as pivotal response training, peer intervention, functional communication etc. focused only on autistic children. The majority of interventions (8) reported positive effects for both speech/language and behaviour outcomes. An interesting finding within this group of studies is that children described

as normally developing have been successfully instructed to teach social communicative skills and social interactive behaviours to children with autism. This approach also promoted acceptable behaviours as perceived by peers and teachers.

Within the studies grouped as hybrid approaches to intervention, the social stories intervention improved participatory behaviour in children with a diagnosis of PDD-NOS. The prescriptive therapeutic songs intervention, which is a variation of social stories, was effective in reducing disruptive behaviour in autistic children. Pragmatic language intervention was effective in improving expressive, pragmatic and receptive language in children with communication difficulties, autism and children with language difficulties and EBD. This type of intervention reported improvements in social involvement in children with communication difficulties and autistic children, while behavioural improvements were reported in children with language difficulties and EBD. Speech and language therapy improved classroom behaviour, expressive and receptive language in children with language and behavioural difficulties. Speech and language therapy also improved language, vocabulary, behaviour and social skills in children with EBD. Language intervention was effective for narrative and semantic language skills, behaviour and self esteem in children with behavioural difficulties. Lastly a classroom wide co-operative skills co-ord improved expressive language, receptive language and social skills in kindergarten children with language and behaviour difficulties.

In contrast to the didactic interventions, hybrid interventions were administered to children with a range of difficulties; these include children with a diagnosis on the autism spectrum disorder, children described as having communication difficulties, children with language difficulties, children with emotional/behavioural difficulties and children with both language difficulties and emotional/behavioural difficulties. Similar to the didactic interventions the majority of hybrid interventions (6) reported positive effects for both speech/language and behavioural outcomes. In one example language intervention was not only effective for speech/language and behaviour but also improved self esteem in children with behavioural difficulties. Within this group there is one example that illustrates the positive effects of classroom wide implemented intervention on language, social skills and behaviour.

The pharmacological interventions had benefits to both language and behaviour. However, only improvements in expressive language and autistic behaviour reached statistical significance. Furthermore, there was no significant improvement in measures of social relatedness.

Similar to the didactic interventions, the pharmacological interventions focused mainly on children with a diagnosis of autism spectrum disorder. Both types of intervention in this group reported outcomes in both speech/language and behaviour. While this type of intervention was found to be effective for behaviour and expressive language. The fact that there were no statistical significant improvements in receptive language and social relatedness, suggests that isolated use of pharmacological intervention without some aspect of therapeutic intervention is unlikely to be effective for teaching the social aspects of communication to children with autism.

To summarise: there were 21 studies included in the in-depth review; 11 didactic interventions, 8 hybrid interventions and 2 pharmacological. All the didactic interventions were weighted as low evidence in the synthesis. Of the 8 hybrid interventions 6 were weighted by reviewers as low evidence and 2 were weighted as medium evidence in this review. One of the pharmacological interventions was weighted as low evidence while the other was weighted as medium evidence. For details of the weighting of each study included in the in-depth review, see Appendix 4.7.2.

---

## CHAPTER FIVE

# Implications

### 5.1 Strengths and limitations of this systematic review

The key strength of this review is the extensive systematic search strategy. Broad terms were incorporated into the initial electronic search strategies, to ensure that association studies were included at the mapping stage. This was then supplemented by a more specific electronic search strategy to include any communication and EBD evaluations that may have been overlooked at the initial mapping stage. A second feature of this review is that the systematic map included a broad range of both association and evaluation studies in the field of communication and EBD.

There are two limitations to the review. There were a relatively small number of studies including both speech, language and communication outcomes on the one hand and emotional and behavioural outcomes on the other. The low methodological quality of many of the studies makes it difficult to extrapolate the findings to the wider population of children with such difficulties

### 5.2 Implications

#### 5.2.1 Policy

The needs of children with both SLCD and EBD are high up the political agenda at present, albeit for different reasons. There is a public narrative about the difficulty of managing the behaviour of young children in the public sphere and there has been much discussion about the values of the Anti-Social Behaviour Order (ASBO) and more recently the 'baby ASBO' or BASBO. Of particular significance has been the concern expressed by the children's commissioner in England about the dangers of labelling children as being worthy of concern when they have developmental difficulties of one sort or another. Effectively this represents a tension between different strands of debate which have yet to be reconciled. This review adds support to

the general discussion of whether children should be picked out as EBD if they are neither able to understand what is said to them nor express their needs effectively. Children with SLCD are also of concern, as witnessed by the conservative MP John Bercow taking up an advisory post on the Labour government's review of support for children with speech, language and communication special needs. The report of the "Bercow review", as it came to be known, was published in 2008 (<http://www.dcsf.gov.uk/slcnaaction/bercow-review.shtml>). The report highlights, amongst other factors, the relationship between SLCD and mental health and the need for more intervention studies. Indeed it is likely to be the main driver for the development of services for children with SLCD for the foreseeable future.

At a practical level the planning of services for SLCD and EBD should be considered jointly, across professions and service providers. There is a good case for more extensive involvement of speech and language therapists in child and adolescent mental health teams across the UK. Similarly it is appropriate for all children presenting with delayed speech and language development to have access to support for their behaviour as appropriate. It is also necessary to implement a dissemination strategy that informs individuals such as teaching assistants and support workers who work directly with children who have difficulties in communication and behaviour of their overlapping needs.

#### 5.2.2 Practice

Central to the above discussion is the need for different professional groups with whom both SLCD and EBD children come into contact to be aware of the need to consider the child as a whole rather than from within relatively narrow professional perspectives. Future efforts should involve more collaboration across disciplines and professional groups in both clinical practice and academic research. Moreover, speech, language and behaviour should be considered jointly by professionals in assessment and research based practice.

Key to the success of many of the interventions reported in the present review is the context in which they were delivered and, particularly with younger children, the role that parents play in supporting and reinforcing the relevant messages. For example, in one of the included papers effective implementation of this intervention was reliant to an extent on the parents reading the social stories to the children outside the therapy time (Ivey *et al.* 2004).

The review has found that some speech and language interventions do have a positive effect on behaviour, although we cannot say which is 'more' effective, or what is differentially more effective for different problems. Therefore, the review does not provide the type of evidence that would lead directly to the redevelopment of services. However, it does point in a direction which has considerable implications for those developing, managing and delivering services to children identified with either or both SLCD and EBD in the future. It flags up a need for practitioners and policy makers to be aware of the needs of these children and highlights how far they can act as a test of both interdisciplinary working and evidence-based practice.

### 5.2.3 Research

There are a number of potential research studies arising out of this review.

Although, as demonstrated in our systematic map, there are now a number of studies examining the association between SLCD and EBD there is still a relative paucity of research in what this overlap means in terms of intervention. For example, although it might be attractive to extrapolate from the findings of this review to suggest that interventions developing communication skills would necessarily have an impact on a child's behaviour, such a conclusion would currently be premature. Nevertheless intervention in this area could make a really significant contribution to the well being of these children.

The first step in this process is the definition of the interventions. A number of different interventions are included in this review and there are many others, often in the form of manuals or guidance which have proponents but for which there is no intervention evidence. One of the best developed interventions for children with anxiety, autism and Asperger syndrome is Cognitive Behavioural Therapy (CBT) (Graham 2005) but we were unable to find a single study which included an analysis of the communication skills of those included in such studies and thus, to meet our inclusion criteria, were forced to exclude the studies in question from the review. Given the high importance of communication skills in the application of cognitive and meta-cognitive interventions this is perhaps surprising, but it does support the assertion that when it comes to intervention the recognition of the association between SLCD and EBD is largely ignored.

This issue is not only of significance for psychological interventions. It is equally valid for those providing speech and language therapy. As indicated above, in the 2003 Cochrane Review of Speech and Language Therapy (Law *et al.* 2003), very few studies reported any data on the child's non-linguistic behaviour, and those that did all addressed the need of pre-school children. Given the level of association between SLCD and EBD this would suggest that behaviour was not an issue for the children concerned. This either implies a level of selection bias in the target populations or children with EBD may have been included in the studies concerned but no account was taken of their behaviour in terms of their communication outcomes. For example, it would be quite reasonable to predict that behaviour would have a moderating effect on the intervention, children who were easier to train being more likely to obtain better results. Language is the medium by which many forms of therapy is delivered. If an individual is unable to understand the messages conveyed in therapy, then it is possible that they will not be able to make the links between language and behaviour in the social context or consider how their communicative behaviour impacts upon others. Similarly, if a child's behaviour adversely affects the delivery of speech and language interventions, this needs to be taken into consideration in the delivery of the programme and the assessment of its outcomes. Unfortunately it is not really possible to comment on this further and this emphasises the importance of better specified research.

As previously stated, many of the interventions labelled as didactic (behavioural only) were used for children with the most severe difficulties, while hybrid interventions were applied more generally to children with less severe and varied difficulties. These approaches encourage the child to reflect on their behaviour and how it relates to others, which involves more advanced skills. Within this latter group of studies there was one example of the positive effects of an intervention implemented in the educational context. Of particular interest is the implementation of pharmacological intervention to treat children with behaviour problems and difficulties in communication. This approach successfully treated behaviour with some benefits to communication. However, the lack of significant improvements in expressive language and social relatedness indicates that isolated use of pharmacological intervention is ineffective for teaching the social aspects of communication without therapeutic intervention.

For the research to develop there needs to be clarity and consistency in the outcomes adopted. For example there is no consistency in the measures used. Finally studies tend to target behaviours that are specific to the children receiving the intervention focusing on what are known as 'body function' and 'activity' rather than 'participation' (World Health Organization 2003). This is probably because such interventions tend to be 'clinical' in nature. From an educational perspective it may well

be that participation in classroom and curricular activities may be more important than objective test performance. Future, research should evaluate interventions in the educational context and measure outcomes for classroom management.

Most of the intervention research currently being conducted in this area is at the pre-theoretical stage (Medical Research Council 2000). Although authors have suggested a number of possible mechanisms (Stevenson 1996) we do not know whether the mechanisms differ according to individual circumstances or whether there is one group of children for example whose underlying problems are primarily emotional in nature and related to anxiety and another group for whom the underlying difficulty is linguistic and who subsequently development behaviour difficulties. With this knowledge, specific interventions could be developed with an underlying theoretical rationale which would have the potential to feed into a robust evidence base.

There is clearly a case for using experimental single-subject designs to explore issues associated with implementation and with theory generation, there is a need for well designed and properly powered group studies. Such designs need to allow for subgroup analysis picking out profiles of children who do and who do not respond to specific interventions. Although there is a case for using case controlled and quasi-experimental designs for exploring such patterns, randomised control studies will be needed to determine whether the intervention is effective.

---

## CHAPTER SIX

# References

### 6.1 Studies included in map and synthesis

\*Studies included in the in-depth review

Baker L, Cantwell DP (1987) Comparison of well, emotionally disordered and behaviourally disordered children with linguistic problems. *Journal of the American Academy of Child and Adolescent Psychiatry* 26 (2): 193-196.

\*Beilinson JS, Olswang LB (2003) Facilitating peer-group entry in kindergartners with impairments in social communication. *Speech, and Hearing Services in Schools* 34 (2): 154-166.

Beitchman JH, Wilson B, Brownlie EB, Walters H, Inglis A, Lancee W (1996) Long-term consistency in speech/language profiles II: behavioural, emotional and social outcomes. *Journal of the American Academy of Child and Adolescent Psychiatry* 35 (6): 815-825.

Benasich AA, Curtiss S, Tallal P (2003) Language, learning and behavioural disturbances in childhood: a longitudinal perspective. *Journal of the American Academy of Child and Adolescent Psychiatry* 32 (3): 585-594.

Bibby P, Eikeseth S, Martin NT, Mudford OC, Reeves D (2001) Progress and outcomes for children with autism receiving parent-managed intensive interventions. *Research in Developmental Disabilities* 22 (6): 425-447.

Botting N, Conti-Ramsden G (1999) Pragmatic language impairment without autism: the children in question. *Autism* 3 (4): 371-396.

Botting N, Conti-Ramsden G (2000) Social and behavioural difficulties in children with language impairment. *Child Language and Teaching Therapy* 16 (2): 105-120.

Brinton B, Fujiki M, McKee L (1998) Negotiation skills of children with specific language impairment. *Journal of Speech, Language and Hearing Research* 41: 927-940.

Brownlie EB, Beitchman JH, Escobar M, Young A, Atkinson L, Johnson C, Wilson B, Douglas L (2004) Early language impairment and young adult delinquent and aggressive behavior. *Journal of Abnormal Child Psychology* 32 (4): 453-467.

Burgess J, Bransby G (1990) An evaluation of the speech and language skills of children with emotional and behavioural problems. *College of Speech Therapy Bulletin* 453: 2-3.

Camarata S, Hughes C, Ruhl K (1988) Mild/moderate behaviorally disordered students: a population at risk for language disorders. *Language, Speech and Hearing Services in Schools* 19: 191-200.

\*Carter CM (2001) Using choice with game play to increase language skills and interactive behaviors in children with autism. *Journal of Positive Behavior Interventions* 3 (3): 131-151.

\*Charlop-Christy MH, Carpenter M, Le L, LeBlanc LA, Kellet K (2002) Using the Picture Exchange Communication System (PECS) with children with autism: assessment of PECS, acquisition, speech, social-communicative behavior and problem behavior. *Journal of Applied Behavior Analysis* 35 (3): 213-231.

\*Chez MG, Aimonovitch M, Buchanan T, Mrazedk S, Tremb RJ (2003) Treating autistic spectrum disorders in children: utility of the cholinesterase inhibitor rivastigmine tartrate. *Journal of Child Neurology* 19 (3): 165-169.

- Cohen NJ, Menna R, Vallance DD, Barwick MA, Im N, Horodezky NB (1998) Language, social cognitive processing and behavioral characteristics of psychiatrically disturbed children with previously identified and unsuspected language impairments. *Journal of Child Psychology and Psychiatry and Allied Disciplines* 39 (6): 853-864.
- Conti-Ramsden G, Botting N (2004) Social difficulties and victimization in children with SLI at 11 years of age. *Journal of Speech, Language and Hearing Research* 47 (1): 145-161.
- \*Cooper J, Smith C, Smith V (Unpublished Manuscript) Enhancing student social skills through the use of cooperative learning and conflict resolution strategies.
- Craig HK, Washington JA (1993) Access behaviors of children with Specific Language Impairment. *Journal of Speech and Hearing Research*, 36 (2): 322-337.
- DeKroon DMA, Kyte CS, Johnson CJ (2002) Partner influences on the social pretend play of children with language impairments. *Language, Speech and Hearing Services in Schools* 33 (4): 253-267.
- Dumas J, Blechman E, Prinz R (1994) Aggressive children and effective communication. *Aggressive Behaviors* 20: 347-358.
- Eikeseth S, Nasset R (2003) Behavioral treatment of children with phonological disorder: the efficacy of vocal imitation and sufficient-response-exemplar training. *Journal of Applied Behavior Analysis* 36 (3): 325-337.
- Fujiki M, Brinton B, Isaacson T, Summers C (2001) Social behaviors of children with language impairment on the playground: a pilot study. *Language, Speech, and Hearing Services in Schools* 32 (2): 101-113.
- Fujiki M, Brinton B, Morgan M, Hart CH (1999) Withdrawn and sociable behavior of children with language impairment. *Language, Speech, and Hearing Services in Schools* 30 (2): 183-195.
- Fujiki M, Spackman MP, Brinton B, Hall A (2004) The relationship of language and emotion regulation skills to reticence in children with specific language impairment. *Journal of Speech, Language, and Hearing Research* 47 (3): 637-646.
- \*Garrison-Harrell L, Kamps D, Kravits T (1997) the effects of peer networks on social-communicative behaviors for students with autism. *Focus on Autism and Other Developmental Disabilities* 12 (4): 241-254.
- Giddan J (1996) Unrecognized language and speech deficits in preadolescent psychiatric inpatients. *American Journal of Orthopsychiatry* 66: 85-92.
- Gilmour J, Hill B, Place M, Skuse DH (2004) Social communication deficits in conduct disorder: a clinical and community survey. *Journal of Child Psychology and Psychiatry and Allied Disciplines* 45 (5): 967-978.
- Hart KI, Fujiki M, Brinton B, Hart CH (2004) the relationship between social behavior and severity of language impairment. *Journal of Speech, Language, and Hearing Research* 47 (3): 647-662.
- \*Heneker S (2005) Speech and language therapy support for pupils with behavioural, emotional and social difficulties (BESD): a pilot project. *British Journal of Special Education* 32 (2): 86-91.
- \*Hyter YD, Rogers-Adkinson DL, Self TL, Simmons BF, Jantz J (2001) Pragmatic language intervention for children with language and emotional/behavioral disorders. *Communication Disorders Quarterly* 23 (1): 4-16.
- \*Ivey ML, Heflin LJ, Alberto P (2004) The Use of social stories to promote independent behaviors in novel events for children with PDD-NOS. *Focus on Autism and Other Developmental Disabilities* 19 (3): 164-176.
- \*Keen D, Sigafos J, Woodyatt G (2001) Replacing prelinguistic behaviors with functional communication. *Journal of Autism and Developmental Disorders* 31 (4): 385-398.
- Landry SH, Loveland KA (1988) Communication behaviors in autism and developmental language delay. *Journal of Child Psychology and Psychiatry and Allied Disciplines* 29 (5): 621-634.
- Law J, Durkin CS, Sargent J, Hanrahan D (1999) Beyond early language unit provision: linguistic, developmental and behavioural outcomes. *Child Language Teaching and Therapy* 15 (2): 93-111.
- \*Law J, Sivyer S (2003) Promoting the communication skills of primary school children excluded from school or at risk of exclusion: an intervention study. *Child Language Teaching and Therapy* 19 (1): 1-25.
- Lindsay G, Dockrell J (2000) The behaviour and self-esteem of children with specific speech and language difficulties. *British Journal of Educational Psychology* 70 (4): 583-601.
- Love AJ, Thompson MG (1988) Language disorders and attention deficit disorders in young children referred to psychiatric services: analysis of prevalence and a conceptual synthesis. *American Journal of Orthopsychiatry* 58: 52-64.
- Luteijn EF, Serra M, Jackson S, Steenhuis MP, Althaus M, Volkmar F, Minderaa R (2000) How unspecified are disorders of children with a pervasive developmental disorder not otherwise specified? A study of social problems in children with PDD-NOS and ADHD. *European Child and Adolescent Psychiatry* 9 (3): 168-179.

Mack AE, Warr-Leeper GA (1992) Language abilities in boys with chronic behavior disorders. *Language, Speech and Hearing Services in Schools* **23** (3): 214-223.

Marton K, Abramoff B, Rosenzweig S (2005) Social cognition and language in children with Specific Language Impairment (SLI). *Journal of Communication Disorders* **38** (2): 143-162.

\*McDougle CJ, Scahill L, Aman MG, McCracken JT, Tierney E, Davies M, Arnold LE, Posey DJ, Martin A, Ghuman JK, Shah B, Chuang SZ, Swiezy NB, Gonzalez NM, Hollway J, Koenig K, McGough JJ, Ritz L, Vitiello B (2005) Risperidone for the core symptom domains of autism: results from the study by the autism network of the research units on pediatric psychopharmacology. *The American Journal of Psychiatry* **162** (6): 1142-1148.

Noterdaeme M, Amorosa H (1999) Evaluation of emotional and behavioral problems in language impaired children using the Child Behavior Checklist. *European Child and Adolescent Psychiatry* **8** (2): 71-77.

\*Nientemp EG, Cole CL (1992) Teaching socially valid social interaction responses to students with severe disabilities in an integrated school setting. *Journal of School Psychology* **30** (4): 343-354.

\*Pasioli V (2004) The use of prescriptive therapeutic songs in a home-based environment to promote social skills acquisition by children with autism: three case studies. *Music Therapy Perspectives* **22** (1): 11-20.

Paul R, Cohen DJ (1984) Outcomes of severe disorders of language acquisition. *Journal of Autism and Developmental Disorders* **14** (4): 405-421.

\*Pierce K, Schreibman L (1995) Increasing complex social behaviors in children with autism: effects of peer-implemented pivotal response training. *Journal of Applied Behavior Analysis* **28** (3): 285-295.

\*Pierce K, Schreibman L (Unpublished) Effects of multiple-peer implemented PRT on the social behavior of children with autism: investigating cross-peer generalization and peer trainer characteristics.

Piel JA (Unpublished) Paradigmatic speech and its relation to childhood behavior.

Redmond SM, Rice ML (1998) The Socioemotional behaviors of children with SLI: social adaption or social deviance? *Journal of Speech Language and Hearing Research* **41** (3): 688-700.

Rinaldi C (2003) Language competence and social behavior of students with emotional or behavioral disorders. *Behavioral Disorders* **29** (1): 34-42.

Ripley K, Yuill N (2005) Patterns of language impairment and behavior in boys excluded from school. *The British Journal of Educational Psychology* **75** (1): 37-50.

Rogers-Adkinson D (1995) Language disorders in students identified as severely behaviourally handicapped. *Dissertation Abstracts International* **56** (Dec): 2120-212A.

Rogers-Adkinson DL (Unpublished) Language disorders in children with emotional disorders.

\*Sigafoos J, Meikle B (1996) Functional communication training for the treatment of multiply determined behavior in two boys with autism. *Behavior Modification* **20** (1): 60-84.

Silva PA, Williams S, McGee R (1987) A longitudinal study of children with developmental language delay at age three: later intelligence, reading and behaviour problems. *Developmental Medicine and Child Neurology* **29** (5): 630-640.

\*Smith C, Goddard S, Fluck MA (2004) Scheme to promote social attention and functional language in young children with communication difficulties and autistic spectrum disorder. *Educational Psychology in Practice* **20** (4): 319-333.

Stevenson J, Richman N, Graham P (1985) Behaviour problems and language abilities at three years and behavioural deviance at eight years. *Journal of Child Psychology and Psychiatry and Allied Disciplines* **26** (2): 215-230.

\*Stringer H (2006) Intervention to facilitate narrative and social skills in secondary school students with language and behaviour difficulties In: Ginsborg J, Clegg J (eds) *Language and social disadvantage*. London: Whurr Publishers.

\*Thorp DM, Stahmer AC, Schreibman L (1995) effects of sociodramatic play training on children with autism. *Journal of Autism and Developmental Disorders* **25** (3): 265-282.

Tomblin JB, Zhang X, Buckwalter P, Catts H (2000) The association of reading disability, behavioral disorders and language impairment among second-grade children. *Journal of Child Psychology and Psychiatry and Allied Disciplines* **41** (4): 473-482.

Trautman R, Giddan K, Jurs T (1990) Language risk factors in emotionally disturbed children within a school and day treatment programs. *Journal of Childhood Communicative Disorders* **13**: 123-133.

Vallance DD, Cummings RL, Humphries T (1998) Mediators of the risk for problem behavior in children with language learning disabilities. *Journal of Learning Disabilities* **31** (2): 160-171.

Wasson CR (2000) Predicting language and behavioural outcomes for high-risk children at eight years of age. *Dissertation Abstracts International Section A: Humanities and Social Sciences* **61** (6-A): 2189.

Willemsen-Swinkels SHN, Buitelaar JK, Weijnen FG, Van Engeland H (1998) Timing of social gaze behavior in children with a pervasive developmental disorder. *Journal of Autism and Developmental Disorders* **28** (3): 199-210.

\*Zercher C, Hunt P, Schuler A, Webster J (2001) Increasing joint attention, play and language through peer supported play. *Early Intervention* **5** (4): 374-398.

## 6.2 Other references used in the text of the technical report

Aram DM, Hall NE (1989) Longitudinal follow-up of children with preschool communication disorders: treatment implications. *School Psychology Review* **18** (4): 487-501.

Armstrong MB, Nettleton SK (2004) Attention deficit hyperactivity disorder and preschool children. *Seminars in Speech and Language* **25** (3): 225-232.

Beitchman JH, Cohen NJ, Konstantareas MM, Tannock R (1996) *Language, learning, and behaviour disorders: developmental, biological, and clinical perspectives*, Cambridge: Cambridge University Press.

Benner GJ, Nelson JR, Epstein MH (2002) Language skills of children with EBD: a literature review. *Journal of Emotional and Behavioural Disorders* **10** (1): 43-56.

Child and Adolescent Mental Health Workforce Group (2005) *Getting the right workforce, getting the workforce right: a strategic review of the child and adolescent mental health workforce*. <http://www.headsupscotland.co.uk/workf1.html> (accessed 21 April 2006).

Clegg J, Hartshorne MA (2004) Speech and language therapy in hyperactivity: A United Kingdom perspective in complex cases. *Seminars in Speech and Language* **25** (3): 263-270.

Clegg, J., Stackhouse, J., Finch, K., Murphy, C., and Nicholls, S. (2009) Language abilities of secondary age pupils at risk of school exclusion: A preliminary report. *Child Language Teaching and Therapy*. **25**, 1: 123-139.

Davis H, Stroud A, Green L (1988) The maternal language environment of children with language delay. *British Journal of Disorders of Communication* **23**: 252-266.

Department for Education and Employment (1994) Code of practice for the identification and assessment of special educational needs (Circular 9/94). London: DfEE.

Donahue M (1983) Learning disabled children as conversational partners. *Topics in Learning Disorders* **4**: 15-27.

Donahue M, Cole D, Hartas D (1994) Links between language and emotional/behavioral disorders. *Education and Treatment of Children*, **17** (3): 244-254.

Enderby P, Emerson J (1996) Speech and language therapy: does it work? *British Journal of Medicine* **312**: 1655-1658.

EPPI-Centre (2002) *Core keywording strategy: data collection for a register of educational research*. Version 0.9.7. London: EPPI-Centre, Social Science Research Unit, Institute of Education, University of London.

Evans J, Harden ATJ, Benefield P (2003) Support for pupils with emotional and behavioural difficulties (EBD) in mainstream primary classrooms: a systematic review of the effectiveness of interventions. In: *Research Evidence in Education Library*. London: EPPI-Centre, Social Science Research Unit, Institute of Education, University of London.

Frith U (1989) *Autism: explaining the enigma*. Oxford: Blackwell.

Gallagher T (1998) Treatment research in speech, language and swallowing: lessons from child language disorders. *Folia Phoniatrica Logopaedica* **50**: 165-182.

Gallagher TM (1999) Interrelationships among children's language, behavior, and emotional problems. *Topics In Language Disorders* **19** (2): 1-15.

Goldstein H, Hockenburger E (1991) Significant progress in child language intervention: an 11 year retrospective. *Research into Developmental Disabilities* **12**: 401-424.

Goldstein, H., Wickstrom, S., Hoyson, M., Jamieson, B., & Odom, S. (1988) Effects of sociodramatic play training on social and communicative interaction. *Education and Treatment of Children*, **11**: 97-117.

Graham P (2005) Jack Tizard lecture: cognitive behaviour therapies for children: passing fashion or here to stay? *Child and Adolescent Mental Health* **10** (2): 57-62.

Gresham FM, Sugai G, Horner RH (2001) Interpreting outcomes of social skills training for students with high-incidence disabilities. *Exceptional Children* **67** (3): 331-344.

Guralnick MJ (1988) Efficacy in early childhood intervention programs. In: Odom, SJ, Karnes, MB (eds) *Early intervention for infants and children with handicaps*. Baltimore: Paul Brooks.

Harden A, Thomas J, Evans J, Scanlon M, Sinclair J (2003) Support for pupils with emotional and behavioural difficulties (EBD) in mainstream primary classrooms: a systematic review of recent research on strategy effectiveness (1999-2002). In: *Research Evidence in Education Library*. London: EPPI-Centre, Social Science Research Unit, Institute of Education, University of London.

Law J, Boyle J, Harris F, Harkness A, Nye C (1998) Screening for speech and language delay: a systematic review of the literature. *Health Technology Assessment* 2: 1-184.

Law J, Garrett Z (2004) The effectiveness of speech and language therapy and its potential role in child and mental health services. *Child and Adolescent Mental Health* 9 (2): 50-55.

Law J, Garrett Z, Nye C (2003) Speech and language therapy intervention for children with primary speech and language delay or disorder. *Cochrane Database of Systematic Reviews* 2003, Issue 3. Art. No.: CD004110. DOI: 10.1002/14651858.CD004110.

Law J, Lindsay G, Peacey N, Gascoigne M, Soloff N, Radford J, Band S (2000). *Provision for children with speech and language needs in England and Wales: facilitating communication between education and health services*. London: DfEE/DoH.

Law J, Lindsay G, Peacey N, Gascoigne M, Soloff N, Radford J, Band S (2001) Facilitating communication between education and health services: the provision for children with speech and language needs. *British Journal of Special Education* 28 (3): 133-138.

Leonard LB (1997) The nature and efficacy of treatment. In: Leonard LB: *Children with specific language impairment*. Cambridge, MA: MIT Press, 1997, pages 193-210.

Mclean LK, Woods Cripe JW (1997) The effectiveness of early intervention for children with communication disorders. In: Guralnick MJ (ed.) *The effectiveness of early intervention*. Baltimore: Paul H. Brookes, pages 349-429.

Medical Research Council (2000) A framework for development and evaluation of RCTs for complex interventions to improve health London: Medical Research Council. <http://www.mrc.ac.uk/Utilities/Documentrecord/index.htm?d=MRC003372> (accessed 2 June 2008).

Nye C, Foster SH, Seaman D (1987) Effectiveness of language intervention with language/learning disabled children. *Journal of Speech and Hearing Research* 52: 348-357.

Quinn MM, Kavale KA, Mathur SR, Rutherford RB Jnr, Forness SR (1999) A meta-analysis of social skill interventions for students with emotional or behavioural disorders. *Journal of Emotional and Behavioural Disorders* 7 (1): 54-64.

Rescorla L, Achenbach TM (2002) Use of the Language Development Survey (LDS) in a national probability sample of children 18 to 35 months old. *Journal of Speech, Language and Hearing Research* 45 (August): 733-743.

Research Units in Paediatric Psychopharmacology (2002) Risperidone in children with autism and conduct disorder. *New England Journal of Medicine* 347 (5): 314-321.

Rutter M, Lord C (1987) Language disorders associated with psychiatric disturbance. In: Yule W, Rutter M (eds) *Language development and disorders*. Oxford: MacKeith Press, pages 206-233.

Scott S (1993) Mental handicap. In: Rutter M, Taylor E, Hersov L (eds) *Child and adolescent psychiatry*, 3rd edition. Oxford: Blackwell.

Stevenson J (1996) Developmental changes in the mechanism linking language disabilities and behaviour disorders. In: Beitchman JH, Cohen NJ, Konstantereeas MM, Tannock R (eds) *Language learning and behavior disorders: developmental, biological and clinical perspectives*. Cambridge: Cambridge University Press, chapter 5.

Tappan MB (1997) Language, culture and moral development: a Vygotskian perspective. *Developmental Review* 17: 78-100.

Thomas J, Brunton J (2006) *EPPI-Reviewer 3.0: analysis and management of data for research synthesis (EPPI-Centre software)*, London: Social Science Research Unit, Institute of Education, University of London.

Toppelberg CO, Shapiro T (2000) Language disorders: a 10-year research update review. *Journal of the American Academy of Child Adolescent Psychiatry*, 39 (2): 143-152.

Vygotsky, L.S. (1986) *Thought and Language*. New York: MIT Press

Winsler A, De Leon JR, Wallace BA, Carlton MP, Willson-Quayle A (2003) Private speech in preschool children: developmental stability and change, across-task consistency, and relations with classroom behaviour. *Journal of Child Language* 30: 583-608.

World Health Organization (2003) *ICD10 international statistical classification of diseases and related health problems*, 10 Revision. Geneva: WHO.

Yoder PJ, McDuffie A (2002) Treatment of primary language disorders in early childhood: evidence of efficacy. In: Accardo P, Rogers B, Capute A (eds) *Disorders of language development*. Baltimore: York Press, pages 151-177.

---

## Appendix 1.1: Authorship of this report

This work is a report of a systematic review conducted by the Nuffield Speech and Language Review Group.

The authors of this report are:

Professor James Law, Queen Margaret University  
Charlene Plunkett, Queen Margaret University

For further information about this review, please contact:

Professor James Law  
Tel: +44 (0)131 474 0000  
Email: jlaw@qmu.ac.uk

For further information about the work of the EPPI-Centre, please contact:

EPPI-Centre  
Social Science Research Unit  
Institute of Education, University of London  
18 Woburn Square  
Tel: +44 (0)20 7612 6397  
Fax: +44 (0)20 7612 6800  
Email: EPPIAdmin@ioe.ac.uk

### **Advisory Group**

Ms Ann Auchterlonie, Director, Afasic Scotland  
Mr Jim Boyle, Reader, Department of Psychology, University of Strathclyde, Scotland  
Dr Judy Clegg, Lecturer, Department of Human Communication Sciences, University of Sheffield, England  
Mr John Coleman, Regional Director, Primary National Strategy, England  
Professor Julie Dockrell, Department of Psychology and Special Needs, Institute of Education, London, England  
Ms Zoe Garrett, Health Technology Analyst, National Institute for Health and Clinical Excellence, London, England

- 54 The interaction between behaviour and speech and language difficulties: does intervention for one affect outcomes in the other?

Dr Michael Morton, Consultant Child and Adolescent Psychiatrist, Department of Child and Family Psychiatry Paediatric Liaison Team, Yorkhill Hospital, Scotland

Ms Lucy Myers, Lecturer, Department of Language and Communication Science, City University, England

Dr Ruth Paradise, Educational Psychologist, Caerphilly Local Education Authority, Wales

Professor Nick Peacey, SENJIT Coordinator, Institute of Education, London, England

Dr Jamie Schwartz, Assistant Professor, Department of Communicative Disorders University of Central Florida, USA

Dr Pamela Snow, Senior Lecturer, School of Psychology, Psychiatry and Psychological Medicine, Monash University, Australia.

Ms Gail Trembl, Educational Advisor, Special Education Needs and Disability, Department for Education Skills

### **Review Group**

Professor James Law, Director of the Centre for Integrated Healthcare Research, Queen Margaret University, Scotland

Mr Jim Boyle, Reader, Department of Psychology, University of Strathclyde, Scotland

Dr Judy Clegg, Lecturer, Department of Human Communication Sciences, University of Sheffield, England

Ms Zoe Garrett, Health Technology Analyst, National Institute for Health and Clinical Excellence, London, England

Ms Lucy Myers, Lecturer, Department of Language and Communication Science, City University, England

Ms Charlene Plunkett, Research Assistant, Centre for Integrated Healthcare Research, Queen Margaret University, Scotland

Dr Ruth Paradise, Educational Psychologist, Caerphilly Local Education Authority, Wales

Dr Pamela Snow, Senior Lecturer, Department of Health and Environment, La Trobe University, Australia

### **Conflicts of interest (if any)**

The principal investigator (Professor James Law) declares his interest as one of the studies authored by him were included in the in-depth review; however the quality weighting of this study was carried out by other members of the core review group.

### **Acknowledgments**

The Nuffield Speech and Language Review Group is developed in collaboration with the Evidence for Policy and Practice Information and Co-ordinating Centre (EPPI-Centre) at the Institute of Education, University of London. Particular thanks go to our EPPI-Centre link person Kelly Dickson and all members of the EPPI-Centre team.

---

## Appendix 2.1: Inclusion and exclusion criteria

### *Inclusion criteria*

Must be a study about the relationship between communication difficulties and behaviour

Population should consist of children, with communicative difficulties and related behavioural problems or children with behavioural problems and related communication difficulties

The mean age group of the children is between the ages of five and twelve years

Must be empirical and one of the following study types:

- I. Exploration of the interaction between behaviour and communication difficulty
- II. Evaluation of a behavioural/social or pharmacological intervention measuring communication outcomes
- III. Evaluation of a speech and language intervention measuring behaviour outcomes
- IV. Qualitative research that may inform the process and effect of specific types of intervention

Published in English language

Published or unpublished but within the public domain after 1984

### *Exclusion criteria*

#### *Topic*

Not a study about the relationship between behaviour and communication difficulties

#### *Population*

Not children with communication difficulties and related behavioural problems or children with behavioural problems and related communication difficulties

English is a foreign or additional language

Children where the mean age group of the children is not between the ages of five and twelve years

- 56 The interaction between behaviour and speech and language difficulties: does intervention for one affect outcomes in the other?

*Study type*

Does not report empirical data

Evaluation of a behavioural/social intervention but does not measure speech/language outcome

Evaluation of a speech/language intervention but does not measure behavioural/social outcomes

*Publication*

Not published in English

Published or unpublished but within the public domain before 1985

---

## Appendix 2.2: Search strategy for electronic databases

### *ERIC (initial search)*

The following thesaurus terms were entered into the ERIC search engines with restrictions to English language.

- #1 language acquisition
- #2 language impairments
- #3 communication disorders
- #4 speech impairments
- #5 delayed speech
- #6 #1 or #2 or #3 or #4 or #5
- #7 behavior disorders
- #8 behavior problems
- #9 affective behavior
- #10 social behavior
- #11 emotional disturbance
- #12 emotional problems
- #13 emotional adjustment
- #14 interpersonal competence
- #15 #7 or #8 or #9 or #10 or #11 or #12 or #13 or #14
- #16 children
- #17 young children
- #18 infants
- #19 kindergarten children
- #20 preschool children
- #21 preadolescents
- #22 adolescents
- #23 #16 or #17 or #18 or #19 or #20 or #21 or #22
- #24 #6 and #15 and #22

- 58 The interaction between behaviour and speech and language difficulties: does intervention for one affect outcomes in the other?

*ERIC (supplementary search)*

The following free text (KW) and thesaurus terms (DE) were searched for in the ERIC search engine and the search was limited to English language.

- #1 language acquisition in DE
- #2 language impairments in DE
- #3 communication disorders in DE
- #4 speech impairments in DE
- #5 delayed speech in DE
- #6 #1 or #2 or #3 or #4 or #5
- #7 behavior disorders in DE
- #8 behavior problems in DE
- #9 affective behaviour in DE
- #10 social behaviour in DE
- #11 emotional disturbance in DE
- #12 emotional problems in DE
- #13 emotional adjustment in DE
- #14 interpersonal competence in DE
- #15 #7 or #8 or #9 or #10 or #11 or #12 or #13 or #14
- #16 children in DE
- #17 young children in DE
- #18 infants in DE
- #19 kindergarten children in DE
- #20 preschool children in DE
- #21 preadolescents in DE
- #22 adolescents in DE
- #23 #16 or #17 or #18 or #19 or #20 or #21 or #22
- #24 intervention in DE
- #25 early intervention in DE
- #26 behavior modification in DE
- #27 educational therapy in DE
- #28 speech therapy in DE
- #29 school based intervention in KW
- #30 classroom based intervention in KW
- #31 curriculum based intervention in KW
- #32 #24 or #25 or #26 or #27 or #28 or #29 or #30 or #31
- #33 autism in DE
- #34 #6 and #15 and #23 and #32 and #33

*Medline (initial search)*

The following thesaurus terms were entered into the Medline search engine with restrictions to English language.

- #1 language disorders
- #2 language development disorders
- #3 communication disorders
- #4 speech disorders
- #5 language development
- #6 #1 or #2 or #3 or #4 or #5
- #7 behavior
- #8 social behavior
- #9 social adjustment
- #10 affective symptoms
- #11 #7 or #8 or #9 or #10
- #12 child
- #13 child, preschool
- #14 adolescent
- #15 #12 or #13 or #14
- #16 #6 and #11 and #15

*Medline (supplementary search)*

The following thesaurus terms were entered into the Medline search engine with restrictions to English language.

- #1 early intervention
- #2 speech therapy
- #3 language therapy
- #4 behavior therapy
- #5 cognitive therapy
- #6 #1 or #2 or #3 or #4 or #5
- #7 language disorders
- #8 language development
- #9 communication disorders
- #10 speech disorders
- #11 #7 or #8 or #9 or #10
- #12 behavior
- #13 social behavior
- #14 social adjustment
- #15 affective symptoms
- #16 #12 or #13 or #14 or #15
- #18 autistic disorder
- #19 child

60 The interaction between behaviour and speech and language difficulties: does intervention for one affect outcomes in the other?

- #20 child' preschool
- #21 adolescent
- #22 #19 or #20 or #21
- #23 #6 and #11 and #16 and #18 and #22

*Psycinfo (initial search)*

The following thesaurus terms were entered into Psycinfo search engine with restrictions English language.

- #1 language disorders
- #2 language development disorders
- #3 communication disorders
- #4 speech disorders
- #5 language development
- #6 #1 or #2 or #3 or #4 or #5
- #7 behavior
- #8 social behavior
- #9 social adjustment
- #10 affective symptoms
- #11 #7 or #8 or #9 or #10
- #12 child
- #13 child, preschool
- #14 adolescent
- #15 #12 or #13 or #14
- #16 #6 or #11 or #15

*Psycinfo (supplementary search)*

The following free text (KW) and thesaurus terms (DE) were searched for in Psycinfo:

- #1 behavior disorders in DE
- #2 behavior problems in DE
- #3 social behavior in DE
- #4 social adjustment in DE
- #5 social skills in DE
- #6 adaptive behavior in DE
- #7 emotional adjustment in DE
- #8 emotionally disturbed in DE
- #9 #1 or #2 or #3 or #4 or #5 or #6 or #7 or #8
- #10 language delay in DE
- #11 language development in DE
- #12 language disorders in DE
- #13 speech disorders in DE
- #14 early childhood development in DE

- #15 #10 or #11 or #12 or #13 or #14
- #16 autism in DE
- #17 school based intervention in DE
- #18 behavior modification in DE
- #19 behavior therapy in DE
- #20 social skills training in DE
- #21 communication skills training in DE
- #22 speech therapy in DE
- #23 #17 or #18 or #19 or #20 or #21 or #22
- #24 child in KW
- #25 children in KW
- #26 infant\* in KW
- #27 adolescen\* in KW
- #28 #24 or #25 or #26 or #27
- #29 #9 and #15 or #16 and #23 and #28

*Cinahl (initial search)*

The following thesaurus terms were entered into the Cinahl search engine:

- #1 language disorders
- #2 speech delay
- #3 impaired verbal communication
- #4 language development
- #5 language processing
- #6 communication skills
- #7 communicative disorders
- #8 #1 or #2 or #3 or #4 or #5 or #6 or #7
- #9 child behavior
- #10 infant behavior
- #11 adolescent behavior
- #12 disruptive behavior
- #13 social behavior
- #14 social skills
- #15 #9 or #10 or #11 or #12 or #13 or #14
- #16 child
- #17 child, preschool
- #18 infant
- #19 adolescence
- #20 #16 or #17 or #18 or #19
- #21 #8 and #15 or #20

62 The interaction between behaviour and speech and language difficulties: does intervention for one affect outcomes in the other?

*Cinahl (supplementary search)*

The following thesaurus terms were entered into the Cinahl database:

- #1 child behavior
- #2 infant behavior
- #3 adolescent behavior
- #4 disruptive behavior
- #5 social behavior
- #6 social skills
- #7 #1 or #2 or #3 or #4 or #5 or #6
- #8 language disorders
- #9 speech delay
- #10 impaired verbal communication
- #11 language development
- #12 language processing
- #13 communication skills
- #14 communicative disorders
- #15 #8 or #9 or #10 or #11 or #12 or #13 or #14
- #16 autistic disorder
- #17 child
- #18 child, preschool
- #19 infant
- #20 adolescence
- #21 #17 or #18 or #19 or #20
- #22 language therapy
- #23 speech therapy
- #24 communication skills training
- #25 social skills training
- #26 behavior modification
- #27 behavior therapy
- #28 early childhood intervention
- #29 #22 or #23 or #24 or #25 or #26 or #27 or #28
- #30 #7 and #15 or #16 and #21 and #29

*Web of Science (initial search)*

The following terms were entered as free text into the Web of Science search engine:

- #1 language development
- #2 language acquisition
- #3 language delay
- #4 language impair\*
- #5 language disorder\*

- #6 communication skills
- #7 communicative difficult\*
- #8 speech impair\*
- #9 #1 or #2 or #3 or #4 or #5 or #6 or #7 or #8
- #10 behavi\* problems
- #11 behavi\* disturbance
- #12 behavi\* disorder
- #13 social behavi\*
- #14 emotional disturbance
- #15 emotional adjustment
- #16 interpersonal competence
- #17 #10 or #11 or #12 or #13 or #14 or #15 or #16
- #18 child
- #19 adolescent
- #20 #18 or #19
- #21 #9 and #17 and #20

*Web of Science (supplementary search)*

The following free text terms were entered into the Web of Science search engine:

- #1 language development
- #2 language acquisition
- #3 language delay
- #4 language impair\*
- #5 language disorder\*
- #6 communication skills
- #7 communicative difficult\*
- #8 speech impair\*
- #9 #1 or #2 or #3 or #4 or #5 or #6 or #7 or #8
- #10 behavi\* problems
- #11 behavi\* disturbance
- #12 behavi\* disorder
- #13 social behavi\*
- #14 emotional disturbance
- #15 emotional adjustment
- #16 interpersonal competence
- #17 #10 or #11 or #12 or #13 or #14 or #15 or #16
- #18 autism
- #19 autistic disorder
- #20 #18 or #19
- #21 child

64 The interaction between behaviour and speech and language difficulties: does intervention for one affect outcomes in the other?

- #22 adolescent
- #23 #21 or #22
- #24 curriculum based intervention
- #25 school based intervention
- #26 speech therapy
- #27 language therapy
- #28 social skills training
- #29 behavi\* modification
- #30 behavi\* therapy
- #31 cognitive therapy
- #32 #24 or #25 or #26 or #27 or #28 or #29 or #30 or #31
- #33 #9 and #17 or #20 and #23 and #32

*Linguistics and Language Behavior Abstracts (initial search)*

The following free text (KW) and thesaurus terms (DE) were searched for in the LLBA search engine and the search was limited to English language:

- #1 children in DE
- #2 infants in DE
- #3 preschool in DE
- #4 adolescents in DE
- #5 #1 or #2 or #3 or #4
- #6 language development in KW
- #7 language acquisition in KW
- #8 language comprehension in KW
- #9 language delay in KW
- #10 language disorders in KW
- #11 language difficult\* in KW
- #12 delayed speech in KW
- #13 communication skills in KW
- #14 communication disorders in KW
- #15 #6 or #7 or #9 or #10 or #11 or #12 or #13 or #14
- #16 behavi\* problems in KW
- #17 behavi\* disorders in KW
- #18 affective behavi\* in KW
- #19 social behavi\* in KW
- #20 social skills in KW
- #21 social adjustment in KW
- #22 classroom behavi\* in KW
- #23 educational performance in KW
- #24 emotional difficult\* in KW
- #25 emotional disturbance in KW

- #26 emotional adjustment in KW
- #27 peer interactions in KW
- #28 interpersonal competence in KW
- #29 #16 or #17 or #18 or #19 or #20 or #21 or #22 or #23 or #24 or #25 or #26 or #27 or #28
- #30 #5 and #15 and #29

*Linguistics and Language Behavior Abstracts (supplementary search)*

The following free text (KW) and thesaurus terms (DE) were searched for in the LLBA search engine and the search was limited to English language:

- #1 autism in DE
- #2 children in DE
- #3 infants in DE
- #4 preschool in DE
- #5 adolescents in DE
- #6 #2 or #3 or #4 or #5
- #7 language development in KW
- #8 language acquisition in KW
- #9 language comprehension in KW
- #10 language delay in KW
- #11 language disorders in KW
- #12 language difficult\* in KW
- #13 delayed speech in KW
- #14 communication skills in KW
- #15 communication disorders in KW
- #16 #7 or #8 or #9 or #10 or #11 or #12 or #13 or #14 or #15
- #17 behavi\* problems in KW
- #18 behavi\* disorders in KW
- #19 affective behavi\* in KW
- #20 social behavi\* in KW
- #21 social skills in KW
- #22 social adjustment in KW
- #23 classroom behavi\* in KW
- #24 educational performance in KW
- #25 emotional difficult\* in KW
- #26 emotional disturbance in KW
- #27 emotional adjustment in KW
- #28 peer interactions in KW
- #29 interpersonal competence in KW
- #30 #17 or #18 or #19 or #20 or #21 or #22 or #23 or #24 or #25 or #26 or #27 or #28 or #29
- #31 education in DE
- #32 language therapy in DE
- #33 psychotherapy in DE
- #34 speech therapy in DE
- #35 #31 or #32 or #33 or #34

---

## Appendix 2.3: Journals handsearched

British Journal of Educational Psychology

British Journal of Special Education

Child Language and Teaching Therapy

Journal of Child Psychology and Psychiatry

Journal of Speech-Language Pathology

Journal of Speech-Language Pathology and Audiology

## Appendix 2.4 EPPI-Centre keyword sheet, including review-specific keywords

### Section A: Primary focus

- A1. What is the primary focus of the study?
- A.1.1 Speech/Language Population
  - A.1.2 EBD population
  - A.1.3 Autism
  - A.1.4 Representative Population
  - A.1.5 Not Stated/Unclear
  - A.1.6 Other

### Section B: Communicative difficulties

- B.1 Please classify what type of speech difficulties the paper describes?  
*Please use as many keywords as applicable*
- B.1.1 Articulation
  - B.1.2 Fluency
  - B.1.3 Phonology
  - B.1.4 Voice disorder
  - B.1.5 Not applicable
  - B.1.6 Not stated/Unclear
  - B.1.7 Other (Please specify)

- B.2 Please classify what type of language difficulties the paper describes?

*Please use as many keywords as applicable*

- B.2.1 Pragmatic
- B.2.2 Expressive
- B.2.3 Receptive
- B.2.4 Expressive/Receptive
- B.2.5 Semantics
- B.2.6 Literacy
- B.2.7 Syntax
- B.2.8 Auditory verbal memory
- B.2.9 Other (Please Specify)
- B.2.10 Not applicable
- B.2.11 Not Stated/Unclear

### Section C: Behavioural, emotional and social problems

- C.1 Please classify what type of EBD problem the paper describes?
- C.1.1 Internalising
  - C.1.2 Externalising
  - C.1.3 Both

### Section D: Interventions?

- D.1 What type of speech and language intervention does the paper report?  
*Please use as many keywords as applicable*
- D.1.1 Social Skills Training
  - D.1.2 Functional communication
  - D.1.3 Parenting Co-ord
  - D.1.4 Not applicable
  - D.1.5 Not stated/Unclear
  - D.1.6 Other (please specify)

- D.2 What type of behaviour interventions does the paper report?

- D.2.1 cognitive behaviour therapy
- D.2.2 social skills training
- D.2.3 parenting co-ords
- D.2.4 pharmacological
- D.2.5 Functional communication
- D.2.6 not applicable
- D.2.7 other (please state)
- D.2.8 Not stated/Unclear

### Section E: Setting

- E.1 What is/are the treatment setting(s) of the study?

- E.1.1 Clinic
- E.1.2 Mainstream School
- E.1.3 Language Unit
- E.1.4 Home
- E.1.5 Don't know
- E.1.6 Not applicable
- E.1.7 Other (please specify)

- E.2 What is/are the assessment setting(s) of the study?  
(please specify)

- E.2.1 Clinic
- E.2.2 Mainstream school
- E.2.3 Language Unit
- E.2.4 Home
- E.2.5 Don't know
- E.2.6 Not applicable
- E.2.7 Other (please specify)

### Section F: Outcome measures

- F.3 What speech outcomes are reported?

- F.3.1 Articulation
- F.3.2 Voice disorder
- F.3.3 Fluency
- F.3.4 Phonology
- F.3.5 Other (please specify)
- F.3.6 Not stated/Unclear
- F.3.7 Not applicable

- F.4 What language outcomes measures are reported?

- F.4.1 Syntax
- F.4.2 Semantics
- F.4.3 Pragmatic
- F.4.4 Literacy
- F.4.5 Expressive
- F.4.6 Expressive/Receptive
- F.4.7 Not stated/Unclear
- F.4.8 Receptive
- F.4.9 Other (please specify)
- F.4.10 Not applicable

- F.5 What EBD outcomes measures are reported?

- F.5.1 Internalising
- F.5.2 Externalising
- F.5.3 Both
- F.5.4 Not applicable

### Section G: Assessment

- G.1 What mode of assessment does the paper report?

- G.1.1 Standardised tests (please specify)
- G.1.2 Standardised rating scales (please specify)
- G.1.3 Systematic observations (please specify)
- G.1.4 Informal reports (please specify)
- G.1.5 Other (please specify)

- 68 The interaction between behaviour and speech and language difficulties: does intervention for one affect outcomes in the other?

Data extraction form

<b>A. Administrative details</b>	
A.1 Name of reviewer	
A.2 Date of review	
A.3 Title of paper and date of publication	
A.4 Authors	
A.5 Date when the study was carried out	
A.6 If this study has a broad focus and this data extraction focuses, on just one component of the study, please specify this here.	
<b>B Study aim(s), rationale and research questions</b>	
B1 Please describe the study's aims, objectives and underpinning rationale.	
B2 What are the study research questions and/or hypotheses?	
<b>C Intervention</b>	
C1 Please describe in as much detail as possible the type of intervention, with which the study is concerned.	
C2 Please describe in as much detail as possible the different components of the intervention. For example the different activities involved and materials used.	
C2 What domains of communication and/or behaviour does the intervention target?	
C3 What was the intensity and duration under which the intervention was administered over the given timescale?	
C4 Which outcomes and assessment instruments does the study use?	
C5 When were measurements of the variable(s) used for outcome made, in relation to the intervention?	
<b>D Methods - Groups</b>	
D1 If comparisons are made between two or more groups, please specify the basis of any divisions made for making these comparisons.	
D2 How do the groups differ?	
D3 Number of groups	
D4 If prospective allocation into more than one group, what was the unit of allocation?	
D5 If prospective allocation into more than one group, which method was used to generate the sequence of allocation	
D6 Was allocation concealed?	
D7 Study design summary	
<b>E Methods - Sampling strategy</b>	
E1 Are the authors trying to produce findings that are representative of a given population?	
E2 What is the sampling frame (if any) from which the participants are chosen (e.g. school, class, caseload and how are the participants selected from the sampling frame, randomly, purposively, opportunistic etc.)?	
E3 Planned sample size	
<b>F Methods - Actual sample</b>	
F1 Please describe the participants in this group (e.g. children with EBD, or children with expressive language disorder)?	
F2 What was the total number of participants	
F3 What is the proportion of those selected for the study who actually participated...	
F4 What is the socio-economic status of the individual within the actual sample?	
F5 What is the ethnicity of the individuals	
F6 What is known about the special educational needs of the individuals	
F7 Is there other useful information	
F8 How representative was the achieved sample (as recruited at the start of the study) in relation to the aims of the sampling frame?	

F9 If study involves studying samples prospectively over time what proportion of the study dropped out?	
F10 Did the ones who dropped out differ?	
F11 What are the baseline values (socio demographic variables and outcome variables)? Please state if there were any statistically significant differences between baseline values.	
<b>G Methods - Data collection</b>	
G1 Who collected the data G2 Do authors describe any ways they addressed the reliability of their data collection tools (e.g. test - re-test)?  Where more than one tool was employed, please provide details for each)	
G3 Do the authors describe any ways they have addressed the validity of their data collection tools/ methods (e.g. mention previous validation of tools, published version of tools, involvement of target population in development of tools)?  Where more than one tool was employed, please provide details	
G4 Concealment in assessment?	
<b>H Methods - data analysis</b>	
H1 Which statistical methods if any were used?	
H2 What rationale do the authors give for the methods of analysis (e.g. for their methods of sampling, data collection or analysis)?	
H3 Do the authors describe strategies used in analysis to control for confounding variables?	
H4 Any other important features?	
<b>I Results and conclusions</b>	
I1 Please summarise the results	
I2 What are the statistically significant results?	
I3 What are the non-significant results?	
I4 What are the results at 6-month follow up?	
I5 Are there any shortcomings?	
I6 Do the authors report on all the variables	
I7 What do the authors conclude about the study?	
I8 What are the implications of the study findings?	
<b>J Quality of the study - Reporting</b>	
J1 Are the aims of the study clearly reported	
J2 Is there adequate description of the sample used in the study and how the sample was identified and recruited?	
J3 Is there adequate description of the methods ?	
J4 Is there an adequate description of the methods of data analysis?	
J5 Is the study replicable?	
J6 Do the authors avoid selective reporting bias?	
<b>K Quality of the study - Methods and data</b>	
K1 Was the choice of research design appropriate	
K2 Has the reliability and validity of data collection tools, methods and analysis been established ?	
K3 To what extent could the design rule out other sources of error?	
K4 How generalisable are the findings?	
K5 Weight of evidence A: Taking account of all quality assessment issues, can the study findings be trusted in answering the study question(s)?	

---

## Appendix 3: Criteria for the weight of evidence

*Weight of Evidence A: Question M.11 Trustworthiness of the study findings (already answered in the data extraction).*

High trustworthiness = 3

Medium trustworthiness = 2

Low trustworthiness = 1

*Weight of Evidence B: appropriateness of research design and analysis for addressing the question, or sub-questions of this specific systematic review.*

High = 3, e.g. RCT

Medium = 2, e.g. CT

Low = 1, e.g. single subject-experimental design, pre-test/post-test design

*Weight of Evidence C: relevance of particular focus of the study (including conceptual focus, context, sample and measures) for addressing the question or sub-questions of this specific systematic review.*

High = 3, e.g. evaluation of intervention in mainstream classroom context, SLT/EBD sample, mixed gender, standardised assessment instruments, language interventions that can be clearly differentiated from behaviour interventions, outcomes that can be clearly defined as language or behaviour

Medium = 2, e.g. evaluation of intervention in special education context, Autism/learning disabled sample

Low = 1, e.g. evaluation in non-educational context, assessment instruments that have not been previously validated, language interventions that cannot be clearly differentiated from behaviour interventions, language outcomes that cannot be clearly differentiated from behaviour

*Weight of Evidence D: taking into soundness of study methodology, appropriateness of design and relevance of focus.*

$D = A + B + C$

3--5 = Low      6--7 = Medium      8--9 = High

*Details of intervention outcome measures*

Interventions	Outcomes	
	Speech/Language	Behaviour
<b>Didactic</b>	Carter (2001) Charlop-Christy <i>et al.</i> (2002) Garrison-Harrell <i>et al.</i> (1997) Nientemp and Cole (1992) Pierce and Schreibman (1995) Pierce and Schreibman (Unpublished) Sigafoos and Meikle (1996) Thorp <i>et al.</i> (1995) Zercher <i>et al.</i> (2001)	Beilinson and Olswang (2003) Carter (2001) Charlop-Christy <i>et al.</i> (2002) Garrison-Harrell <i>et al.</i> (1997) Keen <i>et al.</i> (2001) Pierce and Schreibman (1995) Pierce and Schreibman (Unpublished) Sigafoos and Meikle (1996) Thorp <i>et al.</i> (1995) Zercher <i>et al.</i> (2001)
<b>Hybrid</b>	Cooper <i>et al.</i> (2000) Heneker (2005) Hyter <i>et al.</i> (2001) Law and Sivyver (2003) Smith <i>et al.</i> (2004) Stringer (In Press)	Cooper <i>et al.</i> (2000) Heneker (2005) Hyter <i>et al.</i> (2001) Ivey <i>et al.</i> (2004) Law and Sivyver (2003) Pasiالي (2004) Smith <i>et al.</i> (2004) Stringer (2006)
<b>Pharmacological</b>	Chez <i>et al.</i> (2003) McDougle <i>et al.</i> (2005)	Chez <i>et al.</i> (2003) McDougle <i>et al.</i> (2005)

The results of this systematic review are available in three formats:

**SUMMARY**

Explains the purpose of the review and the main messages from the research evidence

**TECHNICAL REPORT**

Includes the background, main findings, and full technical details of the review

**DATABASES**

Access to codings describing each research study included in the review

These can be downloaded or accessed at:

<http://eppi.ioe.ac.uk/cms/Default.aspx?tabid=2461&language=en-US>

First produced in 2009 by:

Evidence for Policy and Practice Information and Co-ordinating Centre (EPPI-Centre)  
Social Science Research Unit  
Institute of Education, University of London  
18 Woburn Square  
London WC1H 0NR

Tel: +44 (0)20 7612 6397

<http://eppi.ioe.ac.uk/>

<http://www.ioe.ac.uk/ssru/>

The **Evidence for Policy and Practice Information and Co-ordinating Centre** (EPPI-Centre) is part of the Social Science Research Unit (SSRU), Institute of Education, University of London.

The EPPI-Centre was established in 1993 to address the need for a systematic approach to the organisation and review of evidence-based work on social interventions. The work and publications of the Centre engage health and education policy makers, practitioners and service users in discussions about how researchers can make their work more relevant and how to use research findings.

Founded in 1990, the Social Science Research Unit (SSRU) is based at the Institute of Education, University of London. Our mission is to engage in and otherwise promote rigorous, ethical and participative social research as well as to support evidence-informed public policy and practice across a range of domains including education, health and welfare, guided by a concern for human rights, social justice and the development of human potential.

The views expressed in this work are those of the authors and do not necessarily reflect the views of the funder. All errors and omissions remain those of the authors.

This document is available in a range of accessible formats including large print. Please contact the Institute of Education for assistance:

telephone: +44 (0)20 7947 9556 email: [info@ioe.ac.uk](mailto:info@ioe.ac.uk)