

**Early Social Communication Development:
the effectiveness of small group
intervention for preschool children
with autism spectrum disorder**

**This thesis forms part of the UCL
Doctoral Degree in Clinical Communication Studies**

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Declaration

I, Pam Czerniewska, confirm that the work presented in this thesis is my own. Where information has been derived from other sources, I confirm that this has been indicated in the thesis.

Acknowledgements

I am very grateful for the generosity and support of all those involved in this research project.

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Finally, love and thanks to my family.

For
Alexandra & Christof

In memory of
Peter

Abstract

Children with a diagnosis of autism spectrum disorder have difficulties with social communication and interaction and with regulating their behaviour. These core impairments in sociability affect their experiences as they enter educational settings. Children are now diagnosed with ASD as early as 2-3 years allowing early intervention that targets communication skills and increases opportunities for social interaction.

Early intervention studies focussing on imitation and joint attention have demonstrated positive effects. Most have been in specialist preschools. Surprisingly, given that children need to communicate with peers, few studies have looked at the effectiveness of interventions in small groups. This project evaluates a small group intervention in non-specialist preschools which aims to develop social interaction abilities through structured play routines with peers.

The project uses a single subject multiple-baseline-across-subjects experimental design. Four children with ASD aged 30-40 months were observed during preschool activities. Three other children - one neurotypical, one with ASD, and one with language delay - were observed for comparison. In Study One, the target children joined a specialist social communication group following staff training. The children's social communication pre- and post- intervention was compared in four conditions.

Study Two analysed the interaction strategies used by the preschool staff to determine if the training and intervention affected the ways they supported the target children.

Study Three focussed on the social referencing of the target and comparison children analysing changes in the number of looks towards adults and peers following intervention.

During the intervention there was little evidence of change in the children's social interaction levels across the six sessions. The comparison of social communication skills pre- and post-intervention was difficult to make as the context of the observations varied considerably between sessions. The effect of training on practitioner interactive styles was also difficult to assess as the nominated staff member working with the child varied from session to session.

The study raises questions about the value of interventions over such a short duration – duration that is common practice for Speech and Language Therapists in existing clinical services. The study also highlights the practical difficulties faced when attempting to evaluate the effectiveness of an intervention in the context of the daily routine of a child's regular preschool.

Table of Contents

Title.....	1
Declaration	3
Acknowledgements.....	4
Abstract	8
Chapter 1: Introduction.....	17
The structure of the thesis	17
Definition and diagnosis of autism spectrum disorder.....	18
Autism as a multi-dimensional disorder	19
The autism profile	21
The search for effective interventions	23
Focus of the SCIP studies	25
Chapter 2: Research Designs and Methodological Challenges.....	27
Developing an evidence-base	27
Methodological soundness	28
Sample size; selection, and recruitment.....	28
Control groups.....	30
Data collection	31
Current research designs	32
The single subject experimental designs	34
The randomised-controlled trial (RCT)	37
Quasi-experimental design	38
Longitudinal studies	39
The SCIP Project design.....	39
Chapter 3: Review of the Literature.....	41
Introduction to autism intervention in the early years	41
SCIP Literature Review	42
Behavioural approaches.....	44
Naturalistic behavioural approaches	44
Similarities and differences between approaches.....	48
Evaluation of intervention approaches.....	50
Comprehensive Treatment Models vs Focussed Intervention Practices	53

Evidence of atypical development of social skills in infancy	55
The role of joint attention.....	56
Types of joint attention.....	56
Stages of development in joint attention	58
The relationship between early social abilities and later outcomes	61
Joint attention as a target for intervention in the early years.....	64
Intervention studies for developing joint attention in preschools.....	66
Imitation ability as a target for intervention in the early years.....	73
Interventions for developing Imitation in the early years	74
Functional and symbolic play as a target for intervention in the early years	76
Interventions for developing play in the early years	77
The transactional process	78
Historical context to parent involvement in intervention	78
The effect of parent responsiveness on child outcomes in the early years	81
Summary	94
Children’s experiences in preschools.....	96
Responding to communicative attempts from children with ASD	98
Example from the SCIP data.....	98
Effects of teacher interactive style	101
Summary	103
Rationale for the Social Communication in Preschool (SCIP) Project.....	104
Research questions for Study 1.....	105
Research question for Study 2	105
Research question for Study 3	106
Chapter 4: Social Communication in Preschools (SCIP) Project: Study One.....	107
Introduction	107
Ethics	108
Main Researcher	109
Participants	109
Identification and recruitment of children in the experimental and control group	112
Background information and assessments for the children with ASD	114
Preschool Settings and support for participants	120
Payment and costs	122
Staggered introduction of Intervention	123

Data Collection	124
SCIP group Intervention structure	130
SCIP group setting and materials	134
Dependent Measures in Study 1.....	134
Independent Measure.....	136
Coding	137
Inter-rater reliability.....	137
Social communication behaviours observed visually in the SCIP intervention	158
Tests of significance	159
Evidence of possible effects post-intervention using sign test	160
Initiations of Bids for Interaction	164
Responses to Bids for Interaction	166
Use of Communicative Gestures and Words	168
Looks and Smiles at Others	169
Comparison children	171
Erik.....	171
Hari and Fynn	171
Context and variation – limitations of the study observations	175
Discussion of Initiations of Bids for Interaction	177
Discussion of Responses to Bids for Interaction	178
Discussion of Communicative Gestures/Words.....	178
Discussion of Looks and Smiles at others	179
Areas suggested for further study	181
Chapter 5: The role of the practitioners’ interaction:Study Two	183
Introduction	183
SCIP Early Years Practitioners (EYPs).....	186
Staff Training	186
Coding categories.....	187
Participants, Setting and Materials.....	188
Data collection and coding.....	189
Inter-rater reliability.....	189
Responding to the child	204
Adjusting Communication.....	205

Chapter 6 : The development of social referencing in preschools: Study Three.....	217
Introduction	215
Background research	215
Coding	220
Setting and Materials	220
Inter-rater reliability.....	222
Carl	226
Ben	227
Dino	227
Alex.....	228
Erik.....	228
Comparison children – Fynn and Hari.....	229
Peer-mediated interventions	232
Chapter 7: Conclusions, limitations and future directions	235
References.....	247
Appendix 1: Diagnostic Criteria for Autism Spectrum Disorder (APA, 2013)	280
Appendix 2: Information and Consent Forms.....	282
Appendix 3: SCIP Staff Training.....	294
Appendix 4: Coding Forms	296
Appendix 5: Coding Protocols	298

List of Tables

Table 2.1 Research designs and sample size used in intervention studies	33
Table 2.2 Research designs used in current evidence-based research	34
Table 3.1 Summary of studies comparing comprehensive treatment approaches	51
Table 4.1 Children’s diagnostic category; age at start of study, and age at diagnosis ..	111
Table 4.2 Inclusion criteria for research participants	112
Table 4.3 Background information and assessments used at initial consultations.....	114
Table 4.4 Results from Griffiths Mental Development Scales	116
Table 4.5 Children’s language environment and language levels at start of study	117
Table 4.6 Children’s results following ADOS assessments.....	119
Table 4.7 Summary details of the preschools attended and additional support	121
Table 4.8 Schedule of sessions pre-, during, and post-intervention for 5 participants showing staggered introduction of SCIP training and small group intervention	124
Table 4.9 Conditions, duration and manner of collection of SCOs	125
Table 4.10 Percent agreement between masked raters and main researcher	138
Table 4.11 Initiations of Bids for Interaction: pre-intervention scores** and number of sessions above baseline*** during post-intervention sessions, and at 4 month review session.	162
Table 4.12 Responses to Bids for Interaction: pre-intervention scores** and number of sessions above baseline*** during post-intervention sessions, and at 4 month review session.	162
Table 4.13 Communicative gestures/words: pre-intervention scores** and number of sessions above baseline*** during post-intervention sessions, and at 4 month review session.	163
Table 4.14 Looks/smiles at others: pre-intervention scores** and number of sessions above baseline*** during post-intervention sessions, and at 4 month review session.	163
Table 5.1: Categories for coding each practitioner’s interactions with target children	187
Table 5.2 Total number of direct sessions before and after staff training	189
Table 5.3 Percent agreement between masked rater and main researcher.....	190
Table 5.4 EYPs’ use of transactional strategies: pre-intervention baseline scores and number of sessions above baseline during post-intervention and at 4 month review.	199
Table 5.1 % inter-rater reliability	222

List of Figures

Fig 4.1 Percentage of 15 second intervals where children with ASD initiate bids for interaction in SCIP intervention condition	142
Fig 4.2 Percentage of 15 second intervals where children with ASD respond to bids for interaction in SCIP intervention condition	143
Fig 4.3 Percentage of 15 second intervals where children with ASD use communicative gestures/words in SCIP intervention condition	144
Fig 4.4 Percentage of 15 second intervals where children with ASD Look/smile at others in SCIP intervention condition	145
Fig 4.5 Percentage of 15 second intervals where children with ASD initiate bids for interaction in preschool group and intervention.....	146
Fig 4.6 Percentage of 15 second intervals where child with ASD, neurotypical child, and child with language delay initiate bids for interaction in preschool group condition ...	146
Fig 4.7 Percentage of 15 second intervals where children with ASD initiate bids for interaction in non-direct and SCIP intervention conditions	147
Fig 4.8 Percentage of 15 second intervals where child with ASD, neurotypical child, and child with language delay initiate bids for interaction in non-direct condition.	147
Fig 4.9 Percentage of 15 second intervals where children with ASD initiate bids for interaction in direct and SCIP intervention conditions.....	148
Fig 4.10 Percentage of 15 second intervals where child with ASD, neurotypical child, and child with language delay initiate bids for interaction in direct condition.....	148
Fig 4.11 Percentage of 15 second intervals where children with ASD respond to bids for interaction in preschool group and SCIP intervention conditions.	149
Fig 4.12 Percentage of 15 second intervals where neurotypical child; child with ASD, and child with language delay respond to bids for interaction in preschool group.....	149
Fig 4.13 Percentage of 15 second intervals where children with ASD respond to bids for interaction in non-direct and SCIP intervention conditions	150
Fig 4.14 Percentage of 15 second intervals where neurotypical child; child with ASD, & child with language delay respond to bids for interaction in non-direct condition	150
Fig 4.15 Percentage of 15 second intervals where children with ASD respond to bids for interaction in direct and SCIP intervention conditions.....	151
Fig 4.16 Percentage of 15 second intervals where neurotypical child; child with ASD, and child with language delay respond to bids for interaction in direct condition.....	151
Fig 4.17 Percentage of 15 second intervals where children with ASD use communicative words/gestures in preschool group and SCIP intervention conditions	152
Fig 4.18 Percentage of 15 second intervals where child with ASD, neurotypical child, & child with language delay use communicative gestures/words in preschool group.....	152
Fig 4.19 Percentage of 15 second intervals where children with ASD use communicative gestures/words in non-direct and SCIP intervention conditions.....	153
Fig 4.20 Percentage of 15 second intervals where child with ASD, neurotypical child, and child with language delay use communicative gestures/words in non-direct.	153
Fig.4.21 Percentage of 15 second intervals where children with ASD use communicative gestures/words in direct and SCIP intervention conditions	155
Fig 4.22 Percentage of 15 second intervals where child with ASD, neurotypical child, & child with language delay uses communicative gestures/words in direct condition....	154

Fig 4.23 Percentage of 15 second intervals where children with ASD look/smile at others in preschool group and SCIP intervention conditions	155
Fig 4.24 Percentage of 15 second intervals where neurotypical child; child with ASD, and child with language delay look/smile at others in preschool group condition.	155
Fig 4.25 Percentage of 15 second intervals where children with ASD look/smile at others across in non-direct and SCIP intervention conditions.	156
Fig 4.26 Percentage of 15 second intervals where neurotypical child; child with ASD, and child with language delay look/smile at others in non-direct condition	156
Fig 4.27 Percentage of 15 second intervals where children with ASD look/smile at others in direct and SCIP intervention condition.....	156
Fig 4.28 Percentage of 15 second intervals where child with ASD, neurotypical child, and child with language delay look/smile at others in direct condition	157
Fig 4.29 % of 15 second intervals where control child with ASD initiates bids for interaction in SCIP intervention	174
Fig 4.30 % of 15 second intervals where control child with ASD responds to bids for interaction in SCIP intervention	174
Fig 4.31 % of 15 second intervals where control child with ASD uses words/gestures in SCIP intervention.....	174
Fig 4.32 % of 15 second intervals where control child with ASD looks/smiles at others in SCIP intervention.....	174
Fig 5.1 Percentage of 30 second intervals where EYP used strategy to respond to child before and after SCIP training.....	193
Fig 5.2 Percentage of 30 second intervals where EYP used strategy to respond to child in control and comparison group.....	193
Fig 5.3 Percentage of 30 second intervals where EYP used strategy to adjust communication before and after SCIP training	194
Fig 5.4 Percentage of 30 second intervals where EYP used strategy to adjust communication with control and comparison children	194
Fig 5.5 Percentage of 30 second intervals where EYP used strategy to model communication before and after SCIP training	195
Fig 5.6 Percentage of 30 second intervals where EYP used strategy to model communication with control and comparison children	195
Fig 5.7 % of 30 second intervals where EYP used strategy to give feedback before and after SCIP training.....	196
Fig 5.8 Percentage of 30 second intervals where EYP used strategy to give feedback with control and comparison children.....	196
Fig 5.9 % of 30 second intervals where EYP used strategy to foster initiation before and after training	197
Fig 5.10 Percentage of 30 second intervals where EYP used strategy to foster initiation with comparison children	197
Figures 6.1-6.4 Number of looks to adults and children during non-direct sessions for experimental children with ASD	223
Figures 6.5-6.7 Number of looks to adults and children during non-direct sessions for comparison children	223

Chapter 1: Introduction

The structure of the thesis

This research project looks at the development of social communication and interaction in preschool children with a diagnosis of autism spectrum disorder. Specifically, it looks at the effects of a focussed intervention – SCIP: Social Communication in Preschools - introduced into five non-specialist preschools in one area of the UK. The SCIP intervention developed from an existing Speech and Language Therapy package of support, and the project aims to reflect normal clinical practice as far as possible. The overall aim of the research is to add to the small but growing data of evidence-based practices available for use in the early years (Odom, Collet-Klingenberg, Rogers, & Hatton, 2010; Wong et al., 2014).

Full details of the SCIP Project studies are provided in Chapters 4-6. First, Chapter 1 provides some context about the nature of autism and the search for effective interventions. Chapter 2 provides a brief introduction to the methodological challenges of intervention studies, overviewing design decisions for evidence-based research in the early years. Chapter 3 provides an overview of the research on interventions in the early years, identifying the major approaches currently underlying preschool provision and evaluating the evidence for intervention targets and focussed strategies. The experimental studies of the SCIP Project are detailed in Chapters 4-6, and these are followed by conclusions and suggestions for future steps in Chapter 7. The Appendices include the coding forms, protocols, information and consent forms.

Definition and diagnosis of autism spectrum disorder

Autism spectrum disorder¹ (ASD) is currently one of the most common forms of developmental disability (Boyd, Odom, Humphreys, & Sam, 2010). Children with a diagnosis of ASD differ qualitatively in the ways that they communicate and interact with others. Alongside these core impairments in social reciprocity, they will have difficulty regulating their behaviour and often display repetitive behaviours and restricted interests. In addition, some may have sensory processing difficulties such as heightened sensitivity to noises, textures, light, and so on (Bogdashina, 2003). Behavioural indicators can be listed and classified as in the DSM-IV criteria (APA, 2000) recently revised in the DSM-V criteria (APA, 2013). (See Appendix 1 for DSM-V criteria.) ASD affects around 1% of the population (Baird et al., 2000; Baird et al., 2006) and is diagnosed more frequently in boys. More recent estimates suggest a higher incidence such as 1:88 of the population (Blumberg et al., 2013).

The impact of the diagnosis is noted by reviews of children receiving special educational support. Odom et al. (2003) noted that the number of school-aged children in the US receiving special education for autism was 5 times greater in 1999 compared with 1991 figures. This compares with a 25% increase for children with all disabilities during this time. A recent review of autism in school children in Northern Ireland (Information Analysis Directorate, 2014) concluded that the estimated prevalence of autism increased by 67% across all Northern Ireland Health and Social Care Trusts between 2008/09 and 2013/14, with the incidence increasing from 1.2% of the compulsory school age population to 2.0%. The majority of these children had a statement of educational needs.

¹ Alternative terminology includes: autism spectrum disorder; autism; autism spectrum conditions. Here the term autistic spectrum disorder (ASD) is predominantly used and no further distinction is made between ASD and autism in line with clinical practice in the local trust.

Early social communication development: effectiveness of small group intervention for preschool children with ASD

Statistics vary but the message is consistent about the rise in the number of children with diagnosis of autism and the associated increase in the numbers accessing specialist support. The reasons for the increase is unclear but may reflect a broader use of the diagnostic category; a greater number being considered for a diagnosis, and an increase in the number of dual diagnoses with learning disability and attention deficit disorders (Parner, Schendel & Thorsen, 2008). Baird et al., (2006) discuss the increase in autism thus:

Prevalence of autism and related ASDs is substantially greater than previously recognised. Whether the increase is due to better ascertainment, broadening diagnostic criteria, or increased incidence is unclear. Services in health, education, and social care will need to recognise the needs of children with some form of ASD, who constitute 1% of the child population (Baird et al., 2006, p.210).

There are marked differences between the reported incidence around the world (Feinstein, 2010; Hansen, Schendel & Parner, 2015). This appears to reflect reporting variations as well as cultural differences between countries such as parental acceptance of special educational needs, and differences in access to health services (Matson et al., 2011). Despite these differences in definitions and reporting, the need to understand autism and to find ways to support children and their families is a worldwide concern.

Autism as a multi-dimensional disorder

ASD is identified by the discrepancy between the development of social skills and the child's general development – social abilities, emotional reciprocity and language are 'out-of-synch' with motor, adaptive and cognitive functioning (Johnson, 2008). An increasing understanding and recognition of children with delayed pre-linguistic social development has resulted in most diagnoses being considered in the UK by the age of 3-4 year olds. But reaching a diagnosis remains a complex process relying on observations, parent reports of early history, and assessment tools that may either over- or underestimate the presence of defining features (Baird et al., 2000).

Currently (2015), there is general (though not universal) recognition of ASD as a neuro-developmental disability with, most probably, a complex genetic or epigenetic basis (Rutter, 2011; 2013). To date, there are no clear biomarkers of autism that would open the way to identifying autism at birth (Rutter, 2011; 2013). However, the known genetic basis for at least some forms of the disorder increases the likelihood of a child being diagnosed with autism if a sibling has a diagnosis (Bryson et al., 2007; Landa & Garret-Mayer, 2006). Current estimates suggest that 20% of siblings will have a diagnosis of ASD if another sibling has a diagnosis. For identical twins the likelihood is much higher (Folstein & Rutter, 1977). While there is an increased risk of a sibling also having ASD, there is evidence that the genetic type of autism may be different between siblings (Yuen et al., 2015). Yuen et al. (2015) found that the majority of siblings (69 percent) had little to no overlap in the gene variations known to contribute to autism. Less than a third (31 percent) of the sibling pairs shared the same autism-associated genes.

Stephen Scherer, the director of Autism Speaks MSSNG project, put it this way:

We believe each child with autism is like a snowflake; one is unique from another. Surprisingly, our research found that in more cases than not even siblings can have two different 'forms' of autism (Scherer, S. quoted in The Hoops News, January, 2015 www.thehoopsnews.com).

The genetic link is likely to be a combination of genes rather than a single one. ASD may also be the result of a one-off genetic mutation such that there is no previous member of the family with ASD (Yuen et al., 2015). Genetic roots do not exclude the possibility of environmental factors influencing the nature and level of impairment. For example, studies of Romanian orphans suggested that profound institutional deprivation may result in autistic features (Rutter, 2011; Rutter, Kreppner & O'Connor, 2001). Features of autism are likely to emerge from a complex interaction between pre-existing genetic vulnerabilities and the child's environment, modified by compensatory skills and protective factors (Jones, Gliga, Bedford, Charman, & Johnson, 2014).

In recent years, there has been an additional claim that ASD is not a cohesive syndrome. There is emerging evidence that the three dimensions - communication; interaction, and restricted behaviours - are separate impairments (with different genetic influences) that co-occur to produce a distinct syndrome (Happé & Ronald, 2008; Hulme & Snowling, 2009).

Like most neurological conditions, autism is seen as multi-dimensional with a high level of variation in the cognitive, behavioural and language skills of those diagnosed (e.g. Landa, 2008). Wing and Gould (1979) argued that autism was best described as a spectrum of disorders, hence the term ASD. Wing reflected on her research:

We've seen that the best way to look at and describe these children is on the dimensional system. You look at all the different dimensions of social skills, motor skills, comprehension and use of language, etc., and describe where they are on each. That gives you a meaningful profile in terms of helping that child. You don't say he fits this or that group (Wing, quoted in Feinstein, 2010, p.151).

The autism profile

The picture is further complicated by the co-morbidity of ASD with other neurological disorders. Around 70% of people with autism also meet diagnostic criteria for at least one other disorder that affects a person's ability to function (Boyd et al., 2010; Kogan et al., 2009; NICE, 2013). These include: attention deficit (hyperactive) disorder; intellectual disability; epilepsy; affective disorder; depression; cerebral palsy, and syndromes such as Tourette's; Fragile X; Down syndrome, and Rett's (see Cass, 2011; Fleming, Hurley & the Goth, 2015; Research Autism, 2014). Turk (2011) summarised this complex picture by saying that we are dealing with interacting spectra of disorders that need to be specified according to: severity; intellectual functioning; unusual traits and associated medical conditions, developmental and social issues.

In summary, a diagnosis of an autism spectrum disorder indicates areas of difficulty but does not indicate the impact these difficulties will have which will vary according to

- the presence of coexisting conditions
- the severity of the disorder
- the development of the disorder over time
- the demands of the environment
- the person's response to interventions

A diagnosis needs to go alongside a profile that shows how a person's social behaviour develops over time and how it varies in different environmental contexts, with different people and in response to different interventions.

Beneath a diagnosis of ASD, there lies an evolving concept of the nature of 'autism' since it was first mentioned in a published paper by Kanner (1943, reprinted 1968)². Feinstein (2010) has written a 70 year history of autism describing how various professional disciplines debated its origins; its relationship with other disorders, and best ways to support those with a diagnosis (see also Silberman, 2015). Definitions of autism have changed, and theories explaining the disorder have shifted radically mainly from psychogenic towards neuro-developmental ones. Each theory has led to its own type of intervention, often offering strategies in direct opposition to each other. Proponents of different treatment approaches for young children are only recently coming together and drawing on each other's research (Brunner & Seung, 2009; Prizant & Wetherby, 1998).

² Asperger is reported to have used the term 'autistic psychopathy' in a lecture in 1938 (Feinstein, 2010)
Early social communication development: effectiveness of small group intervention for preschool children with ASD

The recent National Institute of Clinical Excellence (NICE) Guidelines (2013) underline the lifelong impact that ASD can have for a person due to both its primary behavioural features and also the secondary disturbances that result from those impairments:

...children and young people with autism frequently experience a range of cognitive, learning, language, medical, emotional and behavioural problems, including: a need for routine; difficulty in understanding other people, including their intentions, feelings and perspectives; sleeping and eating disturbances; and mental health problems such as anxiety, depression, problems with attention, self-injurious behaviour and other challenging, sometimes aggressive behaviour. These features may substantially impact on the quality of life of the individual, and their family or carer, and lead to social vulnerability (NICE, 2013, p.3).

The search for effective interventions

It is in this context - where definitions of ASD are still being debated, where the population is heterogeneous, and where diagnosis relies on behavioural criteria without biomarkers - that professionals search for effective interventions.

Fleming et al. (2015) note in their overview of autism interventions that there are hundreds of interventions designed to help people with a diagnosis of ASD and thousands of research studies looking at those interventions. The authors include in their index of interventions: alternative medicine (e.g. homeopathy); diets; vocational; animal-assisted; alternative and augmentative communication; behavioural and developmental; medications; alternative medication; motor-sensory; psychological; vocational, as well as standard healthcare such as Speech and Language Therapy. These have been under recent scrutiny in the UK by the NICE committee (2013) with some interventions being advised against (e.g. some medical and alternative medical interventions) and with most having insufficient evidence to support claims of success.

Intervention approaches have evolved alongside theories of the causes of ASD. So, for example, psychogenic explanations of ASD, where the child was seen as emotionally locked-in due to trauma, led to parents being blamed with accusations of unresponsiveness. The term, 'refrigerator mothers' developed around this explanation (Bettleheim, 1967). This resulted in interventions that involved removing children from their parents, electric shock treatments and therapies to 'unlock' the trapped child. Such treatments are rarely seen now mainly due to criticisms from parents searching for more humane and evidence-based strategies (Feinstein, 2010).

With the dominant view of ASD as a neurologically-based developmental disability affecting cognitive, behaviour and language areas, current interventions have focussed on developing or changing behaviour and language (e.g. Siegel, 2008). The interventions have been based mainly on prevalent theories about learning and language development with some focussing on emotional-relationship development. (See Chapter 3, and overviews by Ingersoll, 2010; Siegel, 2008).

The interventions reviewed in Chapter 3 and drawn on in this project fall into the category: Cognitive and Behavioural Interventions (Fleming et al., 2015). These are the ones most commonly drawn upon in preschool education and form the majority of practices used by Speech and Language Therapists. This is in line with the NICE Guidelines (2013) that recommend practitioners should:

Consider a specific social-communication intervention for the core features of autism in children and young people that includes play-based strategies with parents, carers and teachers to increase joint attention, engagement and reciprocal communication in the child or young person (NICE 2013, p.810).

Focus of the SCIP studies

The key question of this research project is whether we are able to identify areas of potential deficit that are responsive to intervention in very young children, and reduce the impact of ASD in future social interactions. For example, if a child has reduced awareness of others in the early years, can social awareness be improved and if so will that affect the child's social relationships in the future? Can we affect the developmental trajectory if we provide targeted intervention at the 'right' moment with the 'right' frequency and dosage?

The challenge for the parent, practitioner and researcher is how to disentangle the factors that potentially influence a child's progress so that they can make informed choices about provision. Key questions include:

- what approach supports development best ?
- what might have happened without intervention ?
- are effects of an intervention maintained and generalised?

The evidence seems to suggest that most approaches developed for children with a diagnosis of autism spectrum disorder lead to *some* gains for *some* children at *some* points in their development, for *some* period of time (e.g. Brunner & Seung, 2009; Odom et al., 2003; Ospina et al., 2008; Reichow & Volkmar, 2010; and Warren et al., 2011). But no one approach emerges as the 'best' in terms of efficacy or cost effectiveness.

To put the evidence in perspective, over the past 10 years published systematic reviews that only include evidence meeting strict methodological criteria have identified around 37³ independent studies evaluating effectiveness of a particular approach for children under 5 years. Most are in the US (Odom et al., 2010; Wong et al., 2014). The evidence base is thus in its infancy.

³ Numbers vary slightly due to the different criteria used by reviewers for inclusion
Early social communication development: effectiveness of small group intervention for preschool children with ASD

The evidence on the effectiveness of interventions in the preschool years for children with a diagnosis of ASD is the focus of Chapter 3: Literature Review. Before detailing the studies, Chapter 2 looks briefly at the main methodologies used by intervention studies and at some of the methodological challenges faced by research in this area. These challenges explain, in part, the small number of intervention studies and highlight the limitations that need to be considered in the review of the literature and in the design of this research project.

Chapter 2: Research Designs and Methodological Challenges

Developing an evidence-base

The impetus for increasing the evidence base for intervention practices in preschools comes primarily from the increased numbers of children diagnosed at an early age and needing specialist support (Odom et al., 2010). Inclusive educational policies have added to the need for evidence about appropriate support strategies. As Rogers (2000) noted, 'physical integration does not necessarily foster social integration. Social integration has to be seen as a goal and actively targeted for intervention' (p.406).

The body of research about intervention comes mainly from psychology, special education and communication sciences although they are often hard to pull together as they are embedded in different academic disciplines (Prizant, Wetherby, Rubin, Laurent, & Rydell, 2006). ASD studies are over-represented in the research literature given its prevalence in the population. For example, 26% of special education studies reviewed by Goldstein (2002) included ASD. This reflects first, the impact ASD has on everyday lives of both the child and those around them, and second, its relative newness as a diagnostic category which has increased the motivation to search for 'active ingredients' that support children (Kasari, Gulsrud, Wong, Kwon, & Locke, 2010).

Advances in knowledge about early communication development, in particular, has helped researchers to identify areas to target. Joint attention for example, is known to be a pivotal skill for language learning (Bruner, 1983) and thus joint attention has been considered a promising place for intervention to start (Charman, 2003). Despite this high level of interest in finding effective interventions, independent, scientifically-rigorous experimental studies are few and there is still uncertainty about appropriate and feasible methods to develop an evidence base for practitioners to draw upon. (See Odom et al., 2003; Wong et al., 2014.)

Methodological soundness

Clinical decisions about intervention rely on methodologically sound evidence-based practice (EBP). But how do we evaluate ‘soundness’? Some propositions about EBP seem unarguable. For example, we should ensure studies are independent and avoid bias; reject evidence without rigorous scientific studies, and compare results of intervention with control groups (Thompson, 2006). Yet, in practice, rigour and control do not fit well with complex communication disorders where diagnostic categories leak; variables are hard to control and those involved can act in ways that contaminate results. For example, ethical issues constrain the use of control groups; fidelity of interventions is hard to manage while also ensuring naturalistic conditions, and contamination often results when understandably anxious parents opt to try out alternative interventions during the course of an experiment (e.g. Drew et al., 2002; Pajareya, & Nopmaneejumrulers, 2011).

Reviews, symposia and workshops have raised concerns about current methods and highlighted challenges for future research. Below are some key methodological concerns drawing on workshop and conference papers: Charman et al., 2003; Dollaghan, 2004; Goldstein, 2002; Lord et al., 2005; McConnell, 2002, and Schopler, 2005. These discussions informed the design of this research project.

Sample size; selection, and recruitment

Autism/ASD remains a low incidence disorder so the population for any given age group is relatively small. In addition, the cohort within any age group is characterised by: high variability (Cass, 2011); behaviour patterns that are different and possibly independent of each other (Happé & Ronald, 2008); co-morbidity (Turk, 2011), and high association with learning disabilities (NICE, 2013). The methodological implications of this small, heterogeneous population are that it is hard to recruit participants for locally based research, and to control for factors likely to affect results.

This has resulted in single subject studies being the favoured design (Odom et al., 2010; Wong et al., 2014). Some studies recruit from specialist university-linked nurseries; some use subsets of previously researched samples; some recruit through advertisement. Recently, siblings of children with ASD have been studied closely as they constitute a high-risk group (Rogers, 2009). However, selection from a particular subgroup limits generalisation (Zwaigenbaum et al., 2009). The difficulties are often not acknowledged with many studies failing to report recruitment procedures or to give information about refusers and drop-outs.

Where study samples are small, it is difficult to control for participant characteristics that may affect results. The impact of intervention is likely to depend on many factors related to the child's initial levels but to date it is not clear what the relevant factors are and how they interact with each other. Lord et al. (2005) noted, 'Effects of both chronological age and developmental levels in various areas are probably not linear, and the magnitude of effects may vary according to where in developmental trajectory teaching of a skill begins.' (Lord et al., 2005, p.701.) The heterogeneous nature of children with ASD makes it near impossible to decide on 'risk' factors that reduce the opportunities for intervention effectiveness. There might be an advantage to restricting the sample to those sharing characteristics such as age; gender; language level; IQ; parent level of education, and languages spoken at home with the child. However, the disadvantage is that results may be specific to that group and not generalise to other groups.

Sample size affects costs and confidence levels. Large samples are expensive and difficult to organise but have more power to predict outcomes for other groups. The smaller the sample, the greater is the measurement error, and the wider the confidence interval. On the other hand, small samples offer more control over treatment received, and provide rich data about individual responses to intervention.

Control groups

At the core of scientific evidence-based practice research is the need to show that any results would not have happened anyway, and that they are not happening because you have carefully pre-selected the participants. Some way of comparing intervention with non-intervention or with a different intervention is needed. However, in evidence-based research for children with ASD, control groups raise ethical and practical difficulties. It may be hard or unethical to withhold intervention for a control group. It may be hard to stop participants' families from trying out other intervention during the research and contaminating the results. It may also be hard to ensure that the input for all groups is balanced so that there is confidence that it is the intervention and not just the number of hours or the presence of a research team that makes a difference.

These difficulties can be overcome to some extent by: *randomisation* – randomly allocating children to different groups; *matching* – ensuring that control and experimental groups have children with similar characteristics; using 'waiting' groups or 'treatment-as-usual' groups so that no child is disadvantaged by their allocated group membership, and by keeping records of alternative interventions to ensure groups have, for example, equal number of hours of each treatment.

Another way to introduce a level of control is used in single-subject designs (see below). Here, the participant becomes his/her own control by establishing a baseline measure and then investigating effects following intervention. Confidence in the results can be further increased by staggering the introduction of the intervention across different participants – i.e. single-subject multiple-baseline-across-subjects design. However, children with ASD are characterised by behaviour that varies greatly whenever there are slight changes in conditions. This makes consistent baseline measures hard to achieve especially in more naturalistic studies. Arguably, a stable baseline may bias the effect of the intervention, making it more likely that change will occur after a no-change state (Thompson, 2014). Overall, single-subject studies have in-built limits on the generalisability of results.

The treatment

A study only has value if the intervention can be replicated and shown to be used consistently. But interventions are difficult to standardise especially in studies with young children where environmental conditions of the home or preschool will often affect the intervention's implementation. Fidelity checks can be made, and intervention manuals provided but intervention *drift* remains a problem. In addition, it is hard to control against families and preschools introducing other treatments during the research period and potentially contaminating the results (e.g. Eldevik, Hastings, Jahr, & Hughes, 2012).

Perhaps the hardest factor to control is the treatment 'dose'. Frequency and intensity affect results and also applicability to clinical practice. Yet it is often hard to monitor treatment hours especially with children who may opt out of sessions, or when childhood illness affects implementation of an intervention.

Data collection

In the same way that it is unclear what child factors may affect outcomes, there is no agreement about the outcome measures to use in evidence-based research (Wolery & Garfinkle, 2002). Some studies use standardised outcome measures such as IQ tests (Rickards, Walstab, Wright-Rossi, Simpson, & Reddihough, 2007). These are designed specifically to show stability in normally distributed populations. However, it is questionable whether they are reliable or valid for heterogeneous abnormal populations such as children with ASD (Prizant et al., 2006). Many studies use outcome measures that look directly at the areas targeted by the intervention (e.g. Pajareya & Nopmaneejumrulers, 2011) while others use standardised outcome measures distal to the intervention such as ADOS severity scores (e.g. Green et al., 2010). The former may be open to accusations of bias towards one specific outcome, while the latter may not be sensitive enough to show the effects of an intervention in everyday behaviour.

Effectiveness and Relevance

There is often a methodological trade-off between selecting an outcome measure that is relatively easy to collect, such as a standardised test, and one that is functionally relevant but harder to measure, such as how well a child maintains a conversation with a peer. There is also the ‘translation’ question. Interventions that are measured as having positive effects in clinical conditions may not ‘translate’ into everyday activities (Vivanti et al., 2014). Other key considerations in the method design are whether effects can be shown to generalise and whether they are maintained. This is a particular issue for interventions with children with ASD as a defining feature of the disorder is the difficulty children have in generalising behaviours learned in one setting to another setting. Few studies check generalisation of effects. Where it is studied, attenuation of effects is often found (Kasari, Paparella, Freeman, & Jahromi, 2008; Green et al., 2010).

In the light of these methodological challenges, it is not surprising that studies of the effectiveness of different interventions for preschool children with a diagnosis of ASD has not progressed far from studies of individual cases. Below, the current research designs are described and exemplified. This provides a context in which to overview the literature in Chapter 3.

Current research designs

Empirical research into effective social interventions for young children with ASD is primarily, to use McConnell’s (2002) expression, at the ‘technique building’ stage – identifying approaches to produce specific effects – and only beginning to move towards the ‘technique testing’ stage where different intervention conditions can be compared (McConnell, 2002, p.366).

A number of systematic reviews of intervention studies for young children with a diagnosis of ASD have been published. Although their selection criteria differ, they reflect a growing database demonstrating the effectiveness of communication-based training. The table below summarises the sample size and research designs used in the reviewed research.

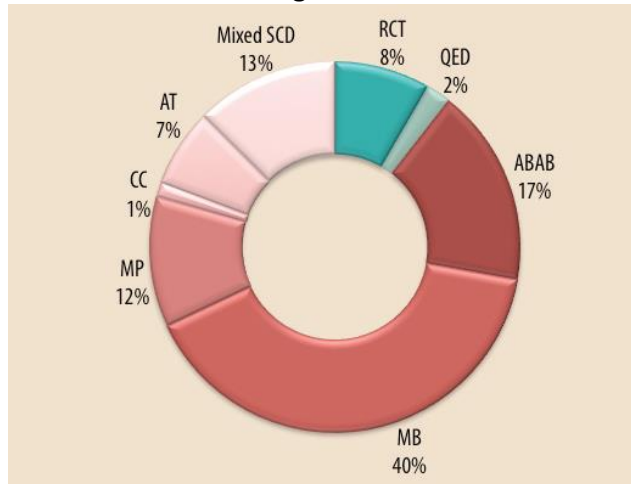
Table 2.1 Research designs and sample size used in intervention studies

Authors	Review period	Studies * with pre-schoolers	Number of participants	Single-subject experimental Design (SSED)	Quasi-experimental	Randomised-controlled trial
Hwang & Hughes, 2000	Pre-2000	16	64 Range 1-15	14 12 multi-baseline 2 reversal	2	-
Goldstein, 2002	Pre-2000	14	* Not available	10	3	1
Brunner & Seung, 2009	2002-2007	14	* Not available	9	5	-
Reichow & Volkmar, 2010	2001-2008	35	186	31	2	2

* Due to the ways evidence was collated it was not always possible to separate pre-school from school-aged data. The later compulsory school starting ages (e.g. 6 years in US) also affects research definitions.

As the table shows, the predominant methodology for studies with pre-schoolers is the single-subject experimental design, though a few quasi-experimental and randomised-controlled trials have now been published (e.g. Kasari, Freeman & Paparella, 2006; Kasari, et al. 2008; Wetherby & Woods, 2006).

A recent major review of intervention research into evidence-based practices (Wong et al., 2014) looking across studies of children and young adults with ASD from birth-22 years summarised the methodologies used.

Table 2.2 Research designs used in current evidence-based research

RCT = Randomized controlled trial

QED = Quasi-experimental design

ABAB = Withdrawal of treatment

MB = Multiple baseline

MP = Multiple probe

CC = Changing criterion

AT = Alternating treatment

(From Wong et al., 2014, p.17)

The chart clearly illustrates the predominance of the single subject experimental design with 40% adopting a multiple-baseline approach, compared with 8% randomised controlled trials and 2% quasi-experimental design. The features of each design are detailed below.

The single subject experimental designs

Single subject designs that focus on a small sample (usually $N < 5$) fall in Robey's (2004) Phases 1 and 2 of the research process, and are used primarily to test whether a therapeutic effect is present and worth investigating further (Thompson, 2006; Wolery & Dunlap, 2001). Researchers pre-select subjects with less priority given to ensuring that they represent a larger population.

As a result, 'rich' detailed data is presented about each child's individual characteristics and background. SSEDs have been especially used for studies using behavioural interventions such as ABA-Applied Behavioural Analysis (Smith, 2012) arguably because the skills taught are easier to specify and measure.

Wolery and Dunlap (2001) and Smith et al. (2007) identify the requirements for reporting results of single-subject studies:

- A clear conceptual foundation providing *a priori* predictions about the effects of interventions.
- Full details about the participants, the setting and all conditions
- Baseline similar to the intervention apart from the variable(s) being examined.
- Full details of the intervention to ensure fidelity and allow replication.
- Replication across 3 or more participants
- Frequent measurements (3-4 times) during baseline and during intervention(s)
- Inter-rater reliability checks.

In SSEDs, each subject serves as his/her own control. Data is collected at repeated points before, during and after interventions (i.e. multiple-baseline measures). Measures are compared to see if variation can be explained by the treatment conditions. Design options include: repeating; alternating; withdrawing, or reversing treatments. Some are less applicable for studies with young children as developmental processes may affect what happens when a treatment stops, i.e. you would not expect behaviours to stop changing when intervention stops, as you might in a drug trial.

SSED results are strengthened if patterns of variation are observed in more than one subject. Confidence also increases when pre-intervention periods vary in length. For instance, if intervention starts after 5, 10 or 15 weeks for 3 different school-aged children, then observed changes that occur after the intervention begins are more likely to have been the result of the intervention than by factors such as the time spent in school *before* intervention.

Treatment effects can be seen more clearly if measures are also made of a skill that is not expected to improve as a result of intervention. No change in this skill following intervention increases confidence that the intervention has a specific effect and not simply the effect of doing something different.

SSEDs are vulnerable to criticism in their data representation and analysis. Usually data is presented as a graph showing baseline, intervention measures and post intervention measures over time, with the vertical axis for dependent variable values and the horizontal axis for the number of sessions/days. Effects are usually analysed through *visual inspection* asking if changes in the values of the dependent variable co-occur with changes in the experimental conditions (Pring, 2005).

There are few statistical procedures that can be used given the small numbers involved and where measures of central tendency such as means can be misleading (Wolery & Dunlap, 2001). It is possible to add safeguards into the data interpretation. Scruggs, Mastropieri, and Casto (1987) suggest analysing the percentage of non-overlapping data (PND). This involves calculating the percentage of values in the intervention condition that are above the highest value in the baseline condition. Above 70% non-overlapping data suggests evidence of effectiveness; below 50% suggests no effect evidence. Pring (2005) also suggests a non-parametric test to amplify visual analysis. One method he outlines is to split the pre-intervention sessions into two halves, calculate the median score for each half, and then find the average median value of the two halves. The number of treatment and post-treatment scores above this value can be calculated and tested for significance using a Sign Test. This latter method was used in the SCIP Project analysis.

Overall, SSEDs provide an accepted way of showing evidence about the effects of interventions, and can capture factors that influence a child's complex interaction with their social and physical environments. Although we cannot generalise results, SSEDs can show what works for a few and indicate who else might benefit.

Horner, Carr, Halle, Odom, and Wolery (2005) note that SSEDs analyse the effects of an intervention for an individual. As this is where intervention will start it makes sense that research should focus there.

The randomised-controlled trial (RCT)

The randomised-controlled trial provides, for many, the scientifically gold-standard 'fair' test (NICE, 2013). RCTs are increasingly represented in the literature, most from the US and most around naturalistic behavioural approaches (Kasari et al., 2006; Yoder & Stone, 2006). But the picture is beginning to change with more RCT studies of social-pragmatic approaches (e.g. Green et al., 2010; Pajareya & Nopmaneejumruslers, 2011).

In Robey's model (2004), RCTs are at Stage 3 in efficacy research, providing stronger evidence about what treatments work (and don't work), for which group of people, for how long, and in what contexts. Confidence in the results comes from its inbuilt checks against bias. The participants are randomly allocated to different groups, including a control group, thus reducing the risk of reaching positive results due to the researcher's selection bias. Not all RCTs in evidence-based practice research have a no-treatment control. More commonly there is random allocation to different experimental conditions or allocation to an experimental condition and treatment-as-usual condition. Sample numbers in RCTs are usually larger and thus represent the population better. Examples described further in Chapter 3 include Green et al., (2010) and Kasari, Freeman and Paparelli (2006).

Many of the challenges of intervention research appear to have been met within the randomised controlled experiment. In particular, sample bias is lessened through random allocation to different conditions. As larger samples can be used, the effects of factors such as gender, demography, parental education and so on can be controlled. It is easier to control the hours of intervention although when comparing groups where one has an intervention and the other group has 'treatment-as-usual', the control over intervention time may be harder.

Early social communication development: effectiveness of small group intervention for preschool children with ASD

The RCT design increases the confidence that effects might be generalised to new groups. However, large scale research also comes with difficulties. They are often costly and difficult to organise. There can be levels of attrition and contamination over the time period as it is hard, especially when the population is young children, to stop participants taking part in other approaches, and to ensure regular attendance. There is a cost in information as the scale of the research increases. Individual details get lost in group results and while one intervention may be shown to work for a significant number in the sample, it may not be clear if that success will apply to a child with a specific profile.

Overall, RCTs can provide a more robust evidence base for certain practices. However, Pring (2005) questions the 'mystique' around the RCT: 'Merely being an RCT is no guarantee that a study has asked sensible questions or obtained useful answers' (Pring, 2005, p.214).

Quasi-experimental design

Somewhere between single subject experiments and randomised controlled trials comes the quasi-experimental design. The term relates to designs that have extra conditions added in order to draw more reliable conclusions about the effects of therapy. Quasi-experimental methods seem to suit more comprehensive interventions with multiple components, typical of social-developmental approaches.

Samples tend to be larger than in SSEs but smaller than in RCTs. The main control is usually to add a comparison group, a group that is matched along identified critical factors such as age but which was not a randomly selected subgroup of the whole population (e.g. Wetherby & Woods, 2006 described in Chapter 3).

The quasi-experimental design provides a pragmatic solution to intervention studies where controls are hard to organise for ethical and practical reasons. However controls against bias are lost. For example, in Wetherby and Woods' study (2006) the comparison group was matched with the experimental children at the end of a one year study. There was therefore no control over the types of support the comparison children experienced while the main experiment was taking place.

Longitudinal studies

There are few articles that provide longitudinal information and none are included in systematic review articles looking at effectiveness of intervention with children with ASD. Relevant longitudinal studies include one by Siller and Sigman (2002) that looked at children's language development and parent responsiveness after 1, 5 and 16 years. Data is beginning to be kept that will enable researchers to consider the developmental trajectories of children with ASD and the effects of different interventions on their development e.g. Toth, Munson, Meltzoff, and Dawson (2006).

The SCIP Project design

The SCIP Project reported here uses a single subject multiple-baseline-across-subjects design. It thus falls into the SSED category. The research design for this Project is detailed in Chapters 4 - 6 with discussion of attempts to overcome the methodological challenges. This follows the overview in Chapter 3 of current literature of interventions for preschool children with a diagnosis of ASD.

Chapter 3: Review of the Literature

Introduction to autism intervention in the early years

The US National Research Council Committee (NRC, 2001) reviewed the current evidence-based interventions identifying a range of underlying approaches. They indicated common elements that have been echoed in more recent UK and Australian overviews (e.g. NICE Guidelines, 2013; Prior, Roberts, Rodger, Williams & Sutherland, 2011). In summary, they highlighted the need for early, intense, individualised intervention with the active involvement of families and a highly supportive environment. Staff, they concluded, need training and the curriculum should be systematic and clearly planned with special attention to the transition from nursery to school.

The consensus about what is needed is an important first step but leaves unanswered questions such as: How early? How intense? How much training? It also leaves open the question about which approach will be able to deliver effective practices that can be implemented across settings and across different groups at an acceptable cost in terms of time and money. As said in Chapter 1, there are hundreds of interventions (Fleming et al., 2015) but insufficient evidence to direct parents and practitioners to best practice. Charman (2010) put it thus: 'The challenge for the next decade is to improve the evidence base for social communication and behavioural interventions that they may lessen the impact of the disorder and improve outcomes for children and their families' (Charman, 2010, p.167).

There is no consensus about the areas to target for intervention or the best approach to use. However, there are small successful steps being taken and some agreement that children are best supported by individually developed programmes that target the foundations of typical language development (e.g. Kasari et al., 2006; Kasari et al., 2008; Yoder & Stone, 2006).

Current recommendations in the UK (NICE, 2013) favour psychosocial approaches that prioritise social communication and interaction and thus help children to engage socially in their everyday activities. They note, however, the limited evidence for any specific intervention.

The focus of the SCIP intervention project is the training of preschool staff, and the introduction of a small social communication group. The group focuses on the core characteristics of autism: children's reduced ability to communicate socially and to interact with others. It draws on the current research into effective interventions in the early years and on research into the role of the adult as a communication partner. It differs from most available evidence-based research by being set in the child's mainstream preschool using an intervention that is based on the child's everyday preschool activities. Further, it includes training of and involvement from non-specialist staff, in settings without additional resources for children with special needs.

SCIP Literature Review

This review of the literature begins with a brief outline of the major approaches to intervention for preschool children that have developed over the past thirty years and a review of the evidence of their effectiveness. The choice of studies is restricted to those focussing on children who have not yet begun formal schooling (< 5 years in UK; <6 years in most other countries) and that aim to develop social interaction and communication, the core areas of deficit in children with ASD. All studies have been published in peer-reviewed journals in English. The majority are from the US, though a few are from the UK, Europe, Australia, and one from south-east Asia.

The intervention studies referred to in the literature draw on, in varying degrees, behavioural, developmental and social communicative approaches. Reports of success of different approaches make it hard for parents, practitioners and policy makers to reach decisions. Claims are made for one approach with little reference to the possibility of equally effective alternative approaches.

Furthermore, these claims are usually based on studies with small, heterogeneous samples and use different outcome measures making comparisons difficult (see Chapter 2, and Prizant et al., 2006).

In this context of competing claims of effectiveness, Section 1 identifies and evaluates different underlying approaches to intervention, with a brief reference to some recent comparative studies. In Section 2, there is evaluation of experimental evidence for the effectiveness of specific interventions focusing on young children's social communication and interaction. Section 3 summarises studies that look at the role of the adult, and the effectiveness of adult (usually parent) training to help the development of children's communication and interaction. Finally, Section 4 looks at studies in early years' education outlining research that evaluates the effectiveness of interventions in preschools and the effectiveness of training practitioners as interventionists.

Section 1: Comparison of intervention approaches

The research showing positive outcomes in the development of children's social communication draws on intervention strategies that have developed from different theoretical positions. The most used communication-based interventions have developed either from behaviourist learning theory (behavioural approaches) or from social-developmental⁴ psychological theories with contributions from psychoanalytic theory. These current approaches have been conceptualised as lying on a continuum with the 'discrete trial-traditional behavioural at one end and developmental social-pragmatic approaches at the other' (Prizant, Wetherby, & Rydell, 2000, p.194).

⁴ These approaches usually use a combination of the words: social, developmental and pragmatic. Here, I have used the term 'social-developmental'.

Early social communication development: effectiveness of small group intervention for preschool children with ASD

Behavioural approaches

Among the behavioural approaches, applied behavioural analysis (ABA) dominated the early interventions for children diagnosed with autism from the 1960s onwards (Lovaas, 1977) especially in the US. The underlying philosophy is that language, play and social interaction are operant behaviours that can be taught through controlling what happens before and after the behaviour and using systematic (negative and positive) reinforcement. The prevailing belief of those developing ABA-based programmes is that the nature of the impairments of ASD means that children will not be able to learn in 'normal' environments and need conditions that ensure high levels of repetitive, adult-led, externally reinforced instruction. Communication behaviours are defined as discrete skills to be introduced in pre-determined step-by-step sequences. The main teaching tools involve prompting (to cue the desired behaviour skill); linking events; reinforcement, and fading-out prompts. Behavioural interventions need high levels of intensive one-to-one adult-directed teaching. In some cases, programmes demand 40 hours of instruction a week though fewer hours has also been shown as adequate (Smith, 1999).

ABA-based interventions remain the approach with the most evidence-based research meeting the criteria for showing effectiveness through controlled trials (Warren et al., 2011). However, the studies are criticised for using small, highly-selective samples; failing to provide independent data analyses, and lacking generalisation of results (Warren et al., 2011). Despite these criticisms, interventions drawing on ABA principles continue to be accepted as effective (NRC, 2001).

Naturalistic behavioural approaches

Although ABA-based interventions remain influential, aspects of the approach began to be modified in the light of criticisms, and when the early promises of 'cures' made by ABA proponents failed to be realised (Siegel, 2008). Critics of ABA programmes argued that skills were often not maintained and did not generalise to other settings (Smith, 2012). In particular, researchers argued that intense ABA interferes with rather than

promotes a child's learning, making them dependent on adult prompts and unable to engage in spontaneous communication. Siegel (2008) argues further that communication skills cannot be taught through rote learning. The intensive, one-to-one nature of the intervention, with specialist tutors, often in special rooms isolated from other members of the family. This lack of a social context for learning language may have the opposite effect to that intended.

Increasingly, behavioural approaches began shifting so that they became more developmental, child-led and naturalistic. Contemporary behaviourist interventions - including Pivot-Response Training (PRT); Milieu Training or Responsive Education; Prelinguistic Milieu Training (RPMT), and Mand model – are characterised by

- being set in natural environments
- centred around the child's interests
- providing models and prompts for the child to copy
- reinforcing the child's response through social praise.

The interventions are still behavioural in approach in that pre-selected behaviours such as imitation are broken down into a set of skills that adults encourage the child to practise and repeat in 1:1 training sessions. However, the approach is sensitive to the child's interest, to family priorities and developmental level (Ingersoll, 2010). For example, Pivot-Response Training has recently been introduced in parent and community-based programmes providing evidence that it can be used by families with fidelity and with positive outcomes (e.g. Hardan et al., 2014; Steiner, Gengoux, Klin, & Chawarska, 2013). Strategies used in naturalistic behavioural interventions have been combined into multi-component curriculum packages such as EIBI – Early intensive Behavioural Intervention. (See review by Reichow, Barton, Boyd, & Hume, 2012).

As the approaches become more child-focussed and community-based they begin to resemble approaches that emerged from a very different model of how children learn and develop the ability to communicate and interact – the social-developmental approach.

Social-developmental approaches

The social-developmental approaches draw on developmental theories of Piaget (e.g. 1952); social constructivist models of Bruner (e.g. 1983), and Vygotsky (1978), and also draw on elements of psychoanalytical theories (Hobson, 1990). They share an underlying assumption that all children's social communication follows a similar developmental path. Children with ASD are assumed to follow a delayed but comparable pathway to neurotypical children. Following from this premise, interventions for children with ASD target core developmental areas that are considered prerequisite to the emergence of later areas in neurotypical development. For example, the child's use of gestures would be an intervention target before the use of words, reflecting neurotypical development of gestures before words (Bates, Thal, Whitesell, Fenson & Oakes, 1989). There is a further assumption that children's behaviours, however atypical, should be seen as serving a social communicative function. So, hand-flapping, screaming, and vocalisations without co-ordinated gaze are treated as if they were intentional. Many challenging behaviours which might be ignored or negatively reinforced in a behavioural approach are seen as communicative and functional for the child in the social-developmental model (Prizant et al., 2006).

The social-developmental approaches overcome the criticisms of behavioural approaches by embedding strategies within social contexts and by responding to the child's developmental level. Casenhiser, Shanker, and Stieben (2011) put it like this:

First they seek to teach children functional skills in a sequence that is generally consistent with typical child development. Second, they focus on helping children to develop various capacities related to social communication in a pragmatically appropriate social context rather than targeting the behaviours themselves (Casenhiser et al., 2011, p.221).

Casenhiser et al. (2011) use the development of 'eye contact' to draw out differences between approaches. Making eye contact is a behaviour where children with ASD are less skilled. In behaviourist approaches, eye contact will be introduced as a discrete skill, practised in repeated trials, using reinforcement techniques such as giving rewards each time the child looks at an adult. In the social-pragmatic approach, eye contact would be seen in developmental terms as a social behaviour that occurs neurotypically in the early months as the child interacts with others tracking what they are doing and looking at. The strategy for promoting eye contact would focus on the reason for looking at people. Adults would try to increase the child's motivation for looking by finding highly motivating activities such as bubbles that will increase the likelihood of the child looking towards someone. The reward would be intrinsic to the activity - the child gets to pop the bubble.

The social-developmental approach places high emphasis on parents' and carers' ability to adapt their interaction and environment to the child's interests and developmental level. Communication in a social-developmental approach is seen as a social activity, involving a transactional process with the caregiver (Prizant et al., 2006). The way those around the child respond to communicative attempts, and the way they structure the environment to support the child are seen as interrelated with the child's development. Social-developmental approaches see parent-mediated training as essential to an intervention's success. Parent approaches such as Hanen '*More than Words*' (Sussman, 1999) and RDI -Relationship Development Intervention (Gutstein & Sheeley, 2002) specifically teach strategies to help parents 'tune in' to their child's learning and language development such as rearranging the environment; modifying their own language and so on. (See Section 3 below.)

The DIR – Developmental, Individual, Relationship-based approach (Greenspan & Weider, 2006; Weider & Greenspan, 2003) gives a central role to parents and carers, specifically promoting the emotional relationship between adults and the child. It is often called DIR Floortime given its use of strategies encouraging close emotional engagement between child and adult on the floor together. As the name suggests, the programme is designed around the child's individual motivations and needs, using a developmental model to plan future activities. The role of the adult is seen as central and he/she will focus on responding to the child's interests and emotional needs. It draws on psychoanalytic principles alongside developmental psychology. It is more frequently used as part of parent training programmes for individual home use, though effectiveness of training in groups has been recently looked at (Casenhiser et al., 2011; Siller, Hutman, & Sigman, 2013).

The approaches, or continuum of approaches, described above were until recently fairly entrenched with their own supporters, terminology, research bases and funding. But over the past ten years, there has been a slow coming together and recognition that similarities exist as well as differences.

Similarities and differences between approaches

Behavioural, naturalistic behavioural, and social -developmental approaches have developed from distinct perspectives and are driven by different theoretical underpinnings. However, Ingersoll (2010) demonstrates the many similarities between them as they have evolved in clinical practice. The approaches are all based on an underlying impairment-based model. Behavioural approaches identify autism-specific difficulties and address these through targeted teaching strategies. Social-developmental approaches identify developmental deficits and introduce strategies to support these.

Most intervention strategies are now child-led; are centred around the child's interests, and build on the child's motivations and strengths. Most acknowledge the central importance of caregivers and assume that success of any intervention depends on the integration of strategies in everyday activities. Most interventions use reinforcement to reward successful social communication, either through external rewards or through social praise.

Ingersoll (2010) goes on to argue that differences are often more in degree and terminology. For example, behavioural approaches set up adult-led, systematic teaching programmes with 'prompts' to support the skills. Social-developmental researchers, on the other hand, avoid direct teaching, seeing themselves as communicative partners who actively facilitate and model actions to show children how to extend existing structures. These facilitative strategies may vary in frequency from the direct teaching and prompting techniques used in behavioural approaches, but the strategies also have much in common.

The SCERTS Framework (Prizant et al., 2006) provides a comprehensive approach that tries to bring together the shared assumptions of most approaches. The framework focuses on the development of a child's social communication (SC) profile alongside emotional regulatory (ER) behaviours that make him/her less available for learning due to sensory and emotional issues. The development of a child's communication is seen as interrelated with the transactional support (TS) available from those around them to modify the environment and to support their learning. The SCERTS framework is drawn on in the design and evaluation of the SCIP project.

Evaluation of intervention approaches

Most approaches claim some success (e.g. Chandler, Christie, Newson, & Prevezer, 2002; Hwang & Hughes, 2000; Ospina et al., 2008) but there remains insufficient evidence to favour one over another (Fleming et al., 2015). Each approach has tended to use different tests of effectiveness. ABA-based programmes and to a lesser extent naturalistic behavioural interventions fit more easily into the scientifically controlled experimental design that is seen as providing more acceptable and rigorous levels of evidence. In contrast, social-developmental approaches have tended to measure gains ‘in broad areas of social communicative functioning using structured observations or standardised assessments during intervention periods of up to a year or more’ (Ingersoll, 2010, p.37). Almost by definition, a social-developmental intervention in which researchers follow the child’s lead and facilitate responses rather than teach specific skills will be less able to predefine discrete variables for testing.

There have been a few studies comparing one approach with another or with ‘treatment-as-usual’. Five recent comparative studies of comprehensive approaches are summarised in Table 3.1.

Table 3.1 Summary of studies comparing comprehensive treatment approaches

Research authors	Design	Sample size & age of children	Approaches compared	Summary of outcomes
Pajareya and Nopmaneejum-ruslers (2011) Context: Thailand	RCT	N=32 Age 2-6 years at start N=16 in DIR/Floortime N=16 in ABA	ABA Applied Behavioural Analysis <i>compared with</i> DIR/Floortime, a social-developmental approach	Significant gains in DIR/Floortime group on measures of functional emotional levels and ratings of autism features
Dawson et al.(2010) Context: USA	RCT	N=48 Age 18-30 mths at start N=24 in ESDM setting N=24 in treatment-as-usual	ESDM: Early Start Denver Model, a behavioural approach using developmentally-based strategies <i>compared with</i> Treatment –as- usual	Significant gains after 1 and 2 years. ESDM group increased their IQ, language and adaptive behaviour scores. Changes in diagnosis from ASD to PDD-NOS more likely for children in ESDM group.
Vivanti et al. (2014) Context: Melbourne, Australia	Matched comparison	N=57 Age 2 ½ -6 years at start N=27 in ESDM settings N=30 matched children in 2 settings	ESDM: Early Start Denver Model, a behavioural approach using developmentally-based strategies <i>compared with</i> Treatment –as- usual in 2 specialist ASD schools	Gains after 1 year for ESDM group in some areas
Eldevik et al. (2012) Context: Norway	RCT	N=43 Age 2-6 years at start N=31 in EIBI N=12 in treatment-as-usual	EIBI: Early Intensive Behavioural Intervention, a specific behavioural intervention <i>compared with</i> Treatment –as- usual	Significant gains after 2 years. EIBI group increased their IQ, and adaptive behaviour scores
Magiati, Charman, and Howlin (2007)	Matched comparison	N=44 Age 2-4 ½ years at start N=28 in EIBI Home-based N=16 in specialist ASD preschools.	EIBI: Early Intensive Behavioural Intervention, a specific behavioural intervention <i>compared with</i> Treatment –as- usual	Gains in cognitive abilities and play after 2 years for both groups No difference <i>between</i> groups but variations in progress <i>within</i> groups.

The comparative research shows some positive outcomes but also highlights the methodological challenges of evaluating interventions. What is striking is that four studies summarised above found gains of varying levels of significance for the approach being investigated even though the approaches are different from each other. In four out of five comparisons, either the 'new' approach (e.g. DIR in Pajareya & Nopmaneejumruslers, 2011; EIBI in Eldevik et al., 2012) or the comprehensive specialist school approach (ESDM in Dawson et al., 2010; ESDM in Vivanti et al., 2014) did better than what was already in place, or what was available in the community. This raises issues about a 'fair' trial. In Dawson et al. (2010) and Vivanti et al. (2014) comparisons of a whole school ASD-focussed curriculum with a mix of various community-based therapies (treatment-as-usual) may not be a fair match of treatments even if number of intervention hours is the same. 'Fairness' is also called into question when the treatment groups being compared may lack fidelity of implementation. Pajareya and Nopmaneejumruslers (2011) and Eldevik et al. (2012) both noted the 'contamination' of treatments when parents and staff did not keep strictly to the research protocol, e.g. families in one group trying out strategies being used in the comparison group.

The fifth study by Vivanti et al., (2007) differed from the other four in that the researchers found *within* group differences but not *between* group differences when they compared outcomes in a setting following an EIBI-based curriculum with a specialist setting following their usual practices. Increased control over the nature of 'treatment-as-usual' may have reduced the differences in the interventions and thus led to this result.

In addition to the likelihood of bias due to differences in the treatments being compared and reduced control over fidelity, the research studies also used different outcomes measures. For example, Pajareya and Nopmaneejumruslers (2011) measured functional and emotional levels – the focus of the DIR approach being researched. Eldevik et al. (2012), on the other hand, measured IQ and behavioural skills – the focus of EIBI intervention.

Green et al. (2010) criticise the reliance in many studies on proximal outcomes that look at the effects of an intervention by measuring changes in what was targeted. They argue that distal outcomes (e.g. autism severity) are needed to overcome this potential bias. Furthermore, measures that favour results from a particular intervention may say little about the barriers a child faces in terms of social functioning (Prizant et al., 2006).

When studies involve children at such early stages in their development (all included children around 2 years old) variations are likely. Until many more studies are carried out – so far only a few hundred children have been studied – no one approach can claim to be the most effective. It may well be that all approaches share some fundamental strategies for success such as practitioner/ parent commitment; intensity and consistency of programme, and an individualised programme for each child.

Comprehensive Treatment Models vs Focussed Intervention Practices

Comprehensive Treatment Models (e.g. DIR Floortime; EIBI; ESDM) looked at above which provide intensive, manualised, comprehensive programmes targeting a number of communicative and behavioural areas over a year-long period differ from *Focused Intervention Practices* that target a small number of areas and are usually short-term with specific learner outcomes such as an increase in attention or turn-taking.

Although the line between the two is blurred, Focussed Intervention Practices are the ones most relevant to typical educational settings where only one or two children with a diagnosis are likely to be included in the class at any one time. Wong et al. (2014, citing Odom, Hume, Boyd, & Stabel, 2012) refer to the current practice of using a *technical eclectic* approach in which classrooms select a range of focussed intervention practices, a selection process that needs to be based on evidence of effectiveness for specific children, and that fit with the staff and parents' priorities and level of training.

A major aim of the current SCIP Project was to see if there is evidence for effectiveness of a specific type of focussed speech and language therapy practice and to see if it could be included within current preschool practices as part of an eclectic approach. The SCIP experimental intervention was designed to be usable by preschool practitioners with only a minimum level of training and with no major modifications to the classroom. In the following section, the evidence for effectiveness of certain focused intervention practices is reviewed.

Section 2: Evaluation of focused intervention practices in the preschool years.

Most early years focussed interventions use as their starting point the lack of capacity in certain areas observed in children with a diagnosis of ASD. There is general agreement that the social and communicative impairments that typify children who go on to receive a diagnosis of ASD begin in infancy (Jones et al., 2014). From a social-developmental perspective, social communication is rooted in the very early interactions between infants and carers. Werner and Kaplan (1963) referred to the primordial sharing situations that infants enter through joint attention with their carers. These provide the early routines and familiar contexts to support a child's processing of social and communicative behaviour, opportunities for carers to infuse symbols into their social interactions. With the development of language from around 12-18 months, these social interactions increase in complexity. 'As the child acquires a vocabulary, the scope of joint engagement increasingly expands as the focus of shared attention is displaced from present objects to symbols that refer to them' (Adamson, Bakeman, Deckner, & Ronski, 2009, p.84).

Evidence of atypical development of social skills in infancy

Disruption in opportunities for joint attention due to severe environmental deprivation or developmental disorders such as autism may mean that the child fails to develop the foundation skills necessary for the development of language and other complex social and cognitive abilities – disorders may ‘disrupt the mutual relation between joint attention and language’ (Adamson et al., 2009, p.84).

Evidence of atypical development of social skills of children with a diagnosis of ASD came initially from retrospective studies such as those looking at home videos recorded by parents during the first year of life. (e.g. Osterling & Dawson, 1994; Werner, Dawson, Osterling, & Dinno, 2000). Evidence also comes from prospective studies (e.g. Baird et al., 2000) where samples of children are tracked, a percentage of whom will receive a diagnosis of ASD. Studies that use siblings of children with a diagnosis of ASD increase the chance that participants will receive a diagnosis given the genetic link between siblings and autism (Ozonoff et al., 2011). Prospective studies with siblings have shown that aspects of joint attention behaviour are highly predictive of autism. For example, Ozonoff et al. (2011) in a study of 25 siblings⁵ later diagnosed with ASD found that early social communication behaviours such as gaze to faces, social smiles and directed vocalizations declined in frequency around the first year for the majority of the cohort, and development continued to fall behind neurotypical peers.

One implication from this research is that identification of critical behaviours that are disrupted in development may indicate areas that could be targeted in intervention.

If young children with autism do not learn to use social communicative skills frequently and in a normative fashion, the many functions that these behaviours serve may not be available to them (e.g. interactive play). To minimize obstacles to the learning of language and social interaction skills, early social communicative behaviours should be targeted in social interactive training programs for preverbal children with autism.
(Hwang & Hughes, 2000, p.341)

⁵ It is now estimated that there is a 20% risk of autism in a sibling of a child with a diagnosis (NICE guidelines, 2011).
Early social communication development: effectiveness of small group intervention for preschool children with ASD

This argument underlies the design of the SCIP intervention. The SCIP intervention focusses on helping preschool staff to understand how social communication develops and to develop ways to reduce the barriers to learning and interaction for children with a diagnosis of ASD. Joint attention is seen as a core skill but how it plays out in the development of communication is still being explored.

The role of joint attention

A key strategy for developing social communication is joint attention (JA), the process that allows infants to tune into and engage with their social environment (e.g. Tomasello & Farrar, 1986) and to join in the to and fro of communicative exchanges (Lieberman & Yoder, 2012). Bruner highlighted the significance of early social engagement through his studies of games that adults play with infants; games he termed 'joint action play routines' (Bruner, 1983). Social interactions found in games like *peek-a-boo* where child and adult jointly attend to an object or event are seen as the context in which neurotypical infants respond to their social world and can thus begin to attend to and later use gestures, sounds, and words to communicate intent. These early interpersonal skills, especially joint attention, are presumed to be pivotal for later learning (Bruinsma, Koegel & Koegel, 2004; Charman, 2003). The critical role that joint attention plays in children's social and cognitive development has led to closer examination of joint attention itself, identifying types and stages of JA.

Types of joint attention

Two forms of joint attention (JA) are identified: declarative joint attention (*look what I can see*) is distinguished from imperative joint attention (*that's what I want*). Children with a diagnosis of ASD are identified as having greater deficits in declarative JA. Imperative (requesting) JA behaviours are often less impaired or not impaired (Sigman, & Ruskin, 1999). In a refinement of this difference in impairment, it has been suggested that the core difference is the child's ability to monitor and regulate the attention of others in relation to objects and events (Charman, 1998).

A further distinction is made between Responding to Joint Attention (RJA) and Initiating Joint Attention (IJA) with Responding developing before Initiating (Bono, Daley, & Sigman, 2004). These distinctions in the use of the term joint attention are not always made clear in research studies making comparisons of results difficult.

Sullivan et al. (2007) looked specifically at response to joint attention (RJA) in 51 children considered 'high risk' due to siblings having a diagnosis of ASD. The children's RJA was measured at 14 and 24 months. Some but not all of the children who later received a diagnosis of ASD showed reduced RJA at 14 months. By 24 months, however, low RJA scores indicated high concern about autism. Overall, as early as 14 months, RJA performance predicted language outcomes. The fact that some children responded to joint attention bids at age 14 months but went on to be diagnosed with ASD suggests that the second year of life may be a critical time for social skills development. It may also be that screening tests for one year olds are not sensitive enough to detect subtle differences in interpersonal skills. The researchers noted that although children at 14 months often looked where an adult pointed, some of them looked 'blank' as if they did not understand the adult intention to share the focus of attention.

Findings have been inconsistent about the contribution RJA and IJA make to later development of language (e.g. Bono et al., 2004; Luyster, Kadlec, Carter & Tager-Flusberg, 2008). Differences may be due to variations in the way RJA and IJA are categorised with some distinguishing high- from low-level JA while others only including high-level JA in their analysis. Low level IJA would involve a co-ordinated gaze between a person and object; high level would include behaviours such as showing and pointing. Some have also included requesting (imperative JA) within IJA (Kossvaki, Jones, & Guldberg, 2012; 2014).

Pickard and Ingersoll (2015) assessed 53 children with ASD aged 22 – 93 months using the Early Social Communication Scales (ESCS: Siebert, Hogan & Mundy, 1982). In a detailed analysis of results, they found that high level IJA (where a child used a behaviour such as pointing as well as looking at their partner) was associated with language outcomes alongside RJA. Low level IJA, i.e. coordinated gaze shift alone, did not predict language outcomes. They hypothesised that only higher level IJA indicates levels of social motivation that affect a child's social communication. Other studies highlight the complexity of identifying what predicts later language development. Luyster et al. (2008) in their study of toddlers aged 18-33 months (N=164) reported that gestures, non-verbal cognitive ability and RJA predicted later receptive language abilities. Imitation, gestures and non-verbal cognitive abilities were the most significant predictors of expressive language

Stages of development in joint attention

Adamson, Bakeman, and Deckner (2004), and Adamson et al. (2009) identified two key types of joint attention: supported joint attention and co-ordinated joint attention. In the former the infant (from around 6 months) joins in with the shared topic/object but does not explicitly attend to the partner. In co-ordinated joint attention, the infant (from about 9 months) acknowledges the partner through explicit communicative gestures such as handing an object, looking up to check their response and so on. Both types of joint attention continue during the early years providing those rich opportunities for learning about interaction and about language. Adamson et al. (2004) make a further distinction about attention to symbols during these interactions. Young children may attend to the symbols used by their carer – the researchers call this symbol-infused engagement; or they may show no attention to symbols – non-symbol infused. So, for example, if a child follows a carer's verbal or non-verbal action event though they do not look at the carer, this would be classified as *symbol-infused supported joint attention*. If a child looks and smiles at the adult while, say, building a tower but does not attend to a direction such as 'put the little one on top', then it would be termed *non-symbol infused co-ordinated joint attention*.

In their studies of neurotypical children, as well as children with ASD and Down syndrome, Adamson et al. (2009) found differences in the types of engagement between the three groups. The group with autism (N=23 aged 30 months) showed levels of supported joint attention (both symbol and non-symbol infused) that were comparable with the 18 month year old typically developing group. The ASD children's expressive language levels did not increase their use of co-ordinated joint attention. One explanation for this is that children with ASD are more able to respond to language when there are reduced demands to co-ordinate visual attention with the play partner (e.g. Bloom and Tinker, 2001). The children with Down syndrome (N=29 aged 30 months) exhibited an interaction pattern that differed from both typically developing and children with ASD. Like the ASD children they had the same level of supported joint attention as the 18 month typically developing children, reflecting their overall delay. However, unlike the ASD group, they also engaged in co-ordinated joint attention, looking at their parent and explicitly acknowledging the joint nature of the play. They differed from both groups by the lower level of symbol-infused interaction. In other words, children with Down syndrome actively chose to socially engage with parents but were less likely to respond to or to use symbols.

Adamson et al.'s study (2009) highlights the importance of the transaction between the adult and child with the adult responding to the child in a way that scaffolds interpersonal skills at an appropriate cognitive and affective level – a level that responds to the child but is not too demanding. Bottema-Beutel, Yoder, Hochman, and Watson (2014) have added to this by distinguishing between high- and low-order supported joint engagement. The higher order engagement (measured by the level of awareness the child shows the adult as a play-partner) is found to be more effective for facilitating expressive language. They emphasise that supported engagement does not require co-ordinated eye gaze. It is enough to have reciprocal actions such as turn-taking. This has implications for the way a child's communication partners interact.

These distinctions between engagement states were made in the research studies above through a structured laboratory 30 minute play programme. Whether the findings can be applied in everyday interactions in a child's home or educational setting has not been explored.

The research overall highlights the role of joint attention as a 'prognostic indicator and a potential intervention goal' for children with ASD (Bruinsma et al., 2004, p.169) and as a component of the social feedback loop that impacts on autism symptomatology (Ibanez, Grantz, & Messinger, 2012). The evidence shows a strong relationship between joint attention and later social communication development with specific types of joint attention, especially responses to JA, appearing more critical than others (Ibanez et al., 2012). Furthermore, it seems that the capacity for joint attention may differentiate children with ASD from typically developing children. Luyster et al. (2008) conclude that 'the language of children with ASD is grounded in the same set of social-cognitive skills that are considered crucial precursors for language development' (Luyster et al., 2008, p.1436).

The prevailing argument of such studies is that differences in early social interaction can set in motion a change in the developmental trajectory. As Jones et al., (2014) note in their extensive review of the literature:

Early emerging behavioural symptoms alter the child's self-directed patterns of attention, changing their experience of the environment and further restricting social learning opportunities. Compensatory skills and pre-existing protective factors are also likely to play a role in the dynamics of a clinical phenotype. Understanding how ASD unfolds from birth onwards is critical to beginning to understand these developmental mechanisms, for identifying children who require early intervention and to indicate appropriate intervention targets. (Jones et al., 2014, p.2)

It remains unclear whether there are key early behaviours such as social orientation (Dawson et al., 2004) or gestures (Veness et al., 2012) whose delayed development affects the emergence of later social abilities such as joint attention; or whether atypical development affects a range of abilities with no clear candidate of a single behaviour acting as a trigger to later abnormalities. It also remains unclear if the atypical features in children who go on to be diagnosed with ASD can be differentiated from atypicalities that occur in children with other difficulties such as cognitive impairment. Other areas of uncertainty include the extent to which biological differences interact with environmental factors and the extent to which development can be affected by interventions (Rutter, 2013).

The relationship between early social abilities and later outcomes

One line of enquiry has been to try to identify impairments that distinguish children who go on to develop ASD from those who will later be identified as neurotypical or as atypical with other disorders (e.g. Dawson et al., 2004; Poon, Watson, Baranek, & Poe, 2012; Shic, Macari, & Chawarska, 2014). A parallel research line (e.g. Charman, 2003; Toth et al., 2006;) has looked at the outcomes of children who have been identified with delayed social abilities in their early years to see if early abilities can predict outcomes.

Dawson et al. (2004) compared three measures: social orienting, joint attention and attention to another's distress for three groups of children: children with ASD; children with other developmental delays, and children with typical development. The children in the ASD group were 3-4 years old (N=72) matched on mental age with the two comparison groups (N=34 and N=39 respectively). Joint attention was seen as 'the most sensitive discriminator of autism from developmental delay or typical development' (Dawson et al., 2004, p.280). When joint attention was combined with social orienting scores the predictive value increased. Joint attention and social orienting were also related to language ability.

Similar results were found by Poon et al. (2012) who concluded from retrospective analysis of video sequences that joint attention, imitation and object play played an important role in predicting later communication of children with a diagnosis of ASD.

Shic et al. (2014) looked at 6 month old infants' (N=99 of which high risk = 57) attention to social scenes by measuring eye gaze to faces that were either still or moving and showing positive affect, and faces that were also speaking. Overall, the infants who went on to be diagnosed with ASD looked at faces less than infants who were assessed as typically developing. In addition, when the face was speaking, the high risk infants showed reduced attention. They researchers suggest that the more complex social scenes (face + speech) result in atypical attention for some children and that this occurs at an optimal language learning point in a child's development.

In a small scale longitudinal study, Charman (2003) followed up young children (N = 18) identified at 20 months as autistic. Retesting on joint attention and play tasks at 42 months showed that ability in a gaze-switching task (e.g. the child's ability to look towards the examiner when a motivating electronic toy stopped) was highly correlated with later language ability and ASD symptom severity. Charman (2003) adds that it remains unclear whether joint attention is a *cause* of autism or is itself an *effect* of neurological and/or psychological abnormalities in perception and processing of social information. Early reduced interest in people and preference for looking at objects (Leekham et al., 2000, cited in Charman, 2003; Swettenham et al., 1998) may lead to infants having less experience in and/or less motivation towards joint attention and therefore becoming less expert in the abilities associated with social interaction such as language and imitation.

Toth et al. (2006) followed the progress of sixty children over two years. The children were assessed using measures of joint attention, imitation, toy play, language, and communication ability. Growth trajectories were modelled allowing the researchers to suggest the relationship between early skill domains and the development of later language and social communication. Their finding suggests that joint attention and immediate imitation are important 'starter set' skills (Toth et al., 2006, p.1001), skills that set the stage for communication exchanges. Once early language skills are emerging, representational play and deferred imitation have the major effect on further communication development.

A study of children through the primary years further draws out features of social communication that set children with ASD apart from other groups of children. The social communication profiles of children aged 3-11 years with a diagnosis of ASD (N=26) were analysed by Maljaars, Noens, Jansen, Scholte & van Berckelaer-Onnes (2011) and compared with a group of typically developing (TD) and developmentally delayed (DD) children matched for mental age (MA: 2-5 years). They noted that the children with ASD had a significantly lower rate of intentional communication compared with the TD and DD children. Their limited communication intentionality leads, they argue, to 'reduced possibilities to control, understand and participate in the social world' (Maljaars et al., 2011, p.603). The authors raise questions about the lack of emphasis in preschools on providing a range of communicative functions especially for children with low levels of non-verbal ability.

In summary, there is growing evidence that joint attention plays a key role in children's development as social communicators and that when certain types of joint attention are disrupted, this will increase the risk of a child being diagnosed with autism.

It appears likely that lack of capacity in joint attention skills reduces a child's motivation to engage with others and results in fewer opportunities to experience social interactions as they move through the educational system.

One implication from this developmental profiling of children with ASD is that targeting joint attention and related skills such as imitation and symbolic play may reduce the effects of ASD. Evidence is beginning to emerge that interventions focussing on developing joint attention can improve the outcomes of children with a diagnosis of ASD.

Joint attention as a target for intervention in the early years

Early intervention studies provide a way to study the potential factors affecting the development of autism as well as providing potential ways of ameliorating or preventing the symptoms of ASD (Jones et al., 2014). White et al. (2011) point to the advantages of making joint attention the focus of intervention in everyday settings:

Effectively teaching joint attention skills may have collateral effects on social interaction and language development in children with autism. By teaching joint attention skills, social initiations, functional and symbolic play skills, and spontaneous speech could increase. This would make for much more efficient intervention programmes than teaching of these social and language skills individually. (White et al., 2011 p.1284).

Overall, the results for joint attention interventions are encouraging but still limited by insufficient evidence - the total number of child participants aged 10 years or below included in published research (1995-2010) is around 300 children. Most studies come from the United States. White et al.'s (2011) systematic review of 27 studies (predominantly with preschool aged children but including children up to age 10 years) concluded that when joint attention was the main target of the intervention, the results were largely positive. They noted the importance of considering the context (clinic, home, and schools) and the partners used (clinicians, parents, and peers) within any intervention. These, they argued, were critical for joint attention outcomes to generalise.

Joint attention is a difficult skill to target as, by definition, children with autism rarely initiate joint attention – they lack the internal motivation to share what they are doing with you (Yoder & Stone, 2006). However, a few studies have specifically targeted joint attention. Whalen and Schreibman (2003) used behaviourally-based pivotal response training (PRT) techniques to develop joint attention with preschool children (N=5) with a diagnosis of ASD. PRT strategies involve following a child's interests, imitating and talking about the actions, and arranging the environment to engage the child. Target skills for joint attention such as looking towards the adult to show a toy are reinforced and developed through modelling during the session. Whalen and Schreibman (2003) found that all children increased their responses to the adult's bid for joint attention (e.g. looking where an adult pointed) and 4 out of the 5 children initiated joint attention more frequently in later sessions. The gains in responses to joint attention were maintained over three months. However, initiation of joint attention did not continue to develop over time and only 2 out of 5 children generalised their skills to new situations. A follow-up study (Whalen, Schreibman, & Ingersoll, 2006) found that targeting joint attention led to collateral gains in language, play and imitation even though these were not directly targeted.

Like many intervention studies, the sample was very small (N=5) and the single subject research design means that no generalisation can be made about other children's performance. However, it seems to indicate that increasing joint attention may affect the development of later communication skills.

In a larger randomised controlled trial (RCT), Yoder and Stone (2006) hypothesised that gains in initiations of joint attention might occur as a result of introducing other interventions. This would overcome the difficulty of working directly with the area where the child has an identified impairment.

Children aged 18 - 60 months (N= 36) were randomly assigned to either a *Turn-taking* intervention using Responsive Education and Prelinguistic Milieu Training (RPMT) – a naturalistic behavioural strategy similar to PRT- or to a *Requesting* intervention using PECS (Picture Exchange Communication System, Bondy & Frost, 1994). The sessions were held in the University clinic, each child receiving an hour per week training for 6 months. The parents were also offered training. Families were asked to keep a record of other support.

Results showed that children demonstrated more joint attention in the *Turn-taking* RPMT condition than in the *Requesting* PECS group. There was a significant increase in the child *initiating* joint attention following the RPMT turn-taking intervention. An example of this would be clapping when a tower of blocks fell over and then looking at the adult. PECS intervention led to fewer gains in children's joint attention compared with RPMT except for those children with the lowest level of joint attention pre-treatment who showed a significant increase in initiation of joint attention. The researchers raise the possibility that there may be a prerequisite skill to joint attention that involves co-ordinating attention between an object and person, a skill that PECS encourages.

Intervention studies for developing joint attention in preschools

The two studies described above (Whalen & Schreibman, 2003; Yoder & Stone, 2006) were clinic-based (though also involved parents in the delivery of the intervention). A critical question for early years' practitioners is whether clinic based evidence can be translated effectively into educational contexts. Inclusion policies; increases in early diagnosis; heightened awareness of the need for early intervention, and the increased professionalism of early years staff have all contributed to a range of interventions being introduced in preschools including those focussing on joint attention. However, there remains as Kaale, Smith and Sponheim (2012) point out: 'a dearth of knowledge about the success of JA intervention when implemented in preschools' (Kaale et al., 2012, p.98).

Evidence supporting joint attention intervention in preschools comes from a randomised-controlled trial by Kasari et al. (2006). Fifty-eight 3-4 year olds with ASD were randomly allocated to either a *Joint Attention (JA)* group, *Symbolic Play (SP)* group or *treatment-as-usual (Control)* group. All the children were enrolled in a specialist ASD nursery receiving behavioural-based (ABA) instruction for 6 hours a day. Their findings indicated that additional training in joint attention, using strategies similar to Whalen and Schreibman (2003), had a significant effect on the child's response to adult bids for attention and on the number of times they initiated JA by showing a toy to an adult. The JA children's gains were significantly better than those in the SP or Control group.

The children with the lowest language level at the start of the study made the most gains if they were in the JA group. This resonates with Toth et al.'s (2006) correlational findings suggesting that joint attention is one of the starter skills. The children in the SP group also made gains in joint attention compared with the Control group, a result supported by the argument (e.g. Bruner, 1983) that play also involves joint attention. A follow-up study (Kasari et al., 2008) demonstrated that these effects were maintained over time and generalised to other settings. Interestingly, the children in the Control group had (by chance) more hours of support during the follow-up period, making the JA and SP improvements even more promising about intervention effectiveness.

Although this study had the advantage of a relatively large sample and random allocation of children to groups, there remain methodological reservations, particularly about the special nature of the sample. The children's outcomes may have been related to the 6 hours a day, direct behavioural-based instruction they were already having in their 1:1 specialist provision. Would the experimental intervention have been as effective if it had been the child's only intervention? Would the effects have been stronger if intervention had focussed on JA and SP throughout the day?

The authors conclude:

Although the current study cannot answer the question of whether a behavioural or developmental approach is more effective in facilitating language outcomes, findings do point to the potential importance of focussing on core deficits of developmentally selected JA and SP skills (Kasari et al., 2008, p.134).

Dykstra, Boyd, Watson, Crais, and Baranek (2011) asked whether the intervention designed by Kasari et al. (2006) would be effective if used in 'public' (i.e. mainstream) preschools without an intensive ABA programme. They introduced Advancing Social Communication and Play (ASAP) – an intervention that had been developed based on Kasari et al.'s research (2006) - using a single subject multiple-baseline design involving 3 children (44, 48 and 58 months old). They attended preschools for children with disabilities where there were individual and group sessions and support from an SLT. (Although these were public in US terms, they had additional specialist support.) The children received 12 weeks of the intervention with the start times staggered consistent with the experimental multiple-baseline design. Staff were trained in a 3-hour workshop. The results varied between participants but all three children showed some improvements in their social communication and pretend play. The effects were greater in one-to-one settings than in group settings.

The study showed that teachers were able to introduce a new intervention and that effects could be achieved after 12 weeks. No data was collected for children not receiving the intervention and there was no follow-up made. The study adds a little more evidence for programmes that target social communication but has limitations of small sample; limited evidence of maintenance and generalisation, and variability of outcomes across participants.

Kaale et al.'s study (2012) attempted to increase the evidence about preschool intervention by conducting an RCT in 59 Norwegian nurseries. In Norway, most children with ASD enter mainstream nurseries with specialist support available. The children in the study, aged 2-5 years, were randomly allocated to either a control group or to the experimental group. In the former, the children (N=27) received treatment-as-usual. In the experimental group (N=34), the children received a joint attention intervention drawing on Kasari et al.'s (2006) manualised approach. The JA intervention lasted 8 weeks with 2 sessions a day, 5 days a week. It is not made clear if the treatment-as-usual group also received the equivalent 1:1 hours of support.

Comparison of pre- and post-test scores showed a significant positive effect of the intervention on the number of initiations for joint attention with preschool teachers. The experimental group also engaged in play with their parents for longer periods following the intervention. However, the time engaged with preschool teachers did not increase. The authors suggest that this may reflect the bias of staff to focus on skills-based table-top learning activities that promote JA initiations, with less focus on relationship-based learning that would encourage longer engaged play. This echoes the comments by Wong and Kasari (2012) that preschool staff are taught to encourage independent learning which may result in reduced time spent in engaged play routines. The results provide further evidence of positive effects of specialist JA intervention, but the observed increases were not supported by the children's scores on standardised tests of JA. There was no difference between the two groups on more formal assessments. It is also unclear if coding of initiations of JA included requesting.

In a follow-up study, Kaale, Fagerland, Martinsen, and Smith (2014) found that the effects found in the 2012 study were maintained after 6- and 12-months. However, the treatment group performed the same as the control group on measures of language development and social functioning. The researchers question whether increases in intensity and duration of the intervention would lead to greater effects on the child's social communication. In addition, they question whether brief training of non-specialist staff and parents is sufficient, asking if a higher level of professional specialist intervention is needed to produce long term effects.

Landa, Holman, O'Neill, and Stuart (2011) asked a similar question to that of Kaale et al. (2012) in their study of the 'active intervention ingredient' affecting the social development of toddlers with autism. Two-year-olds with a diagnosis of ASD were randomly assigned to the treatment group (N=24) in which the preschool curriculum was supplemented with an intervention programme called Interpersonal Synchrony. This intervention specifically targeted social imitation; initiation of joint attention, and shared affect. The control group (N=24) received an identical specialist curriculum but without the added Interpersonal Synchrony element. The hours of support were the same for each group and included 10 hours a week in specialist nursery, plus Speech and Language Therapy, plus parent education sessions.

The experimental group achieved higher post-test scores than the control group, especially for social imitation, but the higher scores in joint attention and shared affect did not reach significance. Overall both groups showed gains in expressive language and communication, but without a non-intervention control group it is impossible to say if that was due to the curriculum both groups received or to maturation. The intensity of the specialist curriculum may have been enough to produce the changes without an additional supplementary curriculum. However, the results support the hypothesis that there is plasticity in a young child's development that can be recruited to promote social communication development.

Wong (2013) developed a research model that tries to address the 'critical gap between the promising efficacy data and the translation of that research to the school settings' (p.342). As other researchers reported above (Dykstra et al., 2012; Kaale et al., 2012; Kasari et al., 2006; Kasari et al., 2008), Wong (2013) identified the child's joint engagement, joint attention, and symbolic play as areas to be targeted as core ingredients for a child's later social communication levels. Thirty- four US preschool children (aged 3-6 years) were randomly assigned to an experimental group or to a Waiting List group. Each child attended a small special education unit and had his/her own specialist teacher. These varied in curriculum approach, some being more behavioural, others more social-development in approach. There were 14 teachers in all. The intervention consisted of 8 play and joint attention sessions. These could be adapted by the teacher to fit in with their school approach. An interventionist provided a one hour training where the teacher learned ways to implement the intervention within the existing curriculum. There was variation in the implementation – for example, in some classes implementation happened in one-to-one activities, while in other classes a group approach was used. Half the schools focussed on joint attention activities first; the other half began with symbolic play activities.

Children in the experimental group scored significantly higher on measures of joint attention and play skills compared with the scores of children in the waiting list group. This was irrespective of the type of specialist class they attended. The gains were greater for those children whose teachers implemented joint attention strategies before symbolic play ones. Wong suggests that symbolic play development may be a more developmentally advanced skill that rests on the foundation of joint attention as suggested by the developmental trajectories predicted by Toth et al. (2006) above.

This small scale study, Wong concludes, demonstrates that teachers are able to implement a class-based intervention with minimal training and that positive outcomes can be seen after 8 sessions. The effects occurred across settings that included a range of approaches: 'it may be that instead of focussing on **how** to teach these social-communication skills, it is more important that play and joint attention **are** being taught in the classroom for young children with autism' (Wong, 2013, p. 353, author's emphasis).

Stickles Good, Ishijima, Chang, and Kasari (2013) extended the scope of many intervention studies by asking if focussed intervention targeting joint attention and symbolic play would lead to improvements in those 'generally overlooked children who do not make significant progress in spoken communication' (p.1050). They introduced a social-developmental intervention named JASPER (Joint Attention Symbolic Play Engagement and Regulation) to 7 preschool children (N=5 at exit) who were already enrolled in an ABA-based programme for 30 hours a week but remained pre-verbal (i.e. using fewer than 10 functional words). A matched preschool control group (N=8 at entry; N=6 at exit) continued to receive the 30 hour-a-week ABA programme. The total number of hours of intervention was the same for each group. After a 12 week intervention period the children were all reassessed using measures of play diversity and social communication plus observations in the classroom settings. This short, low density intervention resulted in increased diversity of play of the children in the experimental group, an effect that generalised to everyday preschool settings. There was a small, but limited effect on the children's use of gestures and initiations.

The very small sample limits the conclusions that can be drawn, but the authors suggest that children who make limited progress from one type of intervention (ABA in this case) may benefit from an alternative approach targeting play and joint attention using a naturalistic developmental approach. Of course it may be that any change of approach makes a difference.

Overall, there are limited but promising results for focused interventions that target joint attention. In most cases, the joint attention intervention has occurred *in addition* to other ASD focussed provision and been carried out by specialist-supported staff. The SCIP research project reported here asks if such results would occur in mainstream preschools with non-specialist staff, the setting that most children with a diagnosis of ASD will experience in the UK.

Imitation ability as a target for intervention in the early years

Alongside joint attention, imitation has also been associated with the development of language and social skills (Ingersoll & Lalonde, 2010; Stone & Yoder, 2001; Toth et al., 2006). At birth, neurotypical babies are able to copy facial movements, for example, copying tongue protrusion within an hour of birth (Hobson, 2002) and by nine months are imitating gestures and actions for objects (e.g. wheels going round) in both immediate and deferred contexts. Infant imitation appears to serve critical social functions ‘providing the child with shared social experiences, a sense of mutual connectedness and a means of communication between social partners’ (Toth et al., 2006, p.994). Bruner (1983) and Bates et al. (1989) demonstrated the role of social imitative play in joint routines for the later development of language, while Ingersoll & Lalonde (2010) in their overview of current research identified imitation skills as playing a foundational role in the development of language.

Imitative skills are often delayed or disordered in children with autism (Ingersoll, 2008; Nadel & Aouka, 2006). However, it is not simply copying actions that is impaired, though children with autism often use fewer gestures and imitative actions. What is more significant is their understanding of the social meaning of actions. For example, children with autism often wave ‘hello’ and ‘goodbye’ with the palm of their hands facing towards themselves. Thus, they are able to copy a motor action – they are waving exactly as they see it being done, i.e. with the palm facing them. What they fail to understand is the social interactive function of showing your open palm to another person.

The reduced understanding of a *social* signal has led to theories about the relationship between early social imitative play and the development of reciprocal interaction and later theory of mind abilities (Meltzoff, 1999).

Carpenter, Pennington, and Rogers (2002) found that object imitation preceded the development of joint attention in children with autism whereas joint attention develops first for neurotypical children. They speculated that imitation may be more important for language acquisition than joint attention for children with ASD: 'We ... suspect that children with autism may be using something else—imitation—to enter into the process of language acquisition' (Carpenter et al., 2002, p.104).

If imitation leads the developmental line into joint attention and verbal and gestural intentional communication, this underscores the importance of developing imitation skills for children with autism. Imitation skills may represent an altered route to social knowledge, developing as a detour around the social-emotional barriers that autism creates (Carpenter et al., 2002, p.105).

Interventions for developing Imitation in the early years

Given this possible link between social imitation and later communication development, researchers have begun to look at the effects of specific imitation training to promote communication. Ingersoll and Schreibman (2006) developed a naturalistic behavioural programme for 5 children aged 29-45 months. Imitation was modelled over 10 weekly sessions using a series of developmental steps. First the interventionist imitated the child; then the child was encouraged to imitate familiar actions and finally to imitate novel actions. The children showed, as hypothesised, increased frequency of imitated actions, and they also showed (with considerable variation between children) increases in language, pretend play and joint attention.

Ingersoll and Lalonde (2010) asked a further question about imitation in their comparison of the effectiveness of *object* and *gesture* imitation for developing language. They introduced gesture imitation to 4 children with ASD who had already taken part in object imitation training as part of the larger study summarised above (Ingersoll & Schreibman, 2006). To give an example of their intervention, in object imitation the trainer might copy the child as he/she sat spinning the wheels of a car, and then model a new action such as rolling the car and saying 'vroom, vroom'. In gesture imitation, the trainer would use a spinning gesture with a finger and say 'spin, spin' and then might gesture driving a car with a gesture of turning the wheel. The results showed some positive effects, with 3 out of 4 children making gains in language use after the gesture imitation was introduced. Both studies are small and single-subject design and success varied between children, but they suggest areas worth further exploration.

Much of the research on imitation and joint attention has been conducted in University settings. Warreyn and Roeyers (2014) asked whether effects would transfer into preschools in a small scale naturalistic study in the Flanders area of Belgium. In Belgium, children with a diagnosis of ASD attend regular school (unless they have severe learning needs) and also attend 3-5 hours at a 'rehabilitation centre'. In this study, an intervention programme was designed for use in the rehabilitation centres focussing on joint attention and imitation. 48 preschoolers (age 3-7 years) were randomly assigned to either the experimental group receiving 24 half-hour sessions of the focussed intervention, or to treatment-as-usual in the specialist centres. Both groups received the same number of hours support. The results are not easy to interpret. Both groups made progress on joint attention and imitation tasks, but the experimental group made significantly more progress than the control group on joint attention measures for Gaze and Initiating requests. Initiating declaratives (i.e. 'look-at-what's-happening' communications) decreased in the post-test scores of both groups, perhaps because the toys were the same in pre- and post- tests so the children were not motivated to get the adult's shared attention.

The imitation scores did not differ between the groups. This may be because treatment-as-usual was also teaching imitation or it may be due to the maturation of both groups. Overall, the authors feel that the progress made following the new initiative justified further research. There is no mention of a follow-up or of assessment to see if the children used the newly acquired skills in other contexts.

Overall, the trends from these studies tentatively indicate that there are positive gains (and no negative effects) resulting from interventions targeting imitation and joint attention. But studies are few, samples are often small, and few interventions have yet been tested in everyday contexts. The SCIP study uses both joint attention and imitation in the small group intervention in the hope of adding more evidence to the emerging data about evidence-based practice.

Functional and symbolic play as a target for intervention in the early years

Play is the third interrelated area that correlates with later communication abilities in both typically and atypically developing children (Toth et al., 2006). Active participation in play is seen as providing the opportunity for children to construct shared meanings and to acquire symbolic systems, such as language (Vygotsky, 1978; Wolfberg & Schuler, 2006). The link between play and language is shown by the appearance of the child's first word in typical development at around the time that pretend play emerges. Word combinations develop at the same time as the child combines imaginary play (e.g. pretending to drink from an empty cup then giving a doll a drink). Children with autism are delayed in their use of symbolic play, and their level of play correlates with expressive language abilities (e.g. Sigman & Ruskin, 1999). Yet, play has only recently been a target of intervention. Wolfberg and Schuler (2006) suggest that play has been seen as a 'luxury to be targeted only when other basic deficiencies have been remedied' (Wolfberg & Schuler, 2006, p.182). Social-developmental approaches, however, have promoted an increased interest in play as an intervention area and have also begun to focus on the role of peers to develop play (Wolfberg, 2003).

Interventions for developing play in the early years

The study referred to above (Kasari et al., 2006) provides the only randomised-controlled trial in preschools that focusses on the role of symbolic play intervention for developing social communication for children with ASD. As noted above, children allocated to the symbolic play group made significant progress on measures of joint attention and social engagement compared with the control group. In addition, the children in the symbolic play group used more diverse and complex play behaviours both in the experimental sessions and at home with their parents. The authors suggest that play (like joint attention) needs focussed intervention strategies, a finding with implications for providers of early years education for children with ASD.

A few intervention programmes have focussed on peer-mediated strategies – where neurotypical peers are taught to support interactive play with children with autism. To date, these have involved school-aged, mainly verbal, children (Rogers, 2000; Wolfberg & Schuler, 2006). Although the studies have shown some promising results, there is limited literature available for peer-based intervention for preschool aged children. This is a significant gap in the research evidence (see Chapter 6 below).

Section 3: The role of the parent/carer in developing social communication and interaction

Joint attention, by definition, involves engagement with a communication partner in a socially supportive environment. It is therefore important to identify the best contexts in which to develop social communication, and also to measure the effects of different communicative partners on children's progress (White et al., 2011). Some interventions have focussed on teaching familiar communicative partners – parents; peers and preschool practitioners – how to implement joint attention strategies (e.g. Kashinath, Woods, & Goldstein, 2006; Wetherby & Woods, 2006).

The transactional process

The underlying principle of training carers as interventionists is that development of communication is a social activity, a transactional process between a child, the learning context and those around him or her. This is core to social-developmental approaches that emphasise the important role of the conversation partner. The focus in the SCERTS framework for working with children with ASD (Prizant et al., 2006) and in other developmental approaches such as DIR Floortime (Greenspan & Weider, 1998; 2006) is on the central role of the early dyadic interactions in development – interactions that can be influenced by the carer’s interaction style (e.g. Tomasello, 2005). The adult is seen as playing a critical role in the child’s development, and needs to consider aspects such as: responding to the child; setting the stage for learning; adapting the environment to help the child be available for learning, providing appropriate learning supports such as symbols and gestures, and giving feedback about an interaction’s success.

Children whose parents and carers are able to support their learning by adapting the way they interact and by adapting the environment are, proponents of such approaches argue, more likely to have positive communication outcomes. The research questions have been around whether caregivers can learn new interpersonal strategies; which strategies lead to positive communication outcomes, and whether changes in adult interaction result in changes to the child’s level of autism severity (Green et al., 2010).

Historical context to parent involvement in intervention

Before turning to the research evidence, it is useful to place parental involvement in intervention in an historical context, a context in which parents were once seen as part of the cause of autism.

The view of parents as part of the problem rather than a key to the solution still holds sway today in some countries (Feinstein, 2010). Feelings of guilt are not uncommon among parents with a child who is developing atypically (Wachtel & Carte, 2008). However, in the case of autism, parents were explicitly blamed only half a century ago. The psychogenic approaches that began in the 1950s, and can still be found, in modified forms, in parts of the world such as France and Italy, are based on the assumption that family members are part of the child's problem. Bruno Bettelheim (1967) was at the forefront of the psychogenic movement. Bettelheim viewed children with autism as in a state of defensive withdrawal, 'a state of mind that develops in reaction to feeling oneself in an extreme situation, entirely without help' (p.57) and concluded that autism is a disease caused by pathological parenting. He popularised the term *refrigerator mother* and his treatment clinics in the 50s and 60s separated the parents from the child as, in his view, this was the only hope of a cure. Without such separation, he argued, the behavioural cycle would continue with the child withdrawing further in response to the parent's pathological lack of response.

Feinstein (2010) and Silberman (2015) note that the extreme nature of these views and the equally extreme and questionably abusive treatments in the treatment centres led to a backlash from parents wanting to defend themselves as loving parents, able to raise healthy siblings, but with nowhere to turn for their child with autism. Many parent groups formed and schools began to open with the aim of supporting the needs of a child with a neurological condition while also recognising the impact that such a disorder can have on a family. The current view, in most countries, is to see autism as a neurological condition with multiple causes that is also *influenced* by the family environment. That is not the same as seeing parents as a cause of autism, instead it views parents as possible facilitators of social development, as the people most able to have a positive impact on the child's development.

This historical context for parental involvement helps to explain why early interventions, especially in the US, rarely included parents. For example, in ABA approaches, children were seen as needing specialist tutors for up to 40 hours a week (e.g. Lovaas, 1977). The parents might be enrolled and trained as co-tutors but the programmes did not build on the family's daily routines, and did not use strategies that parents would naturally use with neurotypical children. It also helps explain why research into parent-mediated interventions is still in its infancy. Siller and Sigman (2002) note that 'the role of parents in the fostering of nonverbal and verbal communication in children with autism has not been investigated', adding that this is probably because of 'fallacious psychogenic theories of autism' (Siller & Sigman, 2002, p.78).

Over the past twenty years, the shift in attitudes has led to naturalistic behavioural interventions that are based around family needs. This has happened alongside the rise of social-developmental and relationship-based approaches that see the adult interactive style as integral to all interventions.

Meadan, Ostrosky, Zaghawan, and SeonYeong (2009) carried out a systematic review of parent-implemented studies building on the evidence of previous reviews (Koegel, 2000; McConachie & Diggle, 2006; Rogers, 2000) that individualised, home-based interventions could provide effective and culturally sensitive programmes of support. Meadan et al.'s (2009) review identified 12 parent-implemented intervention studies published in peer reviewed journals between 1997-2007 for children aged 20months to 9 years. In total, 105 children participated (85 were under 6 years) and 110 parents. Although the country in which they were studied is not stated, most appear to be from the US. To date, including studies since Meadan et al.'s review, only a small, non-representative, population of parents have been tracked in their interactions with children with ASD. The number is even smaller for studies of practitioners' interaction with these children in educational settings.

Overall, Meadan et al. (2009) concluded that studies demonstrate that parents can be taught specific strategies felt important for developing communication. In addition, the children showed positive improvements in targeted aspects such as verbal communication following parent programmes. The parents reported feeling more positive about ways to support their child. Most of the reviewed studies involve small scale research with varied methodologies, often single case studies. In addition, the studies often lack of information about maintenance and generalisation, and lack control of other provision accessed by families.

The findings echo conclusions from other evidence-based research that most approaches work for at least some children for some of the time. The studies indicate strategies that may help, but evidence is not sufficient to recommend large scale implementation of particular parent-mediated intervention. The shortage of clinical trials, of longitudinal studies, of follow-ups, and of comparative studies leaves much unanswered – is it just doing *something* that involves close attention to your child that makes a difference? Below is a closer look at studies investigating the ways parents interact with children with ASD, and evaluating the effectiveness of parent-mediated interventions. This is followed by a summary of research looking at preschool practitioner interaction with children with ASD.

The effect of parent responsiveness on child outcomes in the early years

Siller and Sigman's study (2002) is one of the few longitudinal studies tracking the development of children with autism that looks specifically at parent responsiveness during interactive play. The researchers drew on studies of early language development (e.g. Bates et al., 1988; Bruner, 1983) that showed the importance of activities that encourage joint engagement, where parent and child attend to the same object and the child co-ordinates attention between mother and object. These social joint routines are predictive for later language development in normally developing children and also for children with Down syndrome (Harris, Kasari, & Sigman, 1996).

Siller and Sigman (2002) showed that young children with ASD whose parents showed the highest levels of responsiveness to their child's early interactions developed better joint attention and language over a period of 1, 10 and 16 years. Their study (N=61) included 25 children with a diagnosis of ASD; 18 children with developmental delay including Down syndrome, and 18 children with typical development matched for language level. The average age of the children with ASD at the start of the study was 50 months; average age for typically developing children was 21 months. Participants were initially identified and assessed 1980-1985, then followed up one year later and again after 10 and 16 years. The children's verbal and nonverbal language abilities were assessed using standardised measures, and the parent interactions were assessed during a free play session in a clinic playroom. The main measure of parental style was their synchronisation – the degree to which they responded to the toy that the child was attending to. The parent-synchronised behaviour was coded as either demanding – requiring the child to change in response to an adult direction, or undemanding – not requiring any change in the child's focus.

The first result showed that the degree of synchronisation for parents of children with autism was the same as that for parents of children of delayed and typically developing children. This, the authors felt, was 'remarkable' (p.85) given the challenge of adapting to the child's focus of attention. The result goes against previous findings that parents of children with disabilities including autism are more directive (e.g. Kasari, Sigman, Mundy, & Yirmiya, 1988). This may reflect differences in the assessment play setting and in parents' perceptions of the researcher's expectations. If parents think their performance is being assessed they may become more directive, feeling less comfortable about being 'undemanding'. This resonates with findings from a study reported below (Kossyvakis et al., 2014) who found that preschool staff worried that undemanding strategies, such as waiting for the child to respond, might appear as though they were not actively extending the child's learning.

An interesting question, briefly mentioned by Siller and Sigman (2002), is whether the parents' level of response to a child with autism was high enough. In a research condition where a parent was asked to play with their child, it might be expected that a higher level of synchronisation and verbalisations would be noted for a child with autism compared with a typically developing child. This point is raised (see below) in one of the few studies looking at preschool teacher interaction (Wong & Kasari, 2012) where the teacher responses to children with autism were observed as no different from responses to a neurotypical child when it might have been expected to be higher.

The second result was that parent synchronisation with the child's focus of attention that was *undemanding* was found to be the best predictor of future verbal language gains irrespective of the learning and language ability levels of the children. Gains in the children's nonverbal skills had the highest correlation with parents' initiations of joint attention e.g. parents pointing to the object that the child was playing with. Similar results have been found in parent studies with prelinguistic young children (N=58 aged 17-32 months) with developmental delays (Yoder & Warren, 2001).

Beurkens, Hobson and Hobson (2013) emphasise in their study of parent-child relatedness and relationships that the challenge is to encourage interaction in order to promote social engagement and social development. They found that relatedness was inversely affected by severity of autism. However, there were no differences in parents' views of their relationships depending on the severity. In other words, although it appears harder for parents to synchronise with children with more severe difficulties, parents do not differ in their feelings of connectedness to their children.

Intuitively, it makes sense that a child will be more responsive when their chosen activity is the focus of the interaction, and when they do not have to change attention. Arguably, curriculum pressures in preschools may militate against staff using 'undemanding' responses (Wong & Kasari, 2012). Observation of staff responsiveness forms part of SCIP Study 2 reported in Chapter 5.

Patterson, Elder, Gulsrud, and Kasari, (2014) provide a closer analysis of the ways that adults foster joint engagement and the effects this has on child outcomes. Their study of 85 toddlers (average age: 31 months) interacting with their parents showed differences in engagement. They compared child- initiated joint engagement (CIJE) with parent-initiated joint engagement (PIJE). These correlated with parental interaction style: CIJE was associated with parents who scored more highly on responsiveness; PIJE was associated with parents who scored higher on directiveness. There are parallels here with Siller and Sigman's (2002) demanding and undemanding styles of interaction. CIJE was found to be associated with social behaviours such as increased affect; co-ordinated gaze and gestures. Thus, in the researchers words: 'responsiveness creates an environment that focuses on responding to children's social behaviour...thereby providing children with the opportunity to both drive the interaction and practise initiating critical social behaviours that are difficult for children with ASDs to learn' (Patterson et al., 2014, p.515). On the other hand, PIJE correlated with child measures of coordination and persistence, suggesting that a more directive interactive style can help a child stay on task.

This may be relevant in preschool environments where time spent staying on task may be valued more highly in the curriculum than the number of child-initiated actions. Patterson et al. (2014) also found that children were only engaged with an adult for 13% of the interaction time; they were unengaged for roughly the same amount of time, and were engaged with objects for 50% of the total interaction. This is almost the opposite from observations of neurotypical and developmentally delayed children when children are found to be engaged with adults for around 75% of the time (e.g. Adamson et al., 2009).

Siller et al. (2013) reinforced the importance of parental responsiveness in a randomised controlled trial that investigated the effects of parental training. They asked if responsive behaviours could be taught to parents and further asked if adult responsiveness was more important in the early stage of language development.

This latter question was based on studies of language development that indicate critical 'windows' for children's development in the second year of life (e.g. Kuhl, 2010). Sixty-two families of US preschool children (average age: 5-6years) completed the study; 31 in each group. Each child was assessed for their baseline language and learning abilities; parents were assessed through video observations to measure their synchronisation with their child's play, and were also scored for their insightfulness based on a questionnaire. The families were randomly allocated either to the experimental or the control group. In both groups, the parents received a Parent Advocacy Training, the experimental group had an additional 12 week course in Focussed Playtime Intervention (FPI). This is described as a capacity-building course in which parents were guided to develop strategies to increase their child's social engagement. The parents were encouraged to discuss and reflect on what they were doing and to be active participants in the intervention process.

The overall finding was that the experimental group participating in FPI developed more responsive behaviours. However, closer analysis showed that this effect was significant only for the parents who were classified as *insightful* at the start of the study. The non-insightful parents failed to increase in responsive behaviour. In contrast, the insightful parents in the standard parent training available for the control group decreased in their responsiveness. The authors suggest that parents may revert to more directive styles if they are not encouraged to see themselves as having a role.

Siller et al. (2013) found in addition that the children with lower language abilities – expressive language below the level of a 12month old – made greater improvements. This adds to the growing evidence that interventions may be particularly effective during the very early stages of development.

Although there are methodological shortcomings of this study such as the difference in the number of hours for the 2 groups (15 sessions for the experimental FPI group; 4 sessions for the control group), the results raise questions about *who* benefits from a particular approach and *how* a particular intervention affects both parent and child learning. For example, FPI appeared to be effective for insightful parents and led to most gains for children with low level language abilities. The control group training, on the other hand, appeared to reduce the responsiveness of some parents. As Siller et al. (2013) conclude, research needs to identify the moderators (who it works for) and mediators (how it affects behaviour) of treatment gains in children with ASD.

A similarly designed RCT was set up by Casenhiser et al. (2011) in Canada. They recruited 51 children aged 2;00-4;11 with a diagnosis of ASD and randomly allocated them to two groups. In the experimental group, families took part in a 2-hour a week parent-focussed training based on DIR Floortime principles (Greenspan & Weider, 2006). DIR follows a social-developmental approach with emphasis on developing the parent-child relationship to facilitate joint attention and reciprocity. In the control group, the families received treatment-as-usual. In the Canadian context, regular intervention was mainly based on behavioural principles, but the interventions varied across the control group. The researchers assessed the children before and after the 12 month study period.

Overall, the children in the experimental group made greater improvements in measures of social interaction and joint attention. This included significantly greater enjoyment in interactions with their parents; more attentive behaviour and more initiations of joint attention. These gains in social interaction were not reflected in their expressive language as measured on standard language tests. However, a reanalysis of the data (Casenhiser, Binns, McGill, Morderer, & Shanker, 2015) showed that the experimental children outperformed the control group in terms of their functional use of language.

The authors question the sensitivity of standardised language measures to capture the social and pragmatic uses of language – the uses that are most important to develop for a child with social communication difficulties. Casenhiser et al. (2011) did not use measures of parents' initial responsiveness so could not analyse interaction effects between child outcomes and parental insightfulness.

Kashinath, Woods, and Goldstein (2006) acknowledged the importance noted by Siller et al. (2013) of basing intervention on parents' assessed abilities. The aim of their study was to change individual parent's interaction style by enhancing the use of specific strategies. This, they hypothesised, was likely to affect the child's participation and thereby influence the child's developmental outcomes. The strategies, drawn from previous research findings, were: arranging the environment; using natural reinforcement; using time delay; imitating contingently; modelling, and using gestures/visual cues. They aimed to embed these strategies in each family's daily routine, in the 'unique interactions that organise and shape their children's activity and development' (Kashinath et al., 2006, p.467). Routines were identified by the parents in discussion with the researchers and included both caregiving activities such as dressing, as well as play times both inside and outside. The authors argued that 'identifying intervention strategies that match the child's goals and family's routines may enhance the feasibility, acceptability and sustained use of intervention strategies over time' (Kashinath et al., 2006, p.481).

The researchers first analysed parents' normal interactions with their preschool children (N=5) and then identified two strategies less frequently used that could be embedded into everyday activities. For example, one mother used *contingent imitation* and *time delay* strategies infrequently. These were seen as developmentally appropriate strategies to use in everyday activities and were taught to the mother.

They also identified the natural daily routines where the parents could embed the strategies e.g. 'snack time' and 'car play'. The impact of the introduction of the new strategies was measured using a single study multiple-baseline design. Mother-child interactions were recorded over a 5-6 month period during two-weekly visits by the researcher. The mother's use of the strategy and the child's communication skills were measured before, during and after the intervention.

The findings of the study were encouraging in terms of using parents as interventionists. First, the parents were successful in adopting the strategies taught and embedding them in everyday contexts. They were also able to generalise the strategies to other daily routines. Second, all 5 children made gains in their communication (use of gestures and words) though there was variation across contexts. The analysis of the gains was by visual inspection. While the differences between the baseline measures and the post intervention measures are visible from the graphs, the gains are small and variable. As there were no controls, gains may have been due to normal development over 6 months. However, it remains promising that a study with high ecological validity has positive outcomes both in terms of parent implementation and in child outcomes.

Comparable results were found in a larger quasi-experimental investigation by Wetherby and Woods (2006). They introduced a one year parent-based intervention for seventeen 2-year-olds identified as at risk of ASD. Few studies exist for children below the age of 3, primarily because a diagnosis of ASD is not considered reliable until around 3 years of age (Lord et al., 2000). However, there is an increasing argument to intervene as soon as features of ASD are identified as early intervention may have greater impact (NRC, 2001; Stone & Yoder, 2001).

The parents received training in strategies to increase their child's social interaction (joint attention; imitation, and play routines). All the strategies were embedded in everyday activities and individualised according to the child's preferred areas of play. The parent programme lasted for a year with twice weekly sessions with a trained facilitator. The parents also attended a specially designed parent and child playgroup with weekly advice around social interaction and play. It was thus an intensive intervention in comparison with other studies e.g. Aldred, Green, and Adams (2004). The children's social communication skills were measured pre- and post-intervention using the Communication and Symbolic Behaviour Scales (Wetherby & Prizant, 2003).

The children made significant gains on most measures of social communication. These included communicative functions (e.g. joint attention); communicative means (e.g. gestures and words) and symbolic capacity (e.g. pretend play). Social signals such as gaze shift and shared positive affect (i.e. smiling with pleasure directed to another) increased but the increase was not significant. To control for maturation effects, the researchers compared their results with those of children matched for age and diagnosis who had not received the intervention. These children were diagnosed with ASD at age 3 years, i.e. a year later than the children in the study. Thus the contrast group was not matched at age 2 years when the study began, and so may differ from the experimental group. There were no significant differences between the experimental and comparison children at age 3 in terms of communicative means or for symbolic play, suggesting that gains for the experimental group may be due to maturation. However, other social communication measures increased for the experimental group, suggesting that: 'intervention beginning in the second year of life can have a positive effect on core social communication deficits of ASD' (Wetherby & Woods, 2006, p.79).

Early parent intervention has been studied with children at risk of ASD as young as 7-15 months (Rogers et al., 2014) and 12 months (Steiner et al., 2013) with some evidence of success, demonstrating the ability of parents to adopt supportive strategies. To date, the numbers studied are very small. Most of the studies above used intensive parent-training over a number of months, and focussed on small samples with variable use of control groups.

A large scale RCT in the UK (Green et al., 2010) looked at the effects of a parent-training – the Preschool Autism Communication Trial (PACT) intervention – compared with effects of equivalent hours of treatment-as-usual. The training had been used in a Pilot RCT study (Drew et al., 2002) whose results suggested that parent training may lead to child language gains above those found for children using local services. However, the results in Drew et al.'s study (2002) were mixed and may have been affected by methodological difficulties such as sample size and by parents opting for other interventions during the study. More evidence was needed.

Green et al., (2010) recruited 152 children aged 2;00-4;11 in 3 UK centres, with 77 assigned to PACT and 75 assigned to treatment-as-usual. This was a methodologically robust study with a high level of randomisation; group-matching, and rater-masking. The primary outcome measure was the children's severity score on ADOS-G. This was chosen as it was distal to the intervention – something rarely used in other studies. Other secondary outcomes were proximal i.e. related to the intervention programme. These included: parent synchronisation; children's language scores, and a measure of adaptive functioning beyond the family. The results showed higher improvements for the PACT group on the secondary proximal outcomes compared with the treatment-as-usual group. However, there was no difference between the groups in their post-intervention ADOS-G severity scores (Lord et al., 2000) – both groups improved in terms of identified symptoms. In addition, there was progressive attenuation of effects as the child interacted with less familiar people in less familiar settings.

The research authors conclude that PACT led to positive effects for families in terms of their interactions at home 'in ways that are associated with subsequent positive child outcomes' (Green et al., 2010, p.2159), but that this did not significantly affect clinically-defined autistic symptoms. The result could reflect the lack of sensitivity of ADOS-G. It may also be that changes become more evident over time. For example, changes in parent interactions may lead, long term, to a child's increased access to learning opportunities irrespective of ADOS scores.

Solomon, Van Egeren, Mahoney, Quon-Huber, and Zimmerman (2014) followed a similar RCT model to that of Green et al. (2010) but produced different results. 112 children (aged 2-6 years) completed their study: 57 in the intervention group; 55 in the control group. The intervention consisted of a PLAY programme – Play and Language for Autistic Youngsters – that taught parents a home-based intervention based on the principles of DIR Floortime (Greenspan & Weider, 2006). The control group had regular support from community services. After a year-long programme, there were significant improvements in parent-child interaction styles and also in the children's ADOS scores. However language and cognitive measures did not show significant effects. The researchers suggest caution in interpreting ADOS score measures while at the same time noting the considerable changes in autism symptomatology.

Juneja et al. (2012) add a small study of children under 6 years (N= 36 at entry; N=16 at exit) into this research pool. Their study was based in New Delhi, India, a setting characterised by low resources and high illiteracy rates among parents. India's ASD policy advocates intensive ABA programmes but these are expensive and largely inaccessible to most families. Juneja et al. (2012) introduced a low resource parent-based training combining naturalistic behavioural and ABA principles. After 1 year, the 16 children completing the intervention showed improvements in expressive language; social function and autistic symptoms measured by Childhood Autism Rating Scale (CARS) (Schopler, Reichler, & Renner, 2002).

In most of the studies mentioned above (e.g. Kashinath et al., 2006; Wetherby & Woods, 2006), parents have individual, usually home-based, training. The results have generally been positive. But this type of intervention is intensive and likely to be expensive as a service delivery model. Group teaching offers advantages in terms of effectiveness – reaching more families at a lower cost – and arguably has advantages for parents in terms of peer support. The National Autistic Society Early Bird Model (www.autism.org), for example, provides a forum for parents to share experiences and to support each other (see Shields, 2001). On the other hand, a group delivery model may have disadvantages by failing to target the areas where individual families need support (see Kashinath et al., 2006)

Hardan et al. (2014) carried out a randomized controlled trial (N=47 completed trial) in which parents of children aged 2-6 years (mean age = 4.1 years) participated in either a 12 week training in Pivot Response Treatment (PRT) (Koegel & Koegel, 2006) or joined a 12 week Psychoeducation group (PEG). The families all had additional community support. The PRT training included 4 individual sessions with the clinician whereas the PEG training included only 2 individual sessions. The main child outcome measure was frequency of utterances, both imitative and nonverbally prompted. This was obtained through a 10 minute structured laboratory observation in which parents were asked to get their child to imitate as much as possible. The structured observation occurred before treatment, after 6 weeks and at the end of the 12 week trial. Measures of parent fidelity of treatment implementation were also looked at for the PRT group.

The results showed that all children made significant gains in utterances used over the 12 week period, but the children of parents participating in the Pivot Response Treatment training showed greater improvement. Parents in the PRT group demonstrated a high ability to implement the programme (80% fidelity) and reported greater improvement in functional communication at home than parents in the Psychoeducation group.

The results, while promising for Pivot Response Treatment training need, as the authors acknowledged, some cautionary notes. The treatment groups may not have been equal as they varied in the number of individual vs group sessions. The children all received community support and the influence of these different programmes could not be controlled. There was no follow-up observation. This is a serious weakness given the evidence that progress is often not maintained for this population. A further criticism is that the main outcome measure – child utterances – is a primary focus of PRT training. The Psychoeducation training may have shown greater increases on measures that reflected the focus of the group sessions. The lack of a distal outcome may also have affected results (see Green et al., 2010).

Most parent-mediated interventions have been home-based without reference to the interventions being carried out in the children's preschools. Rickards et al. (2007) introduced a 1 year home-based support programme for 3-5 year old preschoolers with a diagnosis of ASD (N=30) that demonstrated to parents the intervention taking place in their child's specialist centre. A control group (N=29) did not receive the home-based sessions. A parent questionnaire looked at home resources and stress levels. The primary child outcome was in terms of cognitive levels (IQ measurements).

After 1 year (= 40 home visits) the children in the home-based intervention group significantly improved their cognitive functioning (IQ scores) compared with the control group. The gains were related to the parents' levels of stress and access to resources: children in families with few resources and a higher level of stress made more gains than children from low stress/high resourced homes. Although questions can be raised about the usefulness of the cognitive outcome measures to show children's social functioning and communication, the study raises pertinent questions about the way information is shared between homes and schools.

Summary

Overall, the research on adult-mediated interventions reflects the complex interplay of adult and child factors that can affect a child's progress. Broberg, Ferm, and Thunberg (2012) put it this way:

'Either partner in the 'dance' between parent and child is capable of disrupting the interaction and altering its nature in ways that can have lifelong consequences. Initiating and maintain a highly responsive interaction style....can be highly challenging, even for a parent with the best intentions, but is crucial for positive communication development' (Broberg et al., 2012, p.244).

Section 4: The role of the early years' practitioner in the development of social communication and interaction in the early years

Exploration of the preschool practitioner role alongside studies of parents' roles is important too, and forms the second focus of the SCIP Project. Although the trend in the UK and US is for greater preschool inclusion for children with special needs, surprisingly, very little research has looked in depth at the support needed for preschool teachers to focus on the areas studied in parent-child interaction: joint attention; imitation, and symbolic play. Staff-child interaction with children with ASD has only recently been observed (e.g. Keen, Sigafoos, & Woodyatt, 2005 ; Wong & Kasari, 2012) and very few projects have looked at the effectiveness of staff training in mainstream preschools (e.g. Kossyvasi et al., 2012; 2014). What research exists has most often been carried out in specialist autism preschools (usually US where preschool includes 4-6 year olds).

This lack of research interest in mainstream preschools reflects, in part, the relatively low incidence of ASD. A typical UK preschool of 30-50 children will, statistically, have a child with a diagnosis of ASD every couple of years and each one attending will have different behaviours and needs. Preschool staff will therefore have limited experience to draw upon each time a child with a diagnosis enrolls, and training for staff may not be a priority.

Nevertheless, the recent increase in the numbers of young children with a diagnosis of ASD in preschools due to the lower age of diagnosis plus the often 'high visibility' of the children due their often-reported challenging behaviour has led to early years practitioners requesting more support for these children compared with children with other special needs. The requests are usually around attention; play with peers, and language – priorities in the national curriculum.

An extract from the UK Early Years Foundation Stage Curriculum shows that attention, relationships and play are part of the main profile:

Listening and attention: Children listen attentively in a range of situations. They listen to stories, accurately anticipating key events, and respond to what they hear with relevant comments, questions or actions. They give their attention to what others say and respond appropriately, while engaged in another activity

Making relationships: Children play cooperatively, taking turns with others. They take account of one another's ideas about how to organise their activity. They show sensitivity to others' needs and feelings, and form positive relationships with adults and other children.

(from Early Years Foundation Stage Profile Handbook, DfE, 2013, updated October 2014)

It is not stated in the Handbook how staff would promote these skills if a child has severely delayed social interaction skills. Support is provided in the UK through Special Needs publications, e.g. The National Strategies Early Years Inclusion Programme: supporting children on the autism spectrum (DfCSF, 2009). These are rarely accessed by early years' practitioners beyond specialist SENCos, unless staff attend specific training. The US early years' curriculum similarly pays little specific attention to joint attention and symbolic play except as part of general goals (Wong & Kasari, 2012). Evidence of a need to support practitioners working with children with ASD in preschools comes from the few observational studies of current practice.

Children's experiences in preschools

Wong and Kasari (2012) looked at young children's experiences in 11 preschool classrooms in a North Carolina suburban school district. They aimed to find out how often children with a diagnosis of ASD (N=27) and a group with other disabilities (N=28) initiated play and made bids for joint attention; the opportunities provided for such initiations, and the responses from staff when children initiated play and joint attention. The children were 3-5 years, reflecting the later US age of entry to primary education.

The children were filmed on three occasions for 2 hours over a 2 week period.

Behaviour was coded in 5 minute intervals to identify

- 5 engagement states: unengaged; person-engaged; object-engaged; supported-engaged; coordinated-engaged
- 2 play states: functional; symbolic
- 2 joint attention states: responds to joint attention; initiates bid for joint attention

In addition, there was a structured play observation and assessments of social communication and learning ability using standardised tests.

Overall, they found that children with ASD spent 37% of observed time in an unengaged state i.e. not attending to or interacting with objects or other people. They initiated less than other children, including children with other disabilities, and were more likely to slip from object-engaged states to unengaged. Functional play varied with less in unstructured play sessions than in structured play. Children with other disabilities were more likely to develop functional play in unstructured play. Interestingly, teachers were rarely observed to facilitate play, the emphasis seemed to be on letting children play without adult interruption during unstructured times.

Comparisons of joint attention (JA) also showed differences. There was a lower staff response to bids for joint attention from children with ASD compared with children with other disabilities - 58% vs 80%. Children with ASD initiated fewer bids for joint attention in both classroom and assessment settings. When they did initiate or respond to bids, the teachers 'seldom responded to or praised children for attending to their requests for joint attention and rarely recognised or reinforced shows and points as joint attention behaviours' (Wong & Kasari, 2012, p.2158).

Wong and Kasari (2012) highlight the fact that joint attention is not seen as a preschool skill that needs to be targeted specifically perhaps because it is not an area of concern for the majority of children. As in the UK, the US curriculum places emphasis on fostering independence, with EYPs viewed as facilitators providing play materials and opportunities for children to explore stimulating learning areas. Current pedagogy encourages practitioners to reduce the amount of talking and direction as it is felt that this may reduce children's higher level play. For example, Wilcox-Herzog and Kontos (1998) reported that when teachers engage with children in extended conversations, they were less likely to engage in higher level (symbolic) play. In a large scale longitudinal Home-School study, Dickinson and Tabors (2001) discuss 'the struggle with the tension between a desire to foster children's play [by not interrupting] and a desire to provide support to children's language and literacy growth' (Dickinson & Tabors, 2001, p.226).

Children with autism, Wong and Kasari (2012) argue, need assistance to develop social understanding about interaction with others. '...children with autism may have too much independence in that they are not seeking out others in the classroom' (Wong & Kasari, 2012, p.2159). For these children to develop social skills, EYPs need to access strategies to engage children who do not seek out social interaction opportunities and who have reduced understanding about how to engage in communication exchanges.

Responding to communicative attempts from children with ASD

A factor that may further reduce practitioner responsiveness to children's bids for interaction is the nature of children's communication. Children who have not developed recognizable language or gestures may adopt idiosyncratic or unconventional forms of communication. Some of these - for example, screaming - may be perceived as problematic and therefore not responded to in ways to support the child's communication attempts. Keen et al. (2005) suggest that in such cases: 'the child's communicative attempts may be ineffective and the child could either escalate to problem behaviour or cease all communicative attempts, leading to extreme passivity' (Keen et al., 2005, p.20).

Example from the SCIP data

Alex usually chose favourite objects in his preschool that became 'his' for the session. He became quickly distressed if another child took one of these objects. Other children seemed aware of this and usually left the day's objects for Alex, or occasionally would take one for the fun of the chase game that followed. Occasionally, a child would be unaware of Alex's choices. The staff had developed strategies to cope with Alex's need for objects and had reduced his daily collection to 2-3 small toys.

During one adult-directed film sequence, Alex was playing at the water table. He had put 'his' plastic toy in the water. Alex became absorbed in water-pouring, then noticed that 'his' plastic toy was being used by another child, a little girl. Alex reached out and made a hand gesture like a crocodile snap; this he quickly followed with an outstretched hand and an attempt to say 'ready, steady' /edi edi/. These two request forms took less than 5 seconds and when they failed to get the return of the toy, Alex collapsed on the floor screaming. The little girl looked surprised. A third child who had been watching took the plastic toy from the girl and returned it to Alex. The practitioner said: 'Alex, you need to ask nicely'. Alex walked away looking distressed.

This short extract happened very quickly and would probably have gone unnoticed in a busy nursery. However, it demonstrated Alex's attempts to communicate using the strategies that he has in his limited repertoire: an outstretched hand; a 'give' gesture, and the words 'ready-steady'. It also demonstrated the practitioner's response based on either not observing or not recognizing the communicative attempt. This is not a criticism of the practitioner, but recognition of the difficulty of responding quickly and supportively in a busy preschool environment.

Keen et al. (2005) examined the way teachers respond to communicative attempts of children with ASD. They identified 8 children, aged 3-7 years, with a diagnosis of autism that were all assessed as functioning verbally at or below the 6 month age level, and all with some challenging behaviours. Initially they asked four teachers about the children's communication. Questions included, for example, how the child indicated that he/she wants something to eat. The teachers were then observed for 30 minutes (= 3 x 10minutes for different types of activity) for 3 days. The teachers' responses to identified communicative attempts were coded as either: acknowledgement; reaction; no response. Overall, the teachers were coded as responding to 63% of the child's communicative attempts, either acknowledging or reacting in some way that showed they viewed the communicative attempt as intentional. In 38% of occasions, there was no response to the identified communicative attempt.

The interpretation of these results needs some caution, as the authors explain. First, the rate of response is roughly the same as would be found for normally developing children. Parents and teachers typically only respond about two-thirds of the time. This raises the question about what level of response is enough (see Wong & Kasari, 2012, cited above). Should children with severe communication difficulties have a higher response rate than neurotypical children given their need for extra opportunities to engage as conversational partners? Second, the authors point out that although the teachers had identified communicative attempts in the pre-observation interview, in a busy preschool setting these may be missed; not responded to immediately, or deliberately ignored. Some communicative bids which are seen as challenging, e.g. hitting, may be considered best ignored so that the child will not see such behaviours as successful.

The authors do not discuss the previous training in autism of the staff members or the prevalent approaches used in preschools. Behaviourist approaches tend to recommend extinguishing inappropriate behaviours by ignoring them, whereas social-pragmatic approaches are more likely to recommend recognizing inappropriate behaviours as potential communicative attempts that should be acknowledged as precursors of communication.

The low level of acknowledgement of potential, if highly subtle, communicative attempts is concerning as it could result in children giving up in their attempts. Teachers, the authors suggest, may want to consider how to develop a consistent response strategy to help children see that their communicative attempts are valued and to provide opportunities for staff to model appropriate communicative bids.

This conclusion was supported by comments made by staff in the SCIP project. During the staff training (see below), the practitioners discussed the need to become more aware of the nature and the timing of the children's communication. One child, for example, often communicated which nursery rhyme he wanted a few seconds after the other children, and often after a different rhyme had been started. In the flow of a busy preschool his delayed communicative bids were either missed or could not be properly acknowledged. Another child, sometimes used idiosyncratic means of requesting such as saying '*ready-steady*' (see inset box, above). Staff were aware that it was often hard to spot these communicative attempts, and that they focused more on reactions such as screaming following failed communication bids. The emerging consensus from the staff training discussion was that they needed to develop their responses to communicative bids, and to be more consistent across staff members.

Effects of teacher interactive style

The research on training parents as interactive partners (e.g. Siller et al., 2013) demonstrated that parents can be supported to develop strategies to facilitate social interaction. Although parent training may not affect the severity of ASD characteristics as measured by standardized assessments (Green et al., 2010), there are studies indicating an increase in spontaneous use of words and other communication skills following parent training (e.g. Aldred et al. 2004; Kashinath et al. 2006). Fewer studies have focused on the effects of training practitioners.

Kossyvasi et al. (2012; 2014) took as their starting point the lack of studies that involved training preschool practitioners about ways to develop their interactive styles. They used an action research design in which the staff (N=3) developed a set of principles for use with targeted children (N=6; aged 4-5 years) in a specialist preschool. In discussion with staff, the researcher developed a set of principles for promoting children's social communication based on filmed examples of current practice. The principles drew mainly on transactional models as outlined in SCERTS (Prizant et al., 2006) and those used in parent education approaches such as Hanen (Manolson, 1992). Principles included: gaining the child's attention; waiting for initiations; following the child's lead; imitating the child; using minimal speech, and using non-verbal cues. In addition, strategies to increase communication were developed such as: offering choices; stopping before the key words and actions, or 'tempting' joint attention by doing an unexpected action or by 'forgetting' something important.

The identified fifteen principles were practised for a further month with the researcher available to discuss the principles in action. The children were filmed again over a month and comparisons made between pre- and post-practice period. The main outcome variable measured was the number of initiations made by children across four activities (snack; sensory; 1:1 activities; soft play).

Significant differences were found between pre- and post-practice period, with variations between children and between activities. The initiations included imperative requesting (see discussion on imperative and declarative requests above) and these formed the majority of the communicative functions. These increases were maintained at follow-up 12 months later for 2 children (the other children were no longer attending the specialist class). The authors concluded that changing teachers' interactive styles can have positive effects on children's interactions. Gains in the number of initiations were noted for all children despite differences in baseline measures, and across all conditions. The activity with the highest gains in initiations was 'soft play'.

There were differences in the principles that staff used pre- and post- the practice period. Using minimal speech was used frequently at the beginning of the study whereas imitation; expanding the child's language; waiting for the child to initiate, and providing time were among the least frequently used. The least used principles showed the greatest gains, though they remained relatively infrequent. For example, there were 4 instances of 'imitation' pre-intervention and 36 instances post-intervention. For 'provide time' the pre- and post-intervention figures were 0 and 10. By contrast, minimal speech was used 205 times pre-intervention and 286 times post-intervention.

It's hard to interpret the figures. Although there was a ten-fold increase in use of 'provide time' strategy, its use was still very low, and the proportionally smaller increase in 'minimal language' may reflect a ceiling effect. It could also be argued that the difficult principles, such as providing time, were those that are specifically targeting the needs of children with ASD in comparison with strategies like reduced language that supports all children, and are commonly used, e.g. carers are well-known for their 'motherese' (e.g. Snow & Ferguson, 1978).

The follow-up interviews (Kossyvaki et al., 2014) reflected some staff concerns for using specific strategies with this group of children. For example, staff raised concerns that imitating children may be seen as reinforcing behaviours such as rocking that are not appropriate. There were also concerns about ‘providing time’ as it may look as though they were not interacting. Similar concerns about providing time for the child were raised by parents in Gillett and LeBlanc’s study (2007) who were trained in a naturalistic-behaviourist programme requiring a 5 second wait before giving a toy. Parents reported that it seemed unnatural to wait.

Kossyvaki et al. (2012; 2014) point out the limitations of their study such as the small sample and the even smaller sub-sample for the follow-up. There was no control group so it is unclear what gains are due to the children’s normal development over a 6 month period. They also note the effects that an observer-researcher might have on the results. Like all naturalistic studies, many factors could not be controlled such as the activities staff used in the 1:1 activity. This last criticism is arguably balanced by the ‘ecological validity’ of school-based studies.

Summary

From the limited evidence of interventions involving parent and practitioner mediation, the 2013 NICE Guidelines concluded that there were:

small to moderate effects in favour of caregiver- or preschool-teacher-mediated social-communication interventions on social interaction (as measured by the ADOS), communication acts, parent-child joint attention and parent-child joint engagement, for young children with autism (mean ages of 1-4 years). (NICE Guidelines, 2013, Section 5).

Rationale for the Social Communication in Preschool (SCIP) Project

The SCIP research project described in the next three chapters evaluates an early intervention consisting of staff training plus small social communication groups for children with a diagnosis of ASD developed by Speech and Language Therapists (described below). These SCIP groups provide opportunities for children with ASD to develop social interaction abilities such as joint attention and imitation through planned, structured play routines with peers (Prizant et al., 2006). The groups draw on SCERTS Learning and Playing with Peers activities (LAPP) that, to quote from the SCERTS Manual Vol II: 'serve to promote peer-related competencies, including the ability to initiate and maintain successful social-communicative interactions across partners, settings and activities' (Prizant et al., 2006, p. 39). The SCIP intervention incorporates activities that focus on skills identified in the research detailed above that are seen as pivotal in developing social communication abilities: joint attention; imitation, and symbolic play. These foundation skills are built into social activities that are used in typical preschool groups such as group singing of nursery rhymes and action songs; following instructions in group games, and taking turns with motivating toys. In this way the focus is on developing social skills at the same time as showing how and when to use social-communicative skills appropriately (Prizant et al., 2006). Currently no comparable research is available about the effectiveness of social communication groups with children with ASD in non-specialist preschools.

The SCIP Project also draws on the research described above about the role of the adult as part of the transactional process in the development of the child's social-communicative skills. Practitioners in the children's preschools were introduced to strategies for developing the children's social interaction through a 1 hour training session (see below for description of staff training) and through follow-up discussions with the Speech and Language Therapist overseeing the research. A staff member attended each SCIP small group and discussed its structure and future development .

The Project's single-subject multiple-baseline-across-subjects experimental design allowed for regular samples of the children's behaviour over a 12 week period. The data could be looked at in order to investigate changes in the child's social skills. The data could also be used to measure changes in the adult interactive style.

The main areas of focus were:

- changes in the child's social interaction during SLT intervention sessions
- changes over time in children's communication and interaction in directed play, non-directed play, and in regular preschool groups
- changes over time in the adults' interaction styles during directed play activities
- changes over time in children's social orientation to peers and adults in non-directed activities .

Study 1 looks at the effects of SCIP intervention groups that take place in preschools with typically developing peers (Chapter 4)

Research questions for Study 1

Do 2-3 year olds with a diagnosis of ASD show a significant improvement in social communication skills during a small group intervention?

Do 2-3 year olds with a diagnosis of ASD in a preschool setting show gains in social interaction as a result of staff training and participation in a small group intervention?

Study 2 looks at the effects of SCIP intervention groups and staff training on the interactive styles of adults (Chapter 5)

Research question for Study 2

Do preschool practitioners supporting children with a diagnosis of ASD show significant changes in their interactive style as a result of participation in training and small group intervention sessions in their preschool?

Study 3 looks at the effects of SCIP intervention groups on the child's social orientation (Chapter 6)

Research question for Study 3

Do 2-3 year olds with a diagnosis of ASD show a significant change in their orientation towards adults and peers in non-directed activities as a result of participation in a small group intervention at their preschool?

It is hoped that the findings will contribute to professionals' understanding, and help policy-makers, parents and practitioners to make informed choices about effective ways to support the social communicative and interactive abilities of preschool children with a diagnosis of ASD. Overall, the SCIP project hopes to respond in a small way to the need for more evidence to support interventions. Mesibov and Shea (2011) put it thus:

We remain a long way from feeling confident about what intervention helps (and does not help) in practice. Most studies are at the initial phase of identifying the questions to ask and where to begin to look for an answer. The methodological challenges are now well described even if the ways to meet those challenges remain unclear. A start has been made, the search continues to find ways to blend the importance of 'proof' with the richness of clinical practice and the complexities of people with autism (Mesibov & Shea, 2011, p.127)

Chapter 4: Social Communication in Preschools (SCIP) Project:

Study One

Introduction

The three SCIP Project studies described in the following chapters hope to add to the emerging research into the effectiveness of preschool interventions that attempt to increase the social opportunities available to children with a diagnosis of ASD through structured interpersonal and environmental support. The SCIP studies differ from the majority of current studies in two main ways. First, they were carried out in *non-specialist* preschools that follow the UK early years' curriculum, and involved staff with no specific training in meeting the needs of children with ASD. The studies thus attempt to mirror the context in which many young children with a diagnosis of ASD first experience an educational environment. Second, the unique design of the studies (outlined below) allows for the social communication behaviours observed in the intervention to be looked at in parallel with the child's social communication behaviours in the preschool setting. This provides evidence about generalization of taught social skills into everyday practices.

Children with a diagnosis of autism spectrum disorder have, by definition, difficulties with social communication and interaction and have difficulties regulating their behaviour with others. These core impairments in sociability will affect a child's very early experiences and impact on their participation in preschool activities. Inclusion of children in preschools with a diagnosis of ASD has increased the need to address the support necessary to ensure these children can access and benefit from the early years' curriculum. Observations of staff engagement with children in preschools suggest that children with ASD interact less frequently with staff and peers than neurotypical children (Wong & Kasari, 2012). Furthermore, staff initiations and responses to children with ASD are no more frequent than they are with other children despite the concerns about children's interaction difficulties (Keen et al., 2005; Wong & Kasari, 2012).

The emerging evidence, as outlined in Chapter 3, suggests that targeted early intervention can increase opportunities for children to develop interpersonal abilities such as sharing attention (e.g. Kasari et al., 2010; Rogers et al., 2014) and this may 'alter a child's developmental trajectory towards a more typical path' (Steiner et al., 2012, p.92. See also Green et al., 2013). Preliminary findings from research in specialist provisions have found that staff are receptive and able to adapt their practices to include new intervention strategies (Kossyvakis, et al., 2014; Wong, 2014). However, very little research has been carried out within non-specialist preschools (Wong, 2014).

Children with ASD are, due to their delayed interpersonal skills, likely to have particular difficulty joining in the group sessions in preschools with anecdotal reports from parents (personal communication) that some preschools ask for their child to be collected before the group sessions due to their challenging behaviour. Lower engagement with group sessions means that children with ASD miss out on opportunities to interact with peers and adults.

SCIP Study One focusses primarily on the effects of providing a structured small group experience, asking whether such an intervention can increase the ability of children with ASD to engage in everyday preschool activities in non-specialist settings.

Ethics

This study has been ethically reviewed by the National Research Ethics Service (NRES) Research Ethics Committee Number: 12/LO/1072. Site specific approval was given by the local NHS trust and by the preschools involved. Full consent for filming was obtained by staff and parents of children involved in the study, and from parents whose children attended the preschools and therefore might appear in the filmed extracts. All those directly involved were kept informed as the Project progressed. Information and Consent sheets are in Appendix 2.

Main Researcher

The SCIP staff training and the small group intervention were led by the main researcher, an experienced highly specialist Early Years Speech and Language Therapist (SLT) who has been training staff and running small group intervention for children with ASD for the past 12 years, in collaboration with early years' specialists.

Participants

There were a total of 7 male participants in the SCIP study aged 2-3 years (Table 4.1).

- 4 children with ASD took part in the experimental groups
- 1 child with ASD acted as a control with the SCIP intervention occurring after the observation period
- 2 children acted as single case comparisons: 1 neurotypical and 1 with language delay.

The children are introduced below. Pseudonyms have been used to ensure confidentiality.

Alex is the second of three boys. He lives with his parents. Concerns were raised about Alex's delayed social communication and interaction by the preschool teacher who was visiting the youngest brother who has Down syndrome. Referrals were made to the Trust's multi-professional team and his name was given to the main researcher as a potential participant. A place was found at the local children's centre in November 2012. The main researcher visited the family and preschool, and consent was given to begin filming in January 2013. Alex received support from the preschool teacher and was on the waiting list for speech & language therapy support. His family is bilingual.

Ben is the second born child and lives with his mother. His half-sister is an adult and lives separately. She has a diagnosis of ADHD. Concerns were raised about Ben's delayed social communication and interaction by his mother. Referrals were made to the Trust's multi-professional team and his name was given to the main researcher as a potential participant.

Ben began attending a local community preschool in November 2012. The main researcher visited the family and preschool, and consent was given to begin filming in January 2013. Ben received 2 home visits from a specialist preschool teaching team that included a speech and language therapist, and he was on the waiting list for clinic-based speech & language therapy support. His mother is monolingual (English); his father is bilingual.

Carl is the first born and surviving twin resulting from twin-to-twin transfusion syndrome. He lives with his parents. He began attending a local private preschool in early 2013 and concerns were raised about his delayed social communication and interaction by staff. Referrals were made to the Trust's multi-professional team and his name was given to the main researcher as a potential participant. The main researcher visited the family and preschool, and consent was given to begin filming in April 2013. Carl received two home visits from a preschool teacher and was on the waiting list for speech & language therapy support. His family is bilingual.

Dino is the first born. He lives with his mother. Concerns were raised about Dino's delayed language by his mother when he was 2 years old. Referrals were made to the Trust's multi-professional team and his name was given to the main researcher as a potential participant. A place was found at a local children's centre. The main researcher visited the family and preschool, and consent was given to begin filming in April 2013. Dino attended 6 clinic sessions with the local speech and language therapist and he received home visits from an outreach preschool assistant. His mother is bilingual.

Erik is the eldest of two children. He lives with his parents. Concerns were raised about Erik's delayed language and interaction by his parents who went initially to visit a private specialist. Referrals were also made to the Trust's multi-professional team and his name was given to the main researcher as a potential participant.

Erik began at the local preschool attached to a mainstream school in September 2013. The main researcher visited the family and preschool, and consent was given to begin filming in September 2013. Erik received home support from a specialist preschool teaching team that included a speech and language therapist. His family is bilingual.

Fynn is the youngest child. His elder siblings are adults. He lives with his parents. He began attending his local preschool attached to a mainstream school in September 2013 and concerns were raised by staff as his language and behaviour seemed delayed for his age. Referrals were made to the Trust's multi-professional team. He was assessed by the Paediatrician as developmentally delayed. The main researcher met with his mother and preschool, and consent was given to film Fynn as part of a comparison group. He was on the waiting list for speech and language therapy support. His family is bilingual.

Hari is the second of two children. He lives with his parents. He was identified by the preschool staff as a child who was neurotypical. Informal assessment by a speech and language therapist concluded that his communication was appropriate for his age. The main researcher met with his mother and preschool, and consent was given to film Hari as part of a comparison group. No further assessment or intervention was offered to Hari. His family is bilingual.

Table 4.1 Children's diagnostic category; age at start of study, and age at diagnosis

Child Name (<i>not their real names</i>)	Diagnostic category	Age at start of study	Age at ADOS assessment
ALEX	ASD	3;00	3;01
BEN	ASD	3;00	3;02
CARL	ASD	3;08	3;08
DINO	ASD	2;06	2;09
ERIK (control)	ASD	3;02	3;06
FYNN (comparison)	Language delay	3;09	n/a
HARI (comparison)	Neurotypical	3;06	n/a

Identification and recruitment of children in the experimental and control group

The 5 children with a diagnosis of ASD (4 in the experimental group and 1 control) were recruited from referrals to a multi-disciplinary intake panel in an NHS trust. It is an open referral system. Request had been made to the panel to identify potential research participants and children meeting the research criteria (below) were flagged up. The children identified as potential recruits for the SCIP project were accepted in the order of referral to the multi-disciplinary panel. This resulted, by chance, in an all-male group of children. Statistically, the incidence of males to females with a diagnosis of ASD is 1:4 (NICE Guidelines, 2011). The first 4 children identified formed the experimental group; the fifth child was assigned to the control condition.

Table 4.2 Inclusion criteria for research participants

- Aged 30 months – 46 months at start of study observations
- Meeting the DSM-IV criteria (APA, 2000) for a diagnosis of ASD
- Recently begun at preschool
- No previous experience of small group intervention
- Parent and preschool consenting to research procedures
- Attending a preschool setting for at least 3 sessions a week
- Not receiving intensive private intervention
- No severe/profound visual or hearing impairment
- No significant learning disability (i.e. MA > 18 months)
- Parent's use and understanding of English language adequate to participate in intervention groups (translations and interpreters were available).

Following initial assessments (see below) of the 5 children, checks were made that they met the project criteria and that families agreed to participate in a research study. The families were contacted to discuss their willingness to participate; to obtain consent, and to confirm suitability for inclusion. Their preschools were also contacted to discuss their willingness to participate, and for consent to film. Information and consent forms are in Appendix 2. No parent or preschool refused permission and all participated for the period of the research project.

All children were initially assessed by the Speech and Language Therapist and Consultant Paediatrician, following normal clinical practice. The Paediatrician raised with the family the possibility that their child's behaviour may meet the criteria for a diagnosis of ASD, and that further observations would be made before confirming the diagnosis. This is in line with recommended practices (NICE Guidelines, 2011). All children were invited to an ADOS assessment (Lord et al., 2000; Lord et al., 2012) where they were given a formal diagnosis of autism spectrum disorder following the ADOS procedure. In line with normal clinical practice, parents were supported during the diagnostic process by the local services. The research participants received 'treatment-as-usual' from the Speech & Language Therapy Service and the Preschool Teaching Team. Hours of support varied according to the local clinics' current waiting lists at the time of referral. No family took part in any other research or had support beyond that available to all children in the trust.

The main researcher was involved in all project discussions with families. She was mindful of the parents' concerns following a diagnosis of an autism spectrum disorder and was available to answer questions and to direct families to local support services. Parents were made fully aware that participation in the research was voluntary and that they may withdraw at any time. Non-participation in the project did not affect the level of local support available. No families withdrew and all children were able to attend the small group sessions. Parents were kept informed about the Project's development and were shown film extracts at the end of the data collection stage.

Background information and assessments for the children with ASD

Initial assessments of each child followed normal clinical practice. The local trust's Consultant Paediatricians met with families and took a full case history. In addition, they assessed the child's developmental level using Griffiths Mental Development Scales (2006). The Speech and Language Therapist met with each family to enhance the case history with additional information about the child's early language development and language environment. Families were invited to an ADOS assessment (Lord et al., 2000; Lord et al., 2012). Each family had already discussed the diagnosis of an autism spectrum disorder for their child with the professionals involved. The ADOS provided a full description of the child's levels and overall severity.

Table 4.3 Background information and assessments used at initial consultations

Background Information	Medical records providing information about each child's age, gender, family characteristics, other medical conditions, and involvement of other professionals.
Pre-intervention assessment	Clinical Paediatric Assessment including a full case history, medical examination, discussion with parents about social communication difficulties, and developmental check using Griffiths Mental Development Scales (2006).
Speech and Language Therapy Assessment	Additional case history information about early communication, assessment using semi-structured observations, information about each child's language environment including other languages heard, and further discussion about social communication difficulties.
ADOS-G-Autism Diagnosis Observation Schedule	ADOS-G assessment, Autism Diagnostic Observation (Lord et al., 2000; Lord et al., 2012)

Griffiths Mental Development Scales (2006)

Intellectual disability is one of the most common co-occurring disorders in ASD (Fernell, Hedvall, et al., 2013; Matson & Shoemaker, 2009) and is an important predictor of outcome (Howlin, Goode, Hutton, & Rutter, 2004; Wallace, & Rogers, 2010).

Developmental assessments were performed using Griffiths Mental Development Scales Extended –Revised Edition (Griffiths, 2006). This is the standard developmental assessment tool used for the assessment of children in the local NHS trust clinic. The six sub-scales for the 2 to 8 year age group are: A: locomotor gross motor skills including the ability to balance and co-ordinate and control movement; B: personal-social proficiency in the activities of daily living, level of independence and interaction with other children; C: hearing, receptive and expressive language; D: eye and hand co-ordination, fine motor skills, manual dexterity and visual monitoring skills; E: performance visuospatial skills including speed of working and precision; F: practical reasoning ability to solve practical problems, understanding of basic mathematical concepts and understanding of moral issues. For each scale a raw score is obtained. The raw scores can be converted into three kinds of standard score: age equivalents, sub-quotients and general quotients, and then into percentile equivalents. Percentile charts allow comparisons for a child within expected normal distribution. Scores falling within two standard deviations from the mean are within the 5th to the 95th percentiles. Children scoring within this deviation from the mean are considered to be within normal range. Children scoring below the 5th percentile are functioning below two standard deviations to the mean expected for their chronological age. The General Quotient (GQ) is obtained by averaging the raw scores of the sub scales and converting this to an overall age equivalent. This score is divided by the child's actual chronological age to achieve the GQ.

Preschool children with ASD can have uneven cognitive profiles with lower verbal skills (Hedvall, et al., 2013). Consideration of verbal and non-verbal skills can be more indicative of a child's strengths and difficulties than an overall developmental quotient which may over or under estimate different areas of a child's learning ability.

For this study, results from Griffiths' scale C (Hearing and Speech) was converted to Verbal Function, and scale D (Eye and Hand Coordination) and scale E (Performance) were converted to Non-verbal Function. The results of the Griffiths Developmental Mental Scales for participants with ASD are recorded below:

Table 4.4 Results from Griffiths Mental Development Scales

Alex	Verbal function Nonverbal function General Quotient	10 th centile 25-50 th centile 0.79
Ben	Verbal function Nonverbal function General Quotient	<1 st centile 10-25 th centile 0.76
Carl	Verbal function Nonverbal function General Quotient	<1 st centile <1 st centile 0.58
Dino	Verbal function Nonverbal function General Quotient	<1 st centile <1 st centile 0.54
Erik	Verbal function Nonverbal function General Quotient	<1 st centile <1 st centile 0.65

None of the children were able to perform tasks from the Practical Reasoning Scale. Alex and Ben had uneven developmental profiles that may have skewed the general quotient.

Alex had verbal abilities within the low range and non-verbal abilities within the average range. His overall GQ was within the low range.

Ben had significant impairment in his verbal skills. His non-verbal skills were within the low-average range. His overall GQ was within the low range.

Carl, Dino and Erik all showed significant impairment in both their verbal and non-verbal skills.

For Carl and Erik, the GQ indicates abilities within the mild learning disability range.

For Dino, the GQ indicates abilities within the moderate learning disability range.

Speech and Language Therapy assessment

Each child was assessed by a speech and language therapist and additional notes were added to the Paediatrician's case history. The parent acted as interpreter during the assessment where necessary. Assessment was based on non-standardised observations during play which included opportunities to demonstrate expressive and receptive language abilities.

Table 4.5 Children's language environment and language levels at start of study

	Home Language environment	Receptive language	Expressive language
Alex	Mother & Father: Romanian/English Exposed to Romanian for majority of home care.	Not following simple 1 key - word directions e.g. 'give to mummy' (in Romanian or English). No response to own name.	< 5 spontaneous words (in Romanian and English) No gesture or point observed.
Ben	Mother: English; Father: English/Polish Exposed to English for majority of care.	Not following simple 1 key - word directions e.g. 'give to mummy'. No response to own name.	< 5 spontaneous words Some copied words and gestures A few gestures and point (imperative) observed.
Dino	Mother: Romanian/Hungarian/English Exposed to both Romanian and English for home care.	Not following simple 1 key word directions e.g. 'give to mummy' (in Romanian or English). No response to own name.	< 5 spontaneous words (in Romanian and English) No gesture or point observed.
Carl	Mother & Father: Russian/Latvian/Ukrainian Exposed to Russian for majority of home care.	Not following simple 1 key word directions e.g. 'give to mummy' (in Russian or English). No response to own name.	< 5 spontaneous words (in Russian and English) No gesture or point observed.
Erik	Mother & Father: Romanian/English Exposed to Romanian for majority of home care.	Variable ability to follow simple 1 key word directions e.g. 'post the cat' (in Romanian). Variable response to own name.	<10 spontaneous words (in Romanian and English). A few gestures and occasional pointing observed in home setting.
Fynn	Mother & Father: English and Ibo. Exposed to English and Ibo for majority of home care.	Variable ability to follow simple 1 key word directions e.g. 'give me the cat' (in English). Consistent response to own name.	10-20 spontaneous words plus some copied (in English). Use of non-verbal gestures such as pointing and head nodding to indicate needs.
Hari	Main language: English	Appropriate for age	Appropriate for age

ADOS – Autism Diagnostic Observation Scale

The ADOS (Lord et al., 2000; Lord et al., 2012) is a semi-structured, standardized assessment using a range of playful activities designed to look at: language & communication; reciprocal social interaction; imagination & creativity, and stereotyped behaviours & restricted interests. Within each of these categories the assessors rate the child's behaviour from 0-2 or 0-3. A score of 0 reflects the assessors' rating that responses are neurotypical. For partially typical responses, the rating is 1, and a rating of 2 or 3 indicates atypical or highly infrequent responses. For example, the rating for 'Showing' (a sub-section of Reciprocal Social Interaction) a rating of 0 is given if the child spontaneously shows toys or objects throughout the evaluation by holding them up or placing them in front of others and using eye contact with or without vocalisation; a rating of 1 is given if the child shows toys or objects in a partial or inconsistent manner (e.g. holding them up but not using coordinated eye contact); a rating of 2 is given if the child does not show objects to another person during observation.

A more recent version ADOS-2 (Lord et al., 2012) was introduced in the Project's trust in 2013 in line with the change in the DSM classification (APA, 2013). ADOS-2 was used for the assessment of Carl, Dino and Erik. There is no evidence that the change in ADOS versions has affected the diagnosis of children with ASD except in terms of the descriptive terms used.

There are 4 Module levels in ADOS-1 and ADOS-2. The ADOS module is selected according to the expressive language levels of the child. All the children were assessed using Module 1 as they were only using a few single word utterances. Overall scoring uses an algorithmic tool to show severity of autistic features (higher scores = more severe). It is a validated diagnostic tool for ASD in children aged two years or older and there is now a Toddler version available.

The ADOS evaluation was carried out by the main researcher and clinical adviser. Parents were present for the assessment. Professionals observed through a one-way mirror, with parent permission. All ADOS sessions were filmed with permission. All five children in the SCIP project met the criteria for a diagnosis of ASD.

Table 4.6 Children's results following ADOS assessments

Child	ADOS 1 Module 1	Score	Subscale scores for ADOS 1	
Alex	Social affect	14	Communication Reciprocal Social Interaction TOTAL	5 <u>9</u> 14
	TOTAL Above autism spectrum cut-off <i>i.e. meets criteria for diagnosis</i>	14	<i>not included in total</i> Play Stereotyped behaviours & restricted behaviours	3 1
Ben	Social affect	7	Communication Reciprocal Social Interaction TOTAL	2 <u>5</u> 7
	TOTAL Above autism spectrum cut-off <i>i.e. meets criteria for diagnosis</i>	7	<i>not included in total</i> Play Stereotyped behaviours & restricted behaviours	2 3
Child	ADOS 2 Module 1		No subscales available for ADOS 2	
Carl	Social affect	18		
	Restricted and repetitive behaviour TOTAL Moderate to severe concern <i>i.e. meets criteria for diagnosis</i>	<u>3</u> 21		
Dino	Social affect	20		
	Restricted and repetitive behaviour TOTAL Moderate to severe concern <i>i.e. meets criteria for diagnosis</i>	<u>4</u> 24		
Erik	Social affect	5		
	Restricted and repetitive behaviour TOTAL Mild to Moderate concern <i>i.e. meets criteria for diagnosis</i>	3 <u>—</u> 8		

Preschool Settings and support for participants

All filmed sessions were conducted in the children's preschools. There were areas of similarity and areas of differences between each setting, reflecting the normal range of preschool provision. All preschools followed the Early Years Foundation Stage (EYFS) Curriculum and had a 'free-flow' policy, with children moving between activities and exploring the curriculum opportunities with only a few organised group activities. The staff saw themselves primarily as facilitators, monitoring children's access to the learning areas, encouraging each child to participate in the different activities but accepting that children could choose preferred areas. Four out of five preschools had an outside area – the exception was Carl's. The preschool for Fynn and Hari was the same as the one for Erik.

The children with a diagnosis of ASD had additional support at home. There was a preschool key worker allocated to the 4 experimental participants. In Ben's case some additional funding was available for the key worker, the others were funded by the preschools from their special needs budget.

Table 4.7 Summary details of the preschools attended and additional support

Child	Preschool type	Keyworker	Funding	Treatment-as-usual
Alex	Children's Centre taking children from birth – school age. Alex based in 3-4 year old room (approx. 20-25 children). Outside space.	Early Years key worker: NVQ3 (also has SENCo training).	No additional funding.	Preschool support at home (6 sessions). Speech & language therapy support began after the end of the experimental period.
Ben	Privately owned preschool taking children 2 years -school age. Approx. 19 children attending, mixed ages in one room. Outside space.	Early Years key worker: NVQ3.	Additional inclusion funding for 10 hours a week.	Preschool home support (2 sessions) and home-based Speech & language therapy (2 sessions).
Carl	Privately owned preschool taking children from birth – school age. Approx. 25 children attending, 2-4 year olds in one room. No outside space.	Early Years key worker: NVQ3.	No additional funding.	Preschool support at home (monthly sessions). Speech & language therapy support not available until the end of the research period.
Dino	Children's Centre taking children from birth – school age. Free flow in 2 rooms with outside space.	Early Years key worker: NVQ3.	No additional funding.	Preschool support at home (2 sessions) Speech & language therapy in clinic (6 sessions).
Erik	Preschool attached to local authority mainstream school. Approx. 25 children attending, 3-4 year olds in one room. Outside space.	No specific key worker.	No additional funding.	Preschool support at home (5 sessions) Speech & language Therapy in clinic (6 sessions).
Fynn	As Erik	No specific key worker.	No additional funding.	On waiting list for speech and language therapy.
Hari	As Erik and Fynn	n/a	n/a	n/a

All the preschools had some form of group activity. The most formal was in Erik's preschool where all children (N=25) sat for an end of session story or singing session. In Dino's larger preschool, there were separate story & song groups for the younger and older children at the end of the sessions. In the other 3 preschools, the groups happened at different times during the session and children were encouraged to sit, but left to play quietly if they preferred. Smaller groups were introduced by the staff after the SCIP intervention in Ben and Alex's preschools whenever staff numbers were adequate.

The variations between the preschools meant that many factors could not be controlled such as the size and content of preschool groups or the amount of structured activities. However, all preschools shared the same curriculum (as required by UK law) and the variations between the preschools were mainly determined by physical space; resources; age range; and numbers of children and staff, rather than differences in underlying philosophy. Wong (2014) concluded that differences between preschools are not a major factor determining outcomes in intervention studies.

Payment and costs

No payment (beyond travel expenses to clinic assessments) was given to participants or preschools. No additional costs were incurred by participating families or by the preschools. The main researcher had no financial interest in any part of the Project.

Feedback to those involved in the SCIP Project

All parents were contacted at intervals by the main researcher and given feedback about the progress of the study. The preschools were also given feedback at the end of the filming.

Procedures

The methodological concerns summarised in Chapter 2 were considered closely in the choice of procedures for the SCIP Study. The design selected was a single-subject multiple-baseline-across-subjects design. As shown in Table 2.2 (from Wong et al., 2014), this is the most frequently used design among the single-subject experimental designs (SSEDs), as well as being the most frequently used overall.

This design allowed for measurement of a child's social communication and interaction before, during and after intervention in different conditions. The start of the SCIP intervention was systematically staggered over the observation period. This increases the confidence that effects are due to the intervention and not due to other factors such as length of time in preschool (Pring, 2005). The design is considered a first-step in-depth approach that will identify key factors needing further large-scale investigation (see Chapter 7).

Staggered introduction of Intervention

The SCIP staff training and small group intervention was introduced after pre-intervention baseline observation sessions that differed in number for each experimental participant. The staff training occurred as close as possible to the start of the SCIP group. The number of pre-intervention sessions ranged from 3 sessions - the minimum time to provide some stability of observations, to 10 sessions - the maximum time to enable the study to take place within a preschool term. The original plan was to stagger the intervention after 4, 6, 8, and 10 sessions. However, child and staff illness and other extraneous factors affected the number of pre- and post-intervention sessions. In Dino's case, medical concerns affected his attendance. Alex also had a delayed SCIP group intervention start due to staff bereavement leave. Such delays typify preschool attendance patterns and thus reflect the 'normal' conditions in which interventions are implemented.

The SCIP intervention consisted of 1 hour staff training followed by 6 small group sessions (Dino missed 1 session due to illness; 1 session for Alex was not filmed).

Data was collected in the preschool concurrent with the SCIP intervention.

Table 4.8 Schedule of sessions pre-, during, and post-intervention for 5 participants showing staggered introduction of SCIP training and small group intervention

CARL	Parent and Pre-school meetings			Staff Training													4 month review					
BEN	Parent and preschool meetings				Staff																	
DINO	Parent and preschool meetings					Staff Training																
ALEX	Parent and preschool meetings						Staff Training														4 month review	
ERIK	Parent and preschool meetings																					
Session		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21



Data Collection

The children were filmed during regular preschool hours over one term. In 2 cases – Alex and Carl - a 4 month review session in the next term was arranged. Review sessions were not possible for the 2 experimental participants, Dino and Ben, as they moved to specialist preschools. The main researcher filmed the child using a Sony Handycam HDR-CX130E camera and did not intervene during the observations.

Each child was filmed twice weekly under three different conditions: non-direct, direct and normal preschool group (see Table 4.9). The filmed sequences - called Social Communication Observations (SCOs) - were subsequently coded for evidence of the primary dependent variables. SCOs were also collected during the SCIP intervention.

Table 4.9 Conditions, duration and manner of collection of SCOs

Condition	Duration	Description of condition
Non-Direct	5 minutes Twice weekly	The child was filmed for 5 minutes in his self-chosen activity. Staff were asked to engage as they would normally
Direct	5 minutes Twice weekly	The child was filmed while a staff member engaged with him.
Preschool group	5 minutes Twice weekly	The child was filmed during the preschool's normal group session
SCIP Intervention group	15-20minutes six sessions held twice weekly	The child engaged in a set of structured activities that formed the SCIP Social Communication group

- For the *SCOs in Non-direct activities* the staff members were asked to behave in their usual facilitative way but not to set up an individual activity deliberately for the child
- For the *SCOs in Direct activities*, the child's key worker (or another early years' practitioner if key worker absent) was asked to interact in ways she/he felt were representative of her regular interactions with the child. She or he was asked to stay with the child for 5 minutes, following him if he did not stay at the initial activity. Initially, a standardised set of materials was selected for the Direct activity. However, staff in preschools felt that unfamiliar toys led to unrepresentative behaviour from the child and prevented staff from following the child's lead. It was therefore agreed that direct activities would be those that were preferred by the child and thus lead to more ecologically valid observations. This ecological advantage needs to be balanced against the disadvantage of a lack of consistency in play across observations.

- For the *SCOs in Preschool group*, the staff were asked to include the target child in the group activity such as nursery rhyme singing. If the child refused to join the group or moved away during the preschool group, staff were asked to act in their usual ways to encourage participation but not to force the child to join.
- For the SCIP intervention, the preschool chose 2-3 children to join the target child. Effort was made to use the same children for each session. The key worker was present in all intervention groups for Ben, Carl, and Dino. Due to a bereavement, Alex's key worker attended 3/6 sessions. The staff member was encouraged to take an active role in running the intervention session. Where possible, the small group was in a quiet area.

The EYFS curriculum places emphasis on the provision of well-balanced, stimulating resources that allow children to observe, explore, and experiment at their own pace, and thus make progress. There is considerable variation in activities accessed by all children within and across sessions. While staff ensure that each child has opportunities to explore different activities, they are reluctant to children's choices. The exception to this is the group activities that are found in most (but not all) preschools and tend to follow a structure of rhymes and stories. For this study, it proved impossible to control the contexts for the non-direct and direct activities. These variations, although reflecting the child's natural learning environments, may have affected results, as contexts offer different opportunities for social interaction. This is discussed further below.

SCIP Intervention

Staff Training

All preschool staff attended a 1 hour training run by the main researcher before the implementation of the SCIP small group. The training was as close in time as possible to the first SCIP intervention session. The staff training and Intervention was included in Erik's preschool for ethical reasons after the observation period.

The training sessions were adapted for each setting so that they reflected the characteristics and needs of each target child. Filmed examples of the target children were used to demonstrate the points raised in the training and to stimulate staff discussion. Other filmed extracts of children with neurotypical and delayed language were also shown. The training was supported by a Power Point slides (Appendix 3). The training draws mainly on a social-developmental approach that follows a transactional model as set out by SCERTS (Prizant et al., 2006) in which the child's social communication and availability for learning are viewed as interrelated with the learning environment and the support provided for them. The focus is on developing functional spontaneous communication that is developmentally appropriate and fits the family and educational priorities. The main sections of the training are described below.

SCIP Staff Training

1. Introduction

This provided a brief introduction to the role of the main researcher and her role in the local Speech & Language Therapy service, and included an overview of the diagnostic pathway from referral to diagnosis and the local support services available for the child, family and preschool.

2. What we mean by social communication needs

Filmed examples (using the preschool's own children where possible and where parent permission was available) were shown to introduce the meaning of social communication needs. The extracts exemplified children with neurotypical development, language delay, and with a diagnosis of ASD. It was emphasized that ASD is a spectrum of social communication difficulties and differences, often co-existing with other areas of concern such as learning and attention difficulties. The examples also highlighted the effects of environmental demand. For example, one child (Alex) filmed in a structured and familiar bubble-blowing game, with a repeated *ready-steady-go* sequence, looks very similar in behaviour to his peers. However, in another extract from the same time period, the child is shown to be highly distressed in a large group where he is required to wait his turn for a favourite toy and lacks communicative skills except kicking and screaming. The examples showed the differences in the environmental demands on the child's social abilities. The training section aimed to point out the difficulty of differentiating ASD from other concerns such as language delay, and of differentiating ASD from a 'typical' 3 year old bilingual child's behaviour who is new to a busy, noisy English-speaking environment such as a preschool.

3. Features of ASD

The main features of ASD were presented, emphasizing the different profiles that each child is likely to have over time and in different contexts. The discussion was framed within the SCERTS (Prizant et al., 2006) profile, using the main headings from the Social Partner Observation Form: Joint Attention and Symbol Use (Prizant et al., 2006. Vol 1, Appendix A, p251).

4. How social understanding develops

Staff were introduced to a brief overview of a child's developmental stages in learning to be a social communicator from birth to 2 years. Some of the very early interactive experiences of children (e.g. Bates et al., 1988; Bruner, 1983; Trevarthen & Hubley, 1978) were identified and illustrated with examples of experiments (e.g. Dawson et al., 2004; Hobson 2002) showing possible differences emerging in the second year of life between neurotypical children and children later identified with ASD (Jones et al., 2014). The nature of the spectrum was again emphasized alongside the effects of the environmental demands with particular reference to preschools.

5. What we can do

Staff were asked (together or in small groups) to think about ways to help children make sense of communication; how to help them to learn ways of interacting, and ways to help the child to be available for learning in the different preschool activities. The researcher provided filmed examples of how they were already supporting the target child such as use of songs to mark transitions between activities, and the use of gestures and props to support action songs.

6. Summary of main ways to support children

Following the group discussion, a list of strategies was discussed, with staff agreeing what they would aim to put in place over the following sessions. These were:

- Follow the child's interest*
- Adjust their language to the child's level*
- Support their language with gestures; pictures, and props*
- Organise the environment to support attention*
- Model how to interact and be a conversational partner*
- Foster initiations by waiting and offering choices*
- Make links with the child's home to ensure continuity*

These draw on parent training programmes (e.g. Sussman, 1999; Drew et al., 2012; Siller et al., 2013) as well as SCERTS framework for transactional support (Prizant et al., 2006).

7. An overview of the SCIP group

The researcher introduced the format of the SCIP small group intervention. It was agreed where this would be run, who would observe, which children would join the target child, and who would later take over the running of the sessions.

8. Questions

The training session finished with an open discussion and time for questions.

9. Ongoing training

In the filmed sessions that followed the training, the main researcher continued to discuss strategies with the staff to promote social communication. These were mainly in the form of short conversations where staff discussed observations between sessions; raised questions about strategies in place, and demonstrated activities in place.

SCIP group Intervention structure

The SCIP small group intervention consists of a sequence of activities designed to facilitate the development of key social communication behaviours that include:

- Responding to joint attention
- Initiating joint attention
- Using gestures and verbal language
- Looking and smiling at others

These are identified as core aspects of sociability and reflect the areas that children with a diagnosis of ASD find difficult to develop (NICE Guidelines, 2011) and form components of the ADOS evaluation (Lord et al., 2000; Lord et al., 2012). The underlying assumption, based on SCERTS framework (Prizant et al., 2006) is that these skills can be introduced through everyday activities and that this is more effective than the acquisition of discrete skills separated from the social activities in which they are found. The activities in the SCIP intervention are designed to integrate the social skills in a way that is meaningful and purposeful as well as being developmentally appropriate. For example, the intervention begins and ends with the everyday interaction event of *Greeting* and *Farewell*. This social activity involves: responding to a bid for attention as the adult points and names each child; using gestures (waving) and/or words as they join in a 'hello' song; looking at people as the song is repeated for each child; and initiating joint attention when opportunities are given for child to choose whose turn it is. The aim, as in similar approaches with toddlers (e.g. Schertz, Odom, Baggett, & Sideris, 2013), is to focus on the salient aspects of social engagement and help the children to appreciate their own roles as interaction partners.

There is an additional assumption in the SCIP intervention that children with ASD need to practise the roles played in everyday activities first in more engineered environments and then progressively to integrate learned skills into typical everyday activities (Prizant et al., 2006). The SCERTS manual volume 2 (Prizant et al., 2006, p13) suggest developing a progression along a dimension of activities varying in the amount of naturalness:

Plannedengineered.....modified natural.....naturally occurring activity routines.....activities.....activities.....daily activities

This process of ‘scaffolding’ is part of developmental practices used by parents (e.g. Bruner, 1983) to support young children’s learning. For children with ASD, social interaction and communication need higher levels of scaffolding than is provided for neurotypical children but, it is argued by social-developmental approaches, the skills should still remain part of a social routine. The SCIP intervention engineers a more structured and predictable form of a typical preschool group, and embeds this intervention within a child’s preschool experience by including the child’s staff and peers in the normal setting. The SCIP activities are detailed below.

The SCIP intervention

Group introduction

The space was kept as clear as possible of distractions and the key worker encouraged the child to sit with her, at times she sat behind with the child held loosely in front of her. The interventionist began by showing the group a visual timetable and props to signal the sequence of activities of the group.

Greeting

A picture sign was introduced for *Greeting*. The adults sang a 'Hello' song directly to each child, pointing at the children individually and using Makaton signs for the songline: *'it's good to see you here'*. The actions were exaggerated and physical hand-on-hand prompts were used to support pointing and hand-waving. At the end of the greeting, the symbol for *Greeting* was removed from the visual timetable and posted by each child in turn in the Finished Box. The next activity was then introduced with its symbol and prop. This use of symbols was used in the same way for each activity.

Nursery rhyme activity

This activity used favourite nursery rhymes already in use in the preschools, each was represented by a prop such as: a spider for *Incey Wincey spider*; star for *Twinkle Twinkle*; cake for *Happy Birthday*; rocket for *Zoom zoom zoom, we're going to the moon*. The props were placed in a box and children took turns to tap on the box while the adults and children sang *'What's in the box?'* In turn, the children chose a prop and then the group sang the accompanying rhyme. Each child was given a rhyme prop. The singing of the rhyme included exaggerated actions and hand-on-hand prompts. Pauses were introduced at the end of the rhymes providing opportunities for the children to add missing words e.g.*'how I wonder what you [pause] are'*.

At the end of the nursery rhymes, the symbol for the rhyme box was removed from the visual timetable, posted by each child in turn in the Finished box, and the next activity introduced with its symbol and prop.

Musical instrument activity

Each child was encouraged to choose a musical instrument from the preschool selection – usually bells, shakers and tambourines. Then the adults sang a song which repeated *'All the children are playing together'* and the children were prompted to shake their instruments. The interventionist then raised her shaker in the air in an exaggerated motion, and went *'stop'* bringing the instrument to the floor and making a *'sh'* sound + gesture. When a child began shaking again, the rhyme started again. Over time, the children were encouraged through pauses and different looks to initiate the stop and the start of the singing. Again physical prompts were used to help the children imitate the actions.

At the end of the music, the symbol for Musical instruments was removed from the visual timetable, posted by each child in turn in the Finished box, and the next activity introduced with its symbol and prop

Puppet activities [optional activity used when the child was able to sit for an extended session]

A puppet monkey (called Pippo) was brought out of a big box and the *Greeting* song was repeated with Pippo shaking each child's hand. Pippo then was used in a range of shared and pretend play activities. The choice and number varied over time. Activities all accompanied by a rhyme using the same tune invited children to pass a hat around; to take turns feeding Pippo; to help Pippo go to sleep and then to wake up. This activity allowed the introduction of symbolic activities such as pretend sleeping and pretend eating.

At the end of the puppet activities, the symbol for Pippo was removed from the visual timetable, posted by each child in turn in the Finished box, and the next activity introduced with its symbol and prop

High motivator

The final activity was focussed around highly motivating toys such as bubbles, balloon or a spinning toy. Choice was determined by observed preferences – e.g. one child had a fear of balloons so this was not used. Although all SCIP activities were designed to be motivating through the actions and fun generated by the interventionist, the toys for this activity were intrinsically motivating and recognised as such by the children. The activity involved turn-taking and anticipation of actions through pauses e.g. '*ready-steady---[pause]-----go*'.

At the end of the activity, the symbol for the toy was removed from the visual timetable, posted by each child in turn in the Finished box, and the symbol for the Farewell song was shown

Farewell song

The farewell song repeated the *Greeting* song tune with the words 'bye-bye' substituting for 'hello'. Again, each child was sang to in turn with actions to support the words. The children then left the group for their regular preschool activities.

SCIP group setting and materials

The SCIP group sessions were conducted in (semi-)enclosed areas of the preschools. These varied from separate rooms to small enclosed areas within the main nursery space. Distractions were kept to a minimum. The children sat on small chairs or on the floor. The group included the child participant, the interventionist, the child's key worker (for one child, Alex, the key worker could only attend 3/6 sessions), and 2-3 peers chosen by the nursery as at an appropriate developmental level for small group activities. The materials for the group were the same for each child. They consisted of:

- Box containing objects for nursery rhymes (star; spider; duck; cake – one per child)
- Musical instruments (one per child)
- Puppet and props, e.g. hat and cake
- Range of motivating toys for final activity (spinning helicopter; balloon; bubbles)

Support materials for the group consisted of:

- Visual timetable – using photos and symbols of the materials used
- Makaton signs for looking; waiting; sitting; well done; and rhyme actions
- Finished Box

Dependent Measures in Study 1

The dependent measures identified functional social communication. Two main social communicative functions of interaction were identified, showing the child's role as initiator or responder in joint activities:

- Initiates bid for interaction
- Responds to bids for interaction

Two communicative forms were identified as ways children with ASD communicated socially

- Uses communicative gestures and/or words
- Looks and/or smiles at others

These coding categories were reached following a number of pilot trials; by tests to ensure agreement between raters about what constituted socially communicative behaviour, and by pragmatic considerations that the coding categories would be usable in the future by other professionals in preschools. The final list was guided by existing research studies drawing on others' outcome measures (e.g. Kasari et al., 2006, 2008; Pasco, Gordon, Howlin, & Charman, 2008; Steiner et al., 2012) and from the assessment profiles used in SCERTS (Prizant et al., Vol 1, 2006).

The coding protocol for Study One is included in Appendix 5.

Joint attention (initiating and responding) was selected as a main outcome measure given the recent literature supporting its pivotal role in developing social skills (e.g. Charman, 2003; Kasari et al., 2006, 2008; Steiner et al., 2012 and see Chapter 3). The main coding items for functional communication were the child's initiation of bids for interaction with an adult or peer, and the child's response to bids for interaction from an adult or peer. A distinction was made between initiations that were requests for an object and requests for social interaction. The former, behavioural requests, were not coded as research suggests that they are not impaired in the same way as requests for shared attention and responses to bids for social interaction (Bruinsma et al., 2004). A similar coding decision is used in ADOS where *Social Overtures* are only scored if the behaviours 'seem to function primarily as a method of social contact', and *Spontaneous Initiation of Joint Attention* 'does not include attempts if they are for the purpose of requesting' (from ADOS Module 1 scoring sheets, Lord et al., 2000).

This distinction between social and behavioural requests is sometimes blurred and is not consistently used in other research studies. Kossyvaki et al. (2014), for example, explicitly includes requests as part of initiating interaction making comparison of results difficult. In many research studies the distinction is not discussed.

Alongside the coding of behaviours according to their main communicative function, each behaviour was coded according to its communicative form: gestures and words; looks and smiles. Initially, separate coding categories were used for gestures, words, smiles and looks. However, the categories were later combined. Thus a child would be scored as using a communicative gesture/word if he either used one of these (e.g. waving) or if he combined them in the same communicative event (e.g. waving + saying 'bye'). Similarly, a child was scored as looking/smiling at others if he either looked or smiled or combined a look with a smile during the same communicative event. (See Chapter 6 for further analysis of children's social referencing towards adults and peers.)

Coding 'smiles at others' proved difficult at times. One child (Alex) smiled for most of the session, whether another child or adult was with him or not, and he often smiled at the camera. It was decided to discount smiles towards the camera and smiles when they were not directed towards a person to share emotions. This is in line with ADOS rating manual (Lord et al., 2000). Words/word forms or gestures that were not directed towards a person for social contact were similarly not coded. For example, Erik was observed to repeat 'mama' when on his own or during some direct sessions, usually while looking towards the door where his mother came to collect him, or out of the window. This did not appear to be used to communicate with others.

Independent Measure

The independent measure was the introduction of the SCIP intervention group and the staff training session.

Coding

Partial interval coding was used to identify the presence or absence of functional communicative behaviour during each 15 second interval for the five minute probes. This provided 20 intervals of 15 seconds in which a child either exhibited one or more of the behaviours or not. So for example, during a five minute probe a child's SCO sheet might be coded to show that he initiated an interaction one or more times during 2 fifteen-second intervals: 1.00-1.15 and 2.30-2.45. This would be scored as 10% use of initiating bids for interaction as the events occurred in 2 out of 20 fifteen-second intervals. The total percentage for each coding category in which a communicative event occurred over the 5 minute period was entered onto an Excel spread sheet.

The SCIP intervention sessions were coded in the same way. The whole session (usually 12-15 minutes) was divided into 15-second intervals. The child's use of one or more communicative behaviours during a 15-second interval was recorded. The percentages of intervals in which a communicative behaviour occurred was then calculated. This allowed for direct comparison between the communicative behaviours occurring in the SCIP intervention and in the three regular preschool conditions.

Inter-rater reliability

Observations made during pre-, post- and during intervention, plus those made during the intervention were coded by the main researcher as soon as possible after the recording, and a brief description made of the context of each recording. 20% were double coded by two independent raters blind to the date of each recording. All recordings were kept in chronological order and given an alphabet letter from a shuffled set of letter cards. A duplicate set of recordings was compiled with the order randomised by selecting alphabet letters from a reshuffled pack. The two masked raters were each given a random 20% of the duplicate set of the sessions at the end of the collection phase. This meant that each rater double coded 4 - 5 sessions from each condition for each of the five children, and 1 session from the SCIP intervention for each child.

The masked raters were aware of the purpose of the study in broad terms but were blind to the individual characteristics of each child and whether they were the control participant or not. This helped to reduce bias. One rater was a Speech & Language Therapist with a general knowledge of ASD; the other was a student with no specific knowledge about ASD or about speech and language therapy. Both raters received a one hour training including practice coding exercises.

The main researcher's coding was compared against that of each rater and the percent agreement was calculated using the inter-rater formula (e.g. Steiner et al., 2013):

$$\frac{\text{number of agreements}}{\text{number of agreements plus number of disagreements}} \times 100$$

For each coding category of the child's communication - initiations, responses to bids, gestures/words, and looks/smiles – an agreement was defined as both raters identifying the same type of communicative behaviour as the main researcher, e.g. both raters identifying that a child responded to a bid for initiation. The chart below gives the % agreement for each communication behaviour for each masked rater in comparison with the main researcher. Average agreement was >80% for all coding categories.

Table 4.10 Percent agreement between masked raters and main researcher

	Rater 1	Rater 2
Initiates bid for interaction	92.8%	92.2%
Responds to bid for interaction	88.1%	80.35%
Uses communicative gestures/words	88.05%	83.05%
Looks/smiles at others	89.1%	88.15%

Observer effects

Effort was made to reduce the effects of the main researcher also being the person who filmed all child behaviour. To minimise the possible contamination of pre-intervention baselines, staff agreed to delay discussion about intervention strategies until after the training and until the beginning of the SCIP group intervention.

Fidelity of Intervention

The SCIP intervention was delivered by the main researcher on each occasion. The group structure has been used by the main researcher for a number of years and the same activities, strategies, materials, and focus on specific social skills were followed in all sessions.

Recording of results⁶.

Graphs show the overall percentage of social communicative forms and functions observed in the SCIP intervention. Separate graphs show the percentage use of social communicative forms and functions for each condition: preschool group; non-direct, and direct over all sessions.

The study design shows continuous outcomes for SCOs in preschool activities *during* intervention as well as pre- and post- intervention.

⁶ My thanks to Ben Treble and Tom Bird for their help with the construction of Pivot Tables and graphs
Early social communication development: effectiveness of small group intervention for preschool children with ASD

Analysis

Visual analysis provided the primary means of interpreting the results. In order to amplify the visual analysis, the pre-intervention baseline scores were compared with the post-intervention scores for all children using a non-parametric test. This follows Pring's (2005) recommended procedure when small numbers are involved that removes the need to estimate error variability.

To calculate the baseline score, the pre-intervention sessions were divided into two halves and the median was calculated for each half. In the case of an uneven number of pre-intervention sessions, the second half was taken as the larger half. The average of the two medians provided a baseline value. The use of an average median for pre-intervention session scores helped to reduce the problem of the unstable baseline. A stable baseline is difficult to achieve when observations are taking place in a child's natural environment (Pring, 2005).

The baseline value was then compared with the post-intervention SCO scores. The number of post-intervention outcomes above the baseline was calculated. A one-tailed sign test was used (Pring, 2005) to test for significance ($p < 0.05$) of differences.

Summary of Analysis

The graphs and tables presented in the Results section below show the percentage of 15 second intervals in which the 4 children with a diagnosis of ASD in the experimental group – Carl, Ben, Dino and Alex - used the four communicative functions and forms (SCOs) in preschool group, direct, and non-direct conditions and in the SCIP group intervention.

Graphs also show the percentage scores for the 3 children in the comparison group: Erik, who had a diagnosis of ASD but who did not receive the SCIP intervention until the observation period had finished; Hari, the neurotypical child, and Fynn, the child with language delay.

The graphs are grouped according to the four social communication behaviours: Initiates Bids for Interaction; Responds to Bids for Interaction; Uses Communicative Words/Gestures, and Looks/Smiles at Others.

To increase the confidence about trends observed, a non-parametric test was used to analyse the data further, as described above. The dashed green line on the graphs shows the baseline value. The results of the non-parametric test are presented in Tables 4.11-4.14.

Results

The SCIP intervention graphs in Figures 4.1-4.4 show the percentage of 15 second intervals during which the four social communicative behaviours occurred on at least one occasion during the small group intervention. The green vertical lines mark the beginning and end of the SCIP intervention sessions. The graphs are presented in the order in which the SCIP intervention was introduced: Carl, Ben, Dino, and Alex.

Figures 4.5-4.28 show the % occurrence of the four social communication behaviours (blue line) during the daily preschool group, non-direct, and direct sessions.

Figures 4.5-4.10 shows the children's Initiations of Bids for Interaction

Figures 4.11-4.16 shows the children's Responses to Bids for Interaction

Figures 4.17-4.22 shows the children's Use of Communicative Gestures/Words

Figures 4.23-4.28 shows the children's Looks/Smiles towards Others

Again these are in the order: Carl, Ben, Dino and Alex to help visual analysis. In addition, the equivalent graphs for the comparison children who did not receive the intervention are printed in the right-hand column.

To help the visual analysis, the scores during the SCIP intervention for each social communicative behaviour are shown (red line) on the same graphs, with the green vertical lines delineating the intervention sessions

Fig 4.1 Percentage of 15 second intervals where children with ASD initiate bids for interaction in SCIP intervention condition

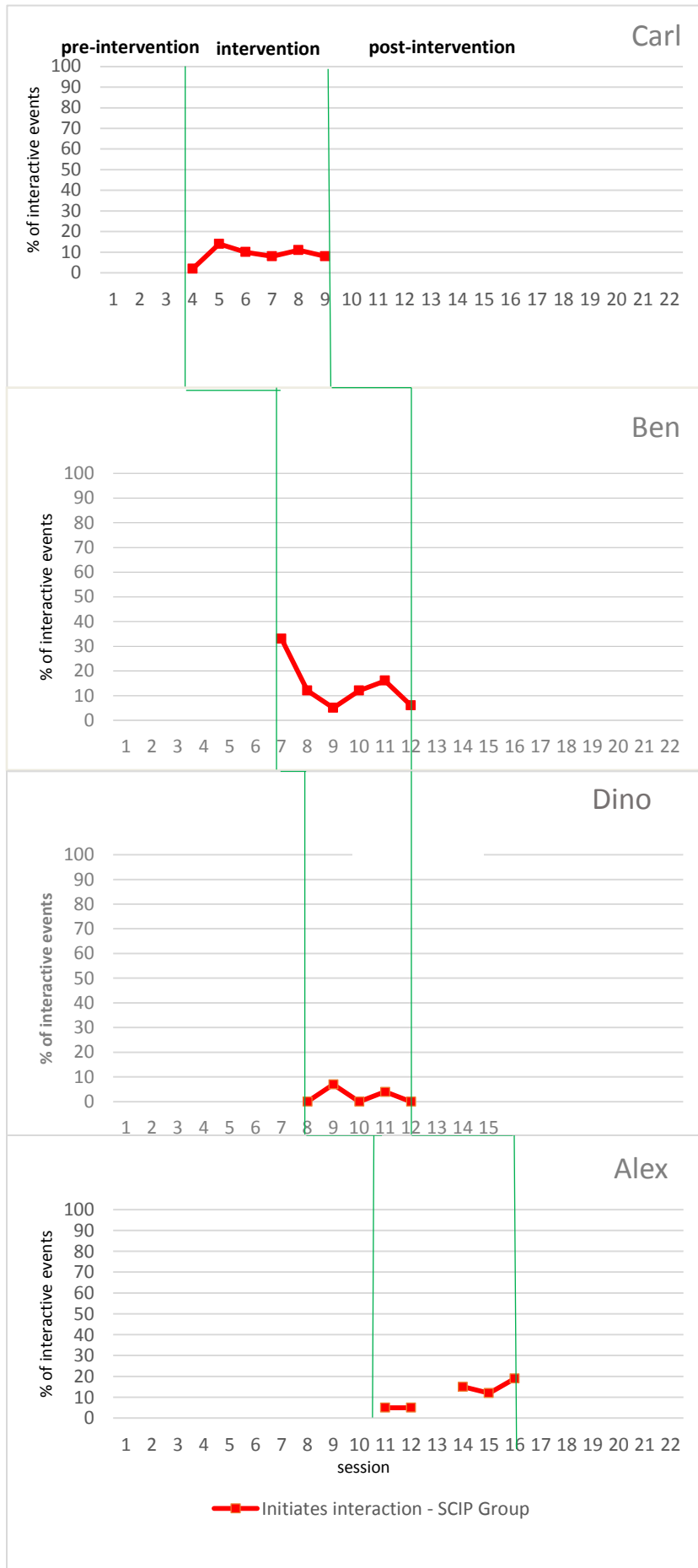


Fig 4.2 Percentage of 15 second intervals where children with ASD respond to bids for interaction in SCIP intervention condition

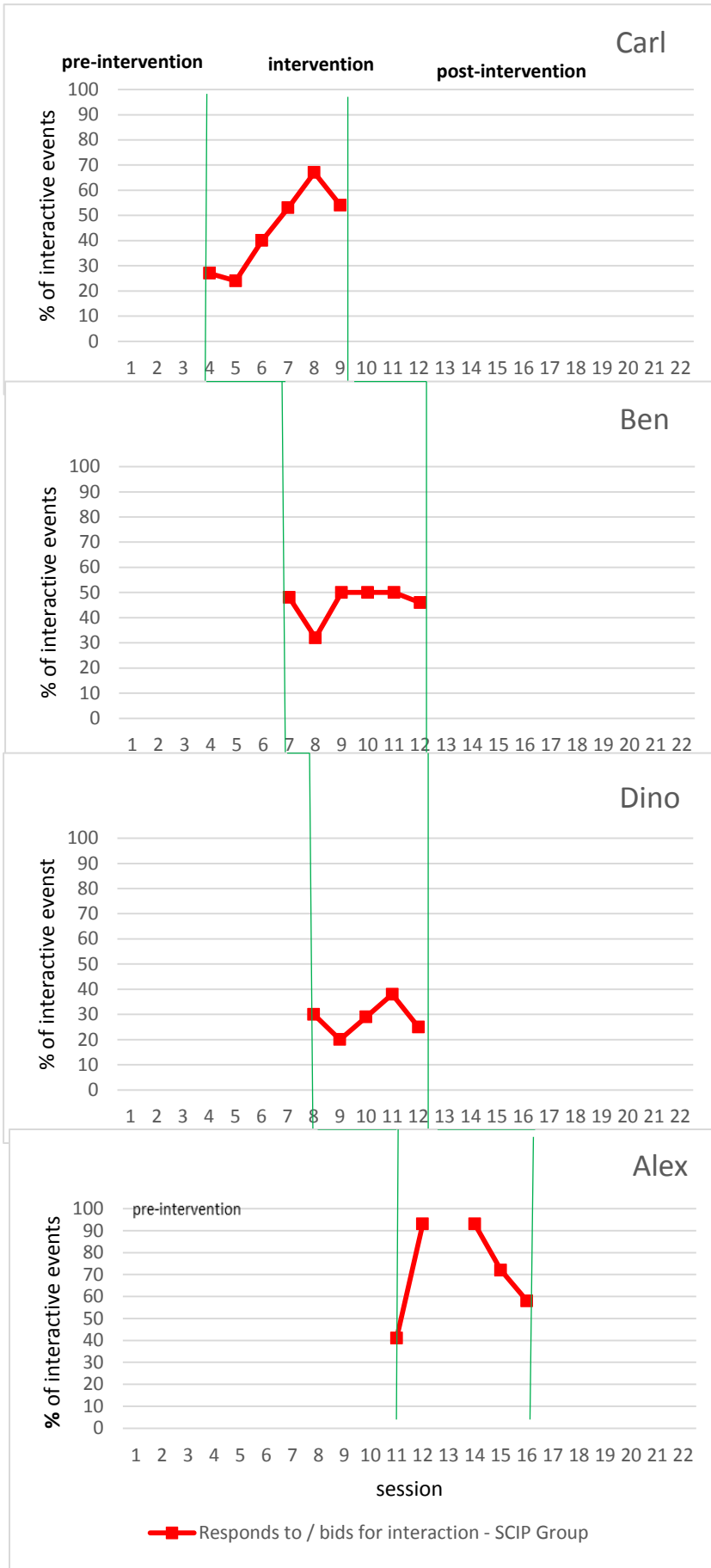


Fig 4.3 Percentage of 15 second intervals where children with ASD use communicative gestures/words in SCIP intervention condition

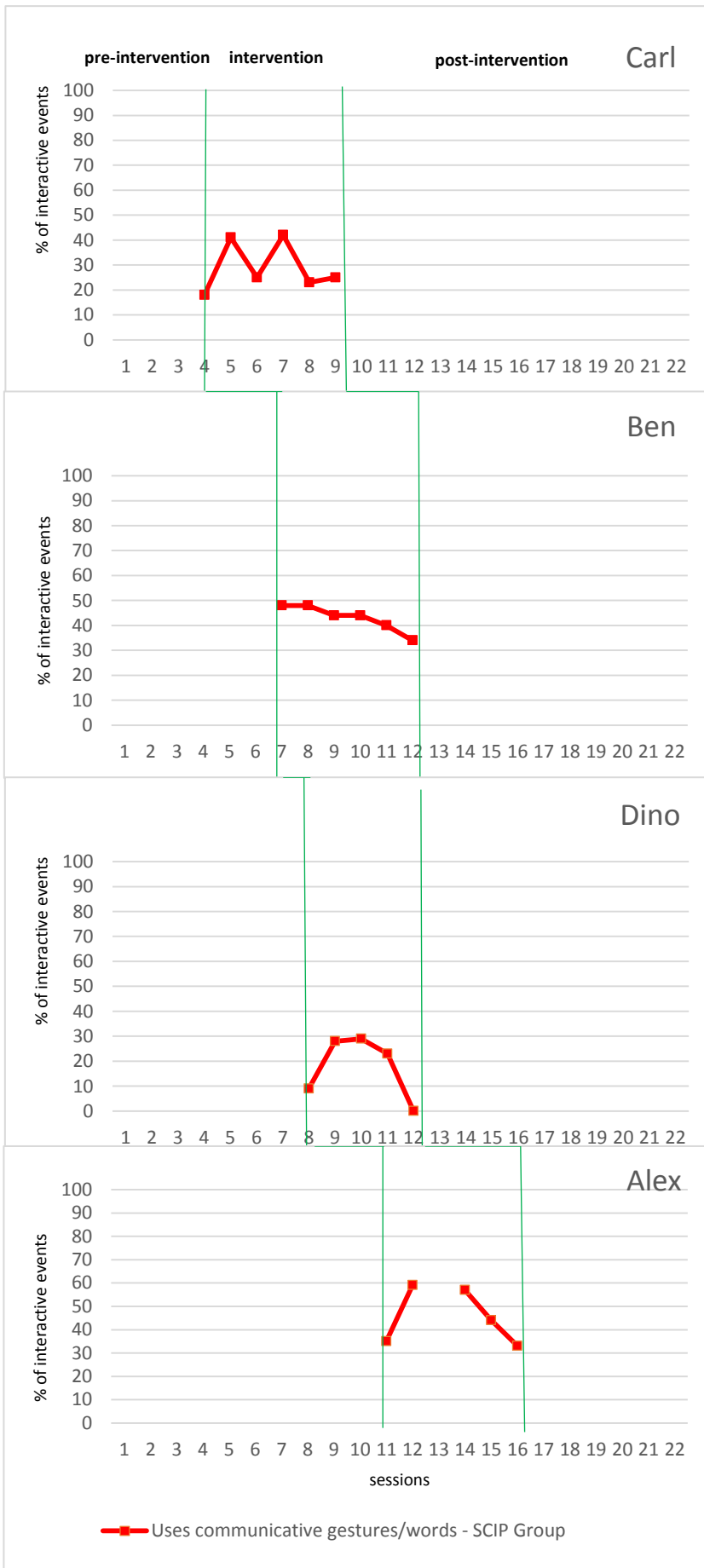


Fig 4.4 Percentage of 15 second intervals where children with ASD Look/smile at others in SCIP intervention condition

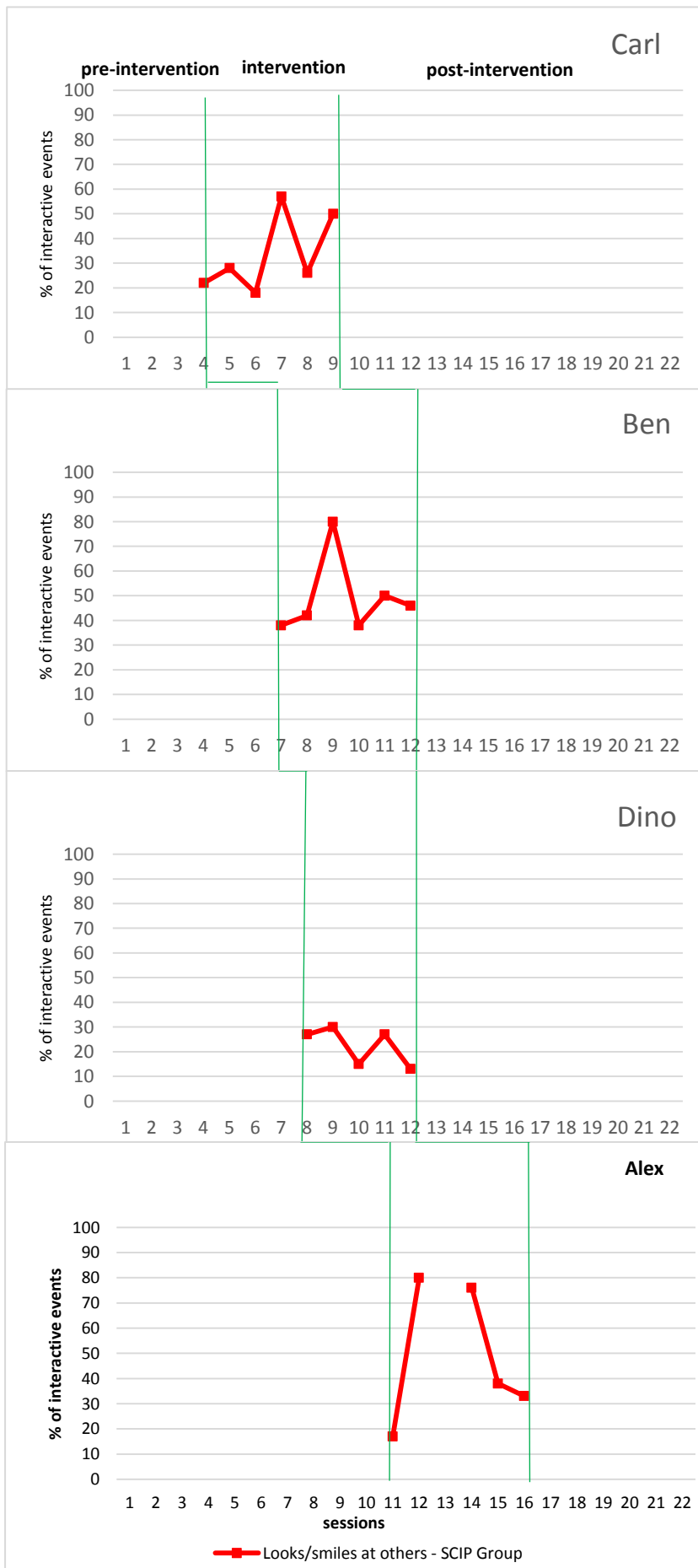


Fig 4.5 Percentage of 15 second intervals where children with ASD initiate bids for interaction in preschool group and SCIP intervention conditions

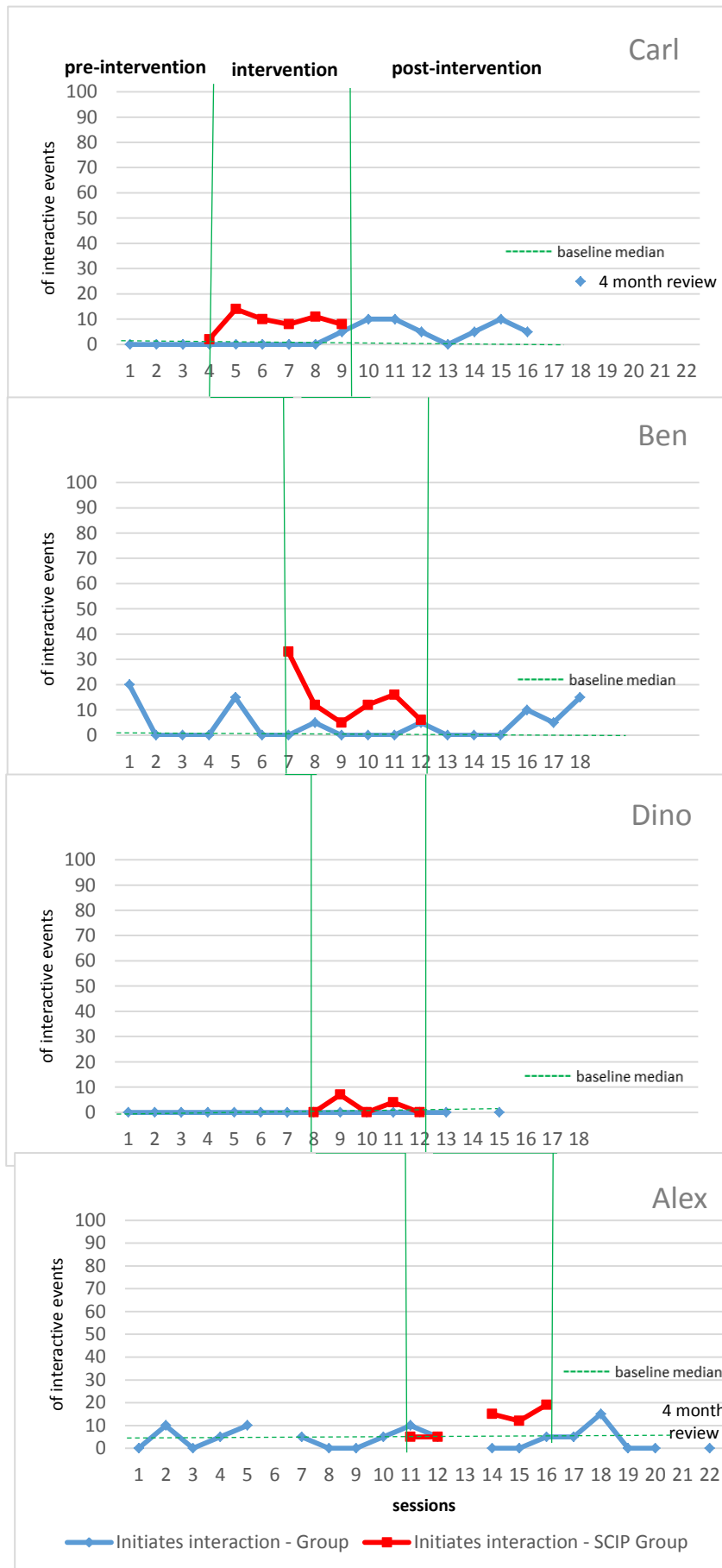


Fig 4.6 Percentage of 15 second intervals where child with ASD, neurotypical child, and child with language delay initiate bids for interaction in preschool group condition

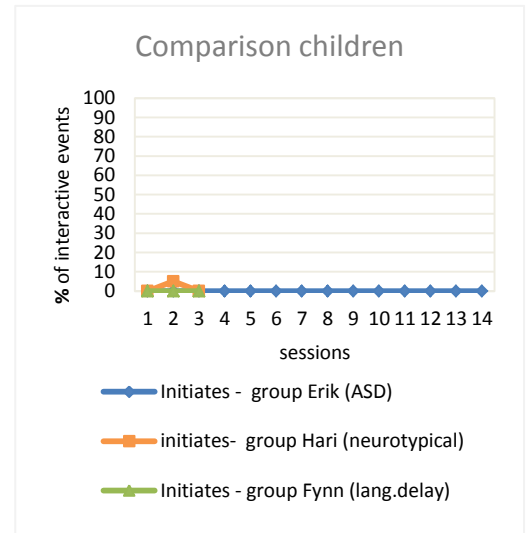


Fig 4.7 Percentage of 15 second intervals where children with ASD initiate bids for interaction in non-direct and SCIP intervention conditions

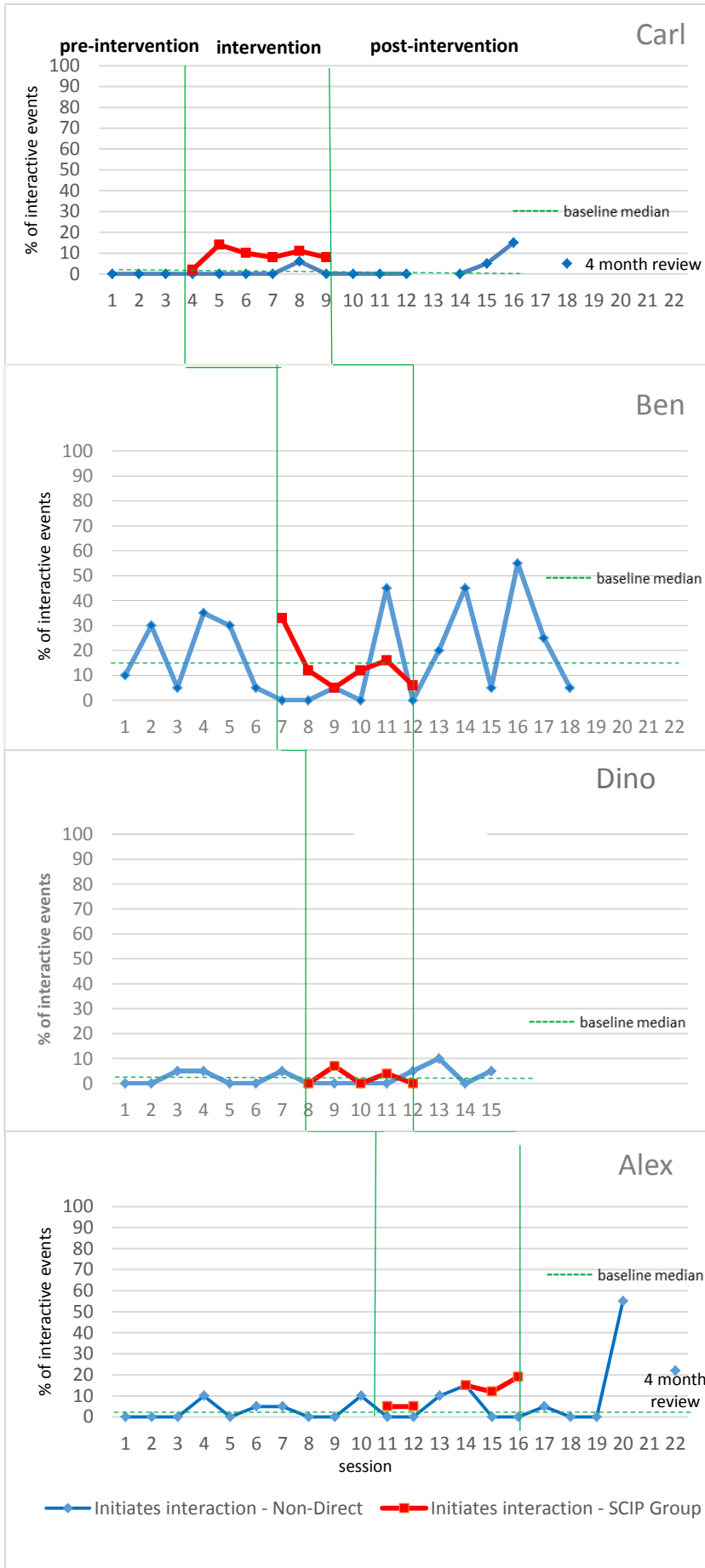


Fig 4.8 Percentage of 15 second intervals where child with ASD, neurotypical child, and child with language delay initiate bids for interaction in non-direct condition.

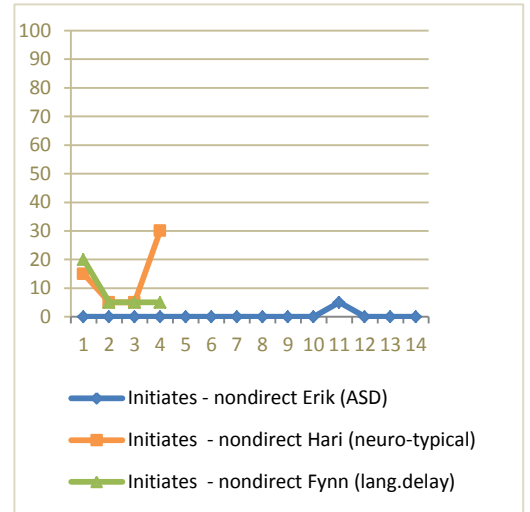


Fig 4.9 Percentage of 15 second intervals where children with ASD Initiate bids for interaction in direct and SCIP intervention conditions

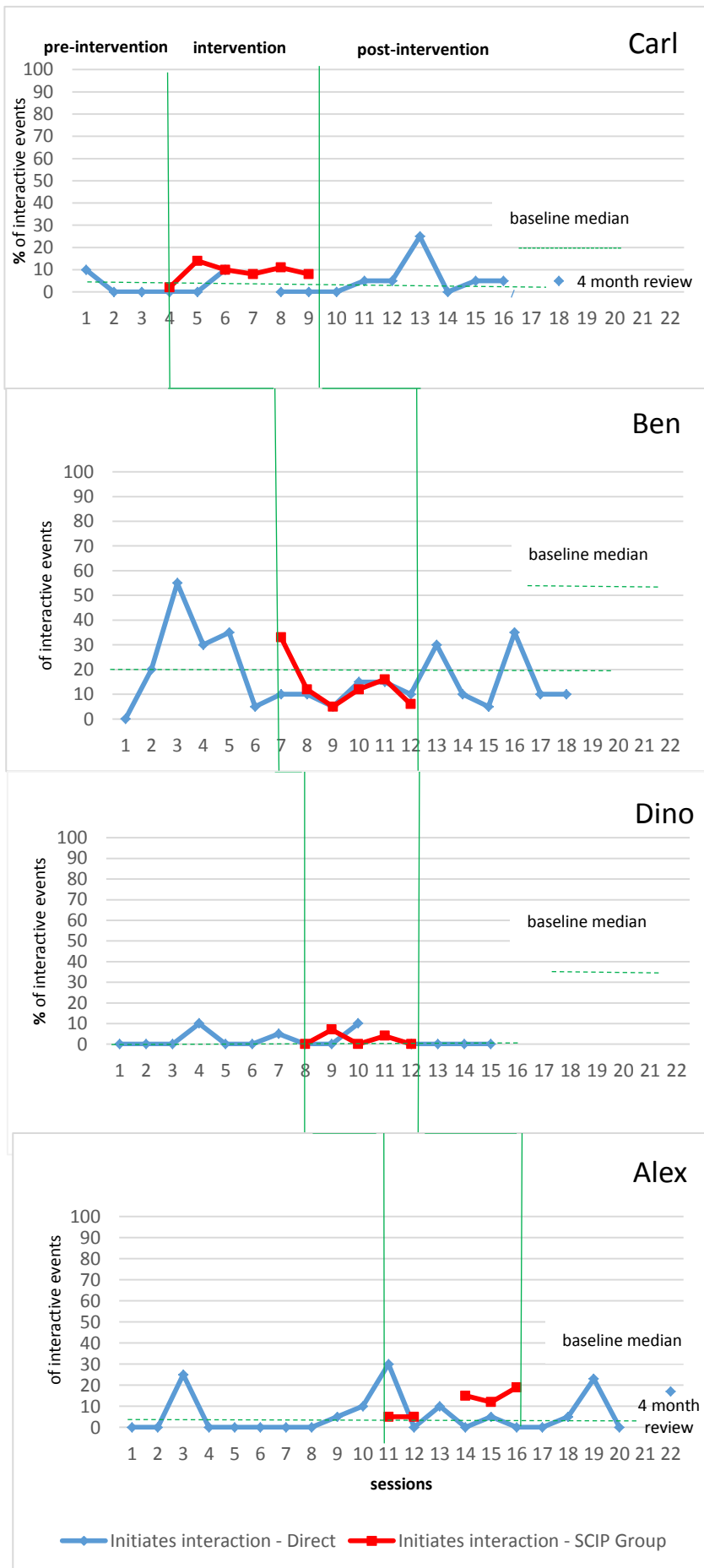


Fig 4.10 Percentage of 15 second intervals where child with ASD, neurotypical child, and child with language delay initiate bids for interaction in direct condition.

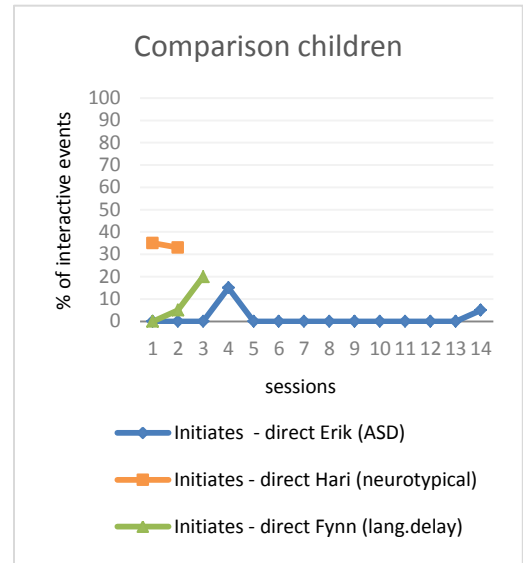


Fig 4.11 Percentage of 15 second intervals where children with ASD respond to bids for interaction in preschool group and SCIP intervention conditions

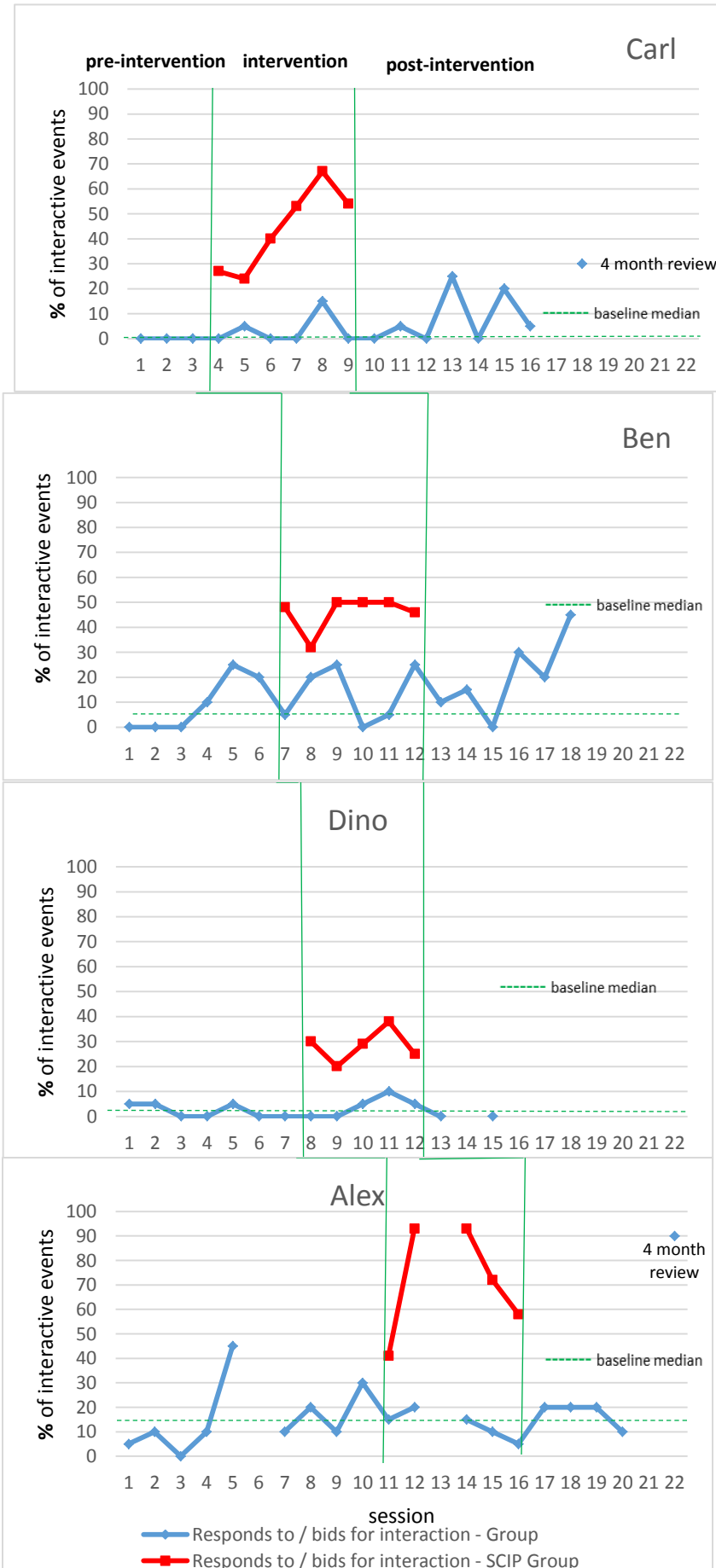


Fig 4.12 Percentage of 15 second intervals where neurotypical child; child with ASD, and child with language delay respond to bids for interaction in preschool group condition

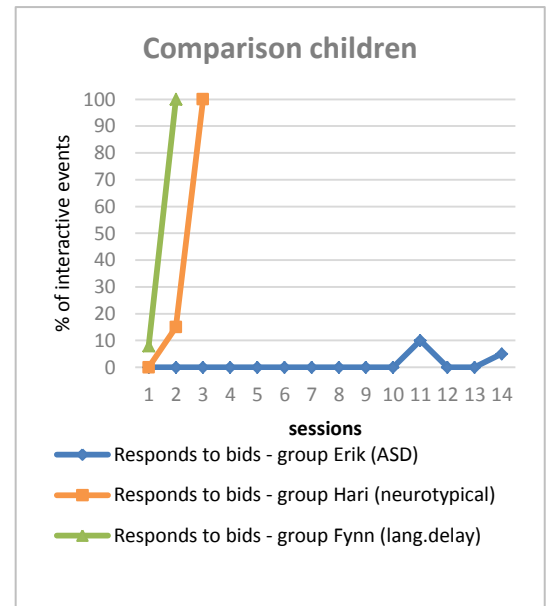


Fig 4.13 Percentage of 15 second intervals where children with ASD respond to bids for interaction in non-direct and SCIP intervention conditions

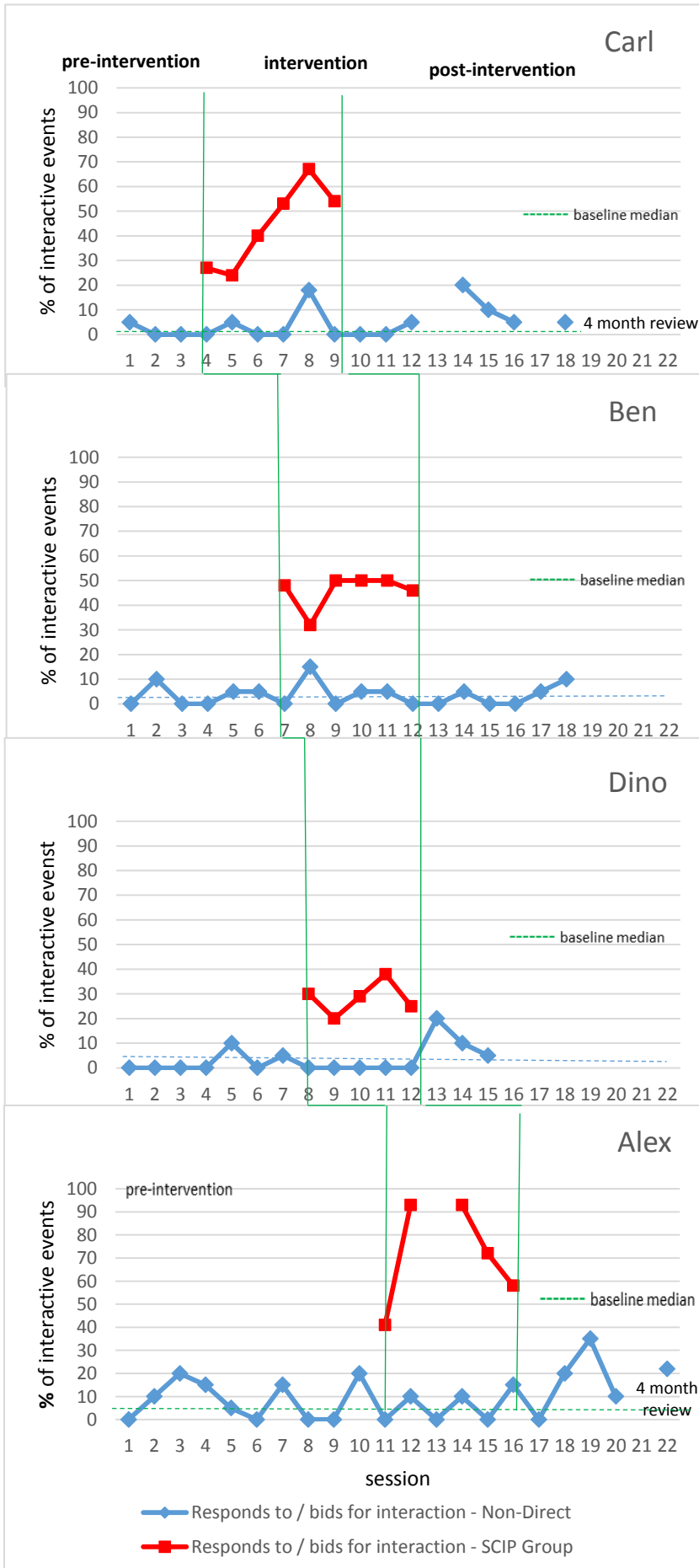


Fig 4.14 Percentage of 15 second intervals where neurotypical child; child with ASD, and child with language delay respond to bids for interaction in non-direct condition

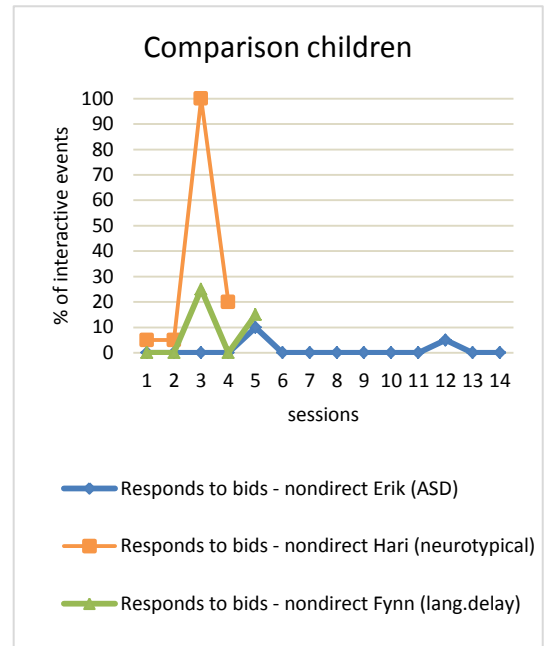


Fig 4.15 Percentage of 15 second intervals where children with ASD respond to bids for interaction in direct and SCIP intervention conditions

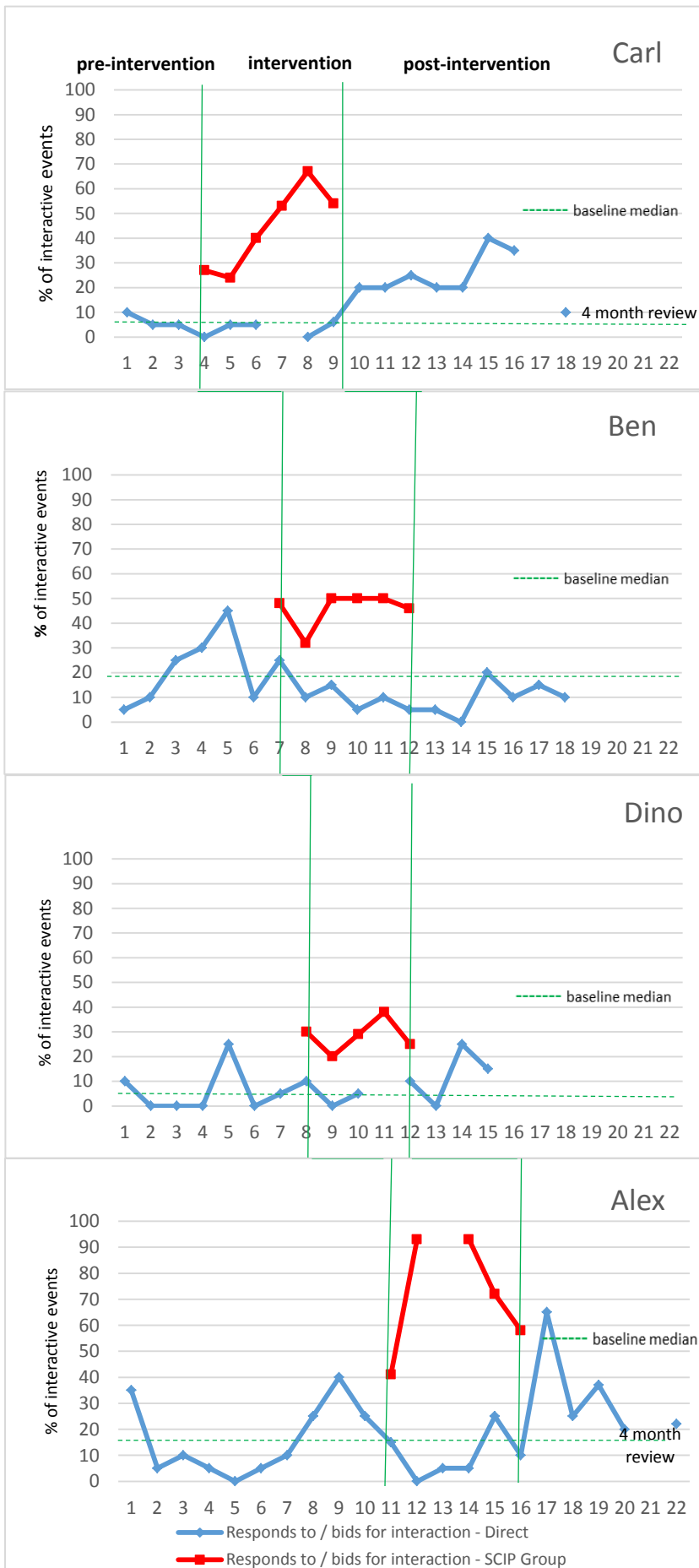


Fig 4.16 Percentage of 15 second intervals where neurotypical child; child with ASD, and child with language delay respond to bids for interaction in direct condition

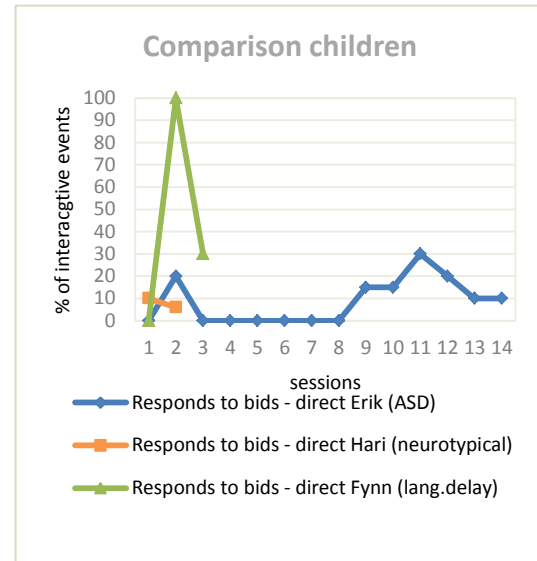


Fig 4.17 Percentage of 15 second intervals where children with ASD use communicative gestures/words in preschool group and SCIP intervention conditions

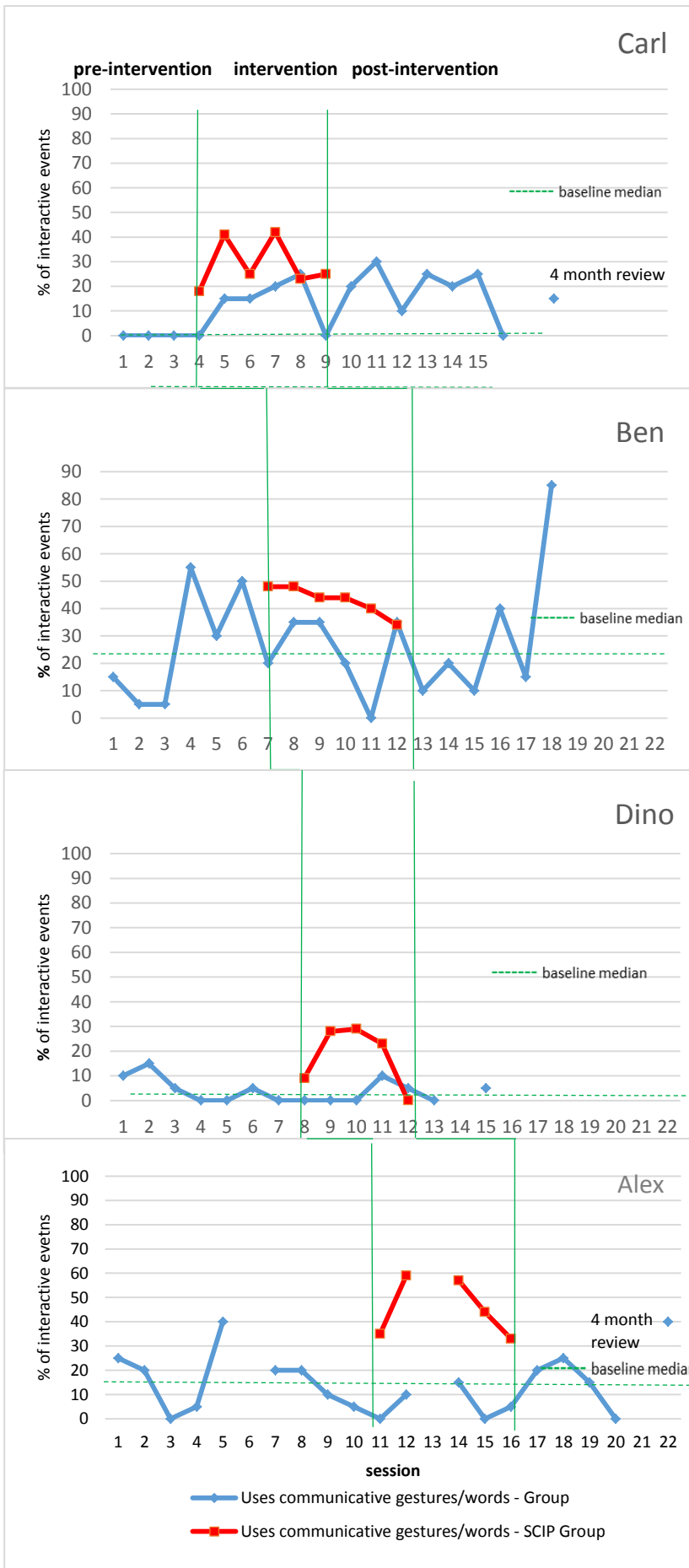


Fig 4.18 Percentage of 15 second intervals where child with ASD, neurotypical child, and child with language delay use communicative gestures/words in preschool group condition

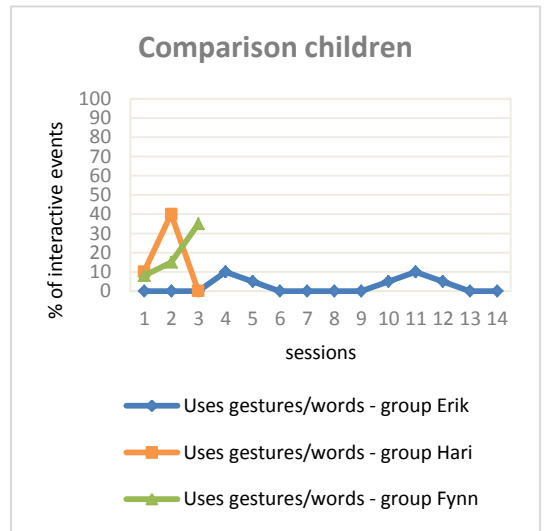


Fig 4.19 Percentage of 15 second intervals where children with ASD use communicative gestures/words in non-direct and SCIP intervention conditions

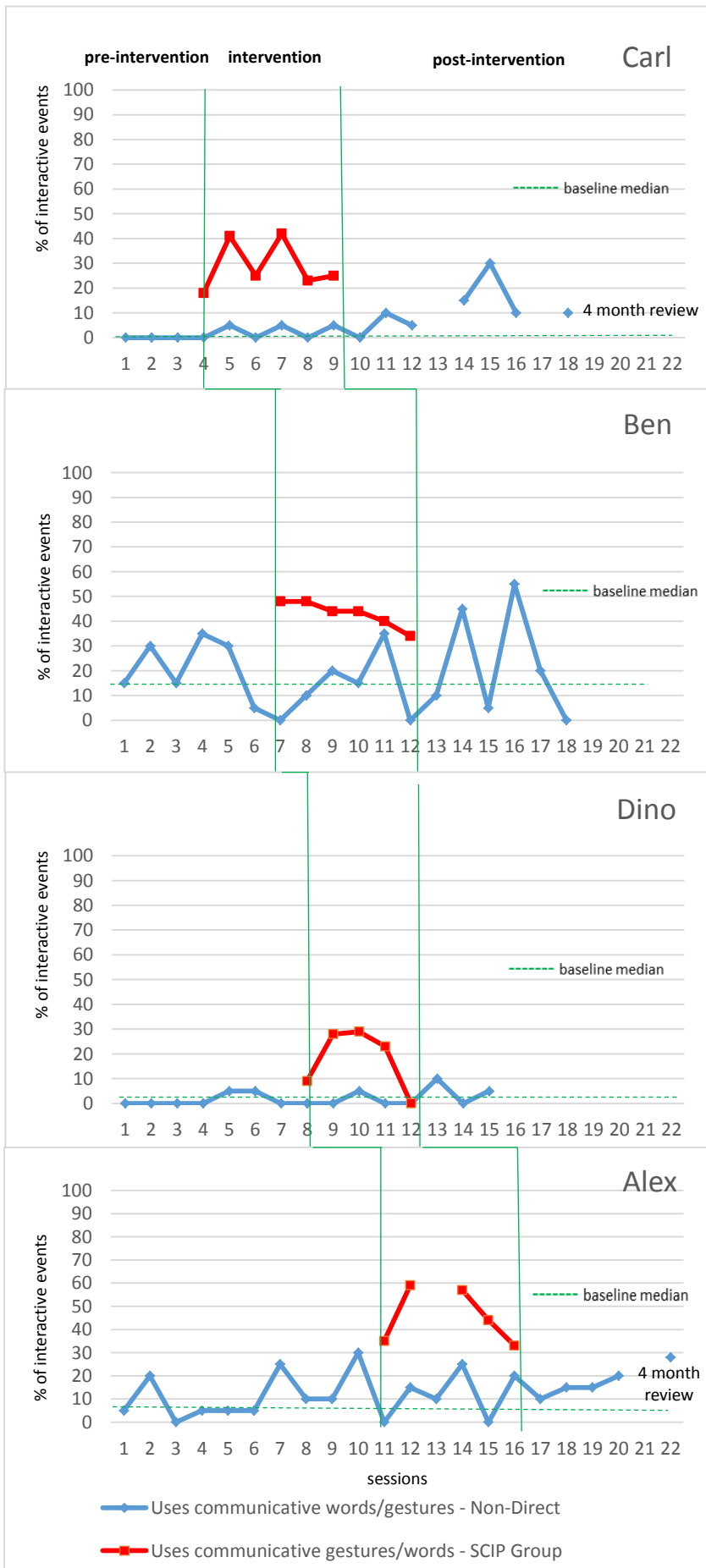


Fig 4.20 Percentage of 15 second intervals where child with ASD, neurotypical child, and child with language delay use communicative gestures/words in non-direct condition.

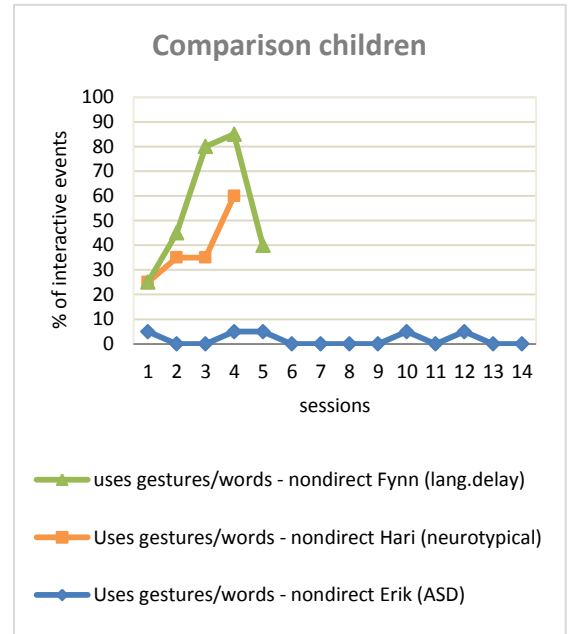


Fig 4.21 Percentage of 15 second intervals where children with ASD use communicative gestures/words in direct and SCIP intervention conditions

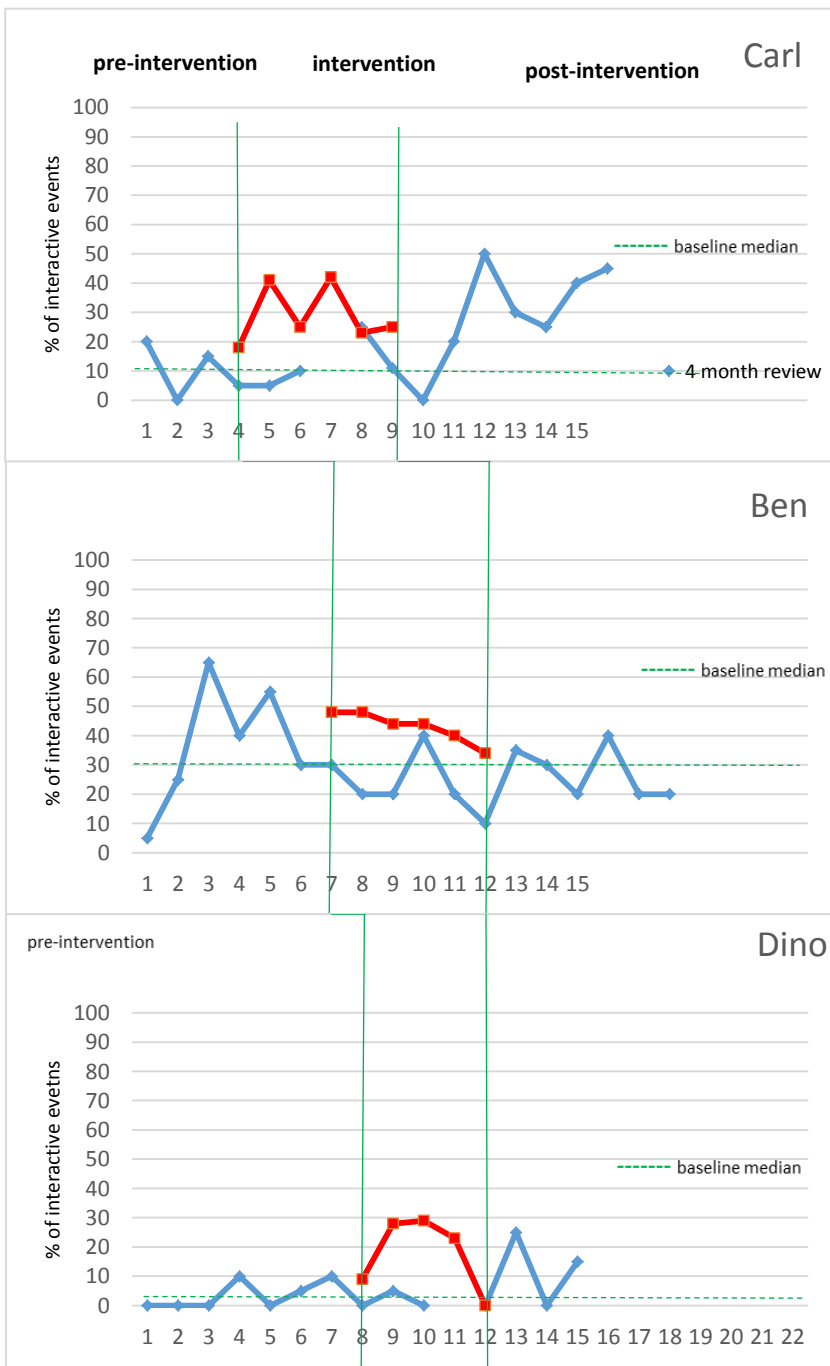


Fig 4.22 Percentage of 15 second intervals where child with ASD, neurotypical child, and child with language delay uses communicative gestures/words in direct condition

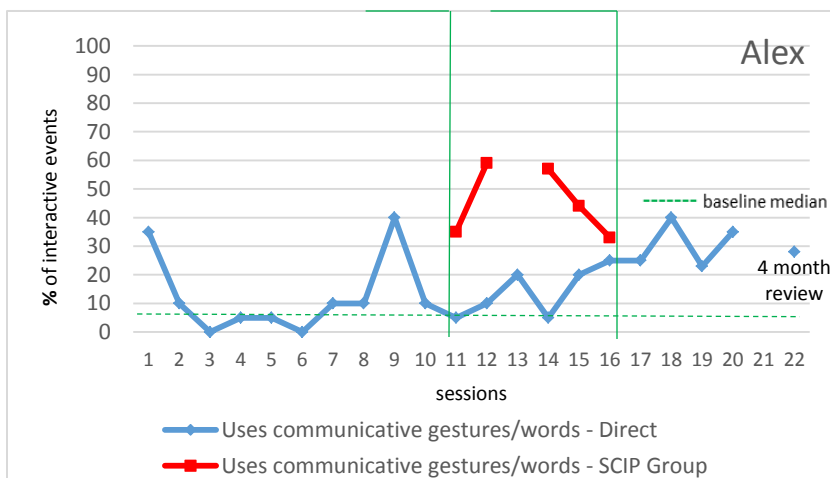
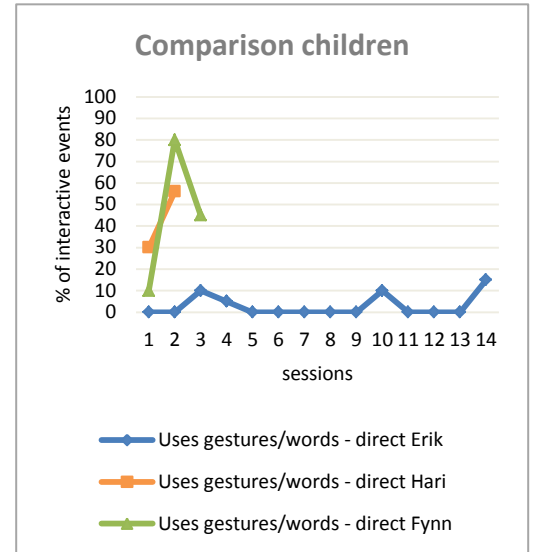


Fig 4.23 Percentage of 15 second intervals where children with ASD look/smile at others in preschool group and SCIP intervention conditions

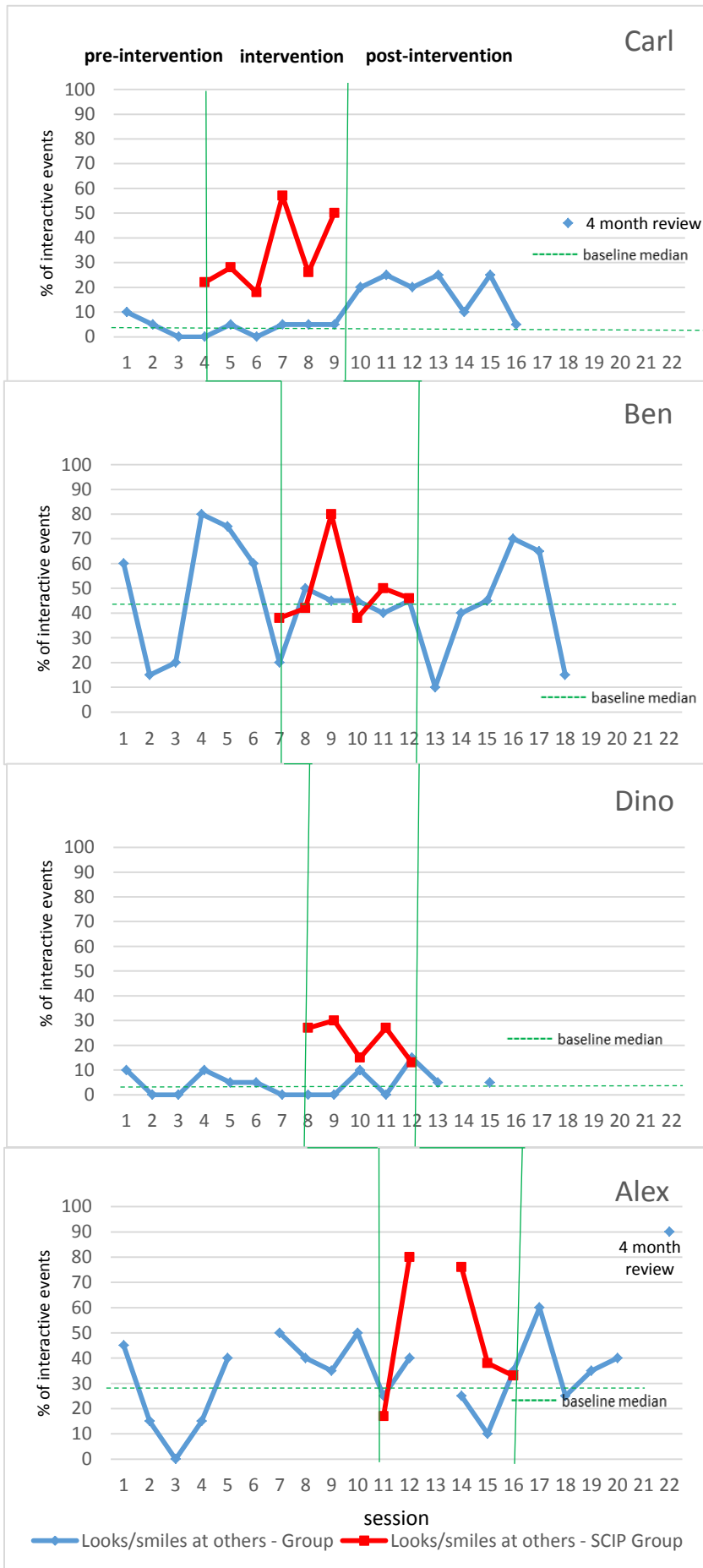


Fig 4.24 Percentage of 15 second intervals where neurotypical child; child with ASD, and child with language delay look/smile at others in preschool group condition.

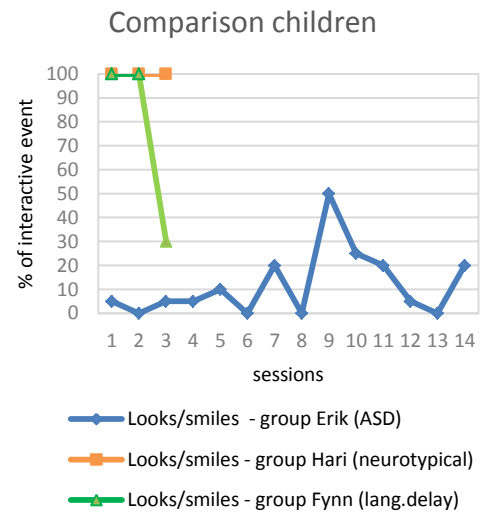


Fig 4.25 Percentage of 15 second intervals where children with ASD look/smile at others across in non-direct and SCIP intervention conditions.

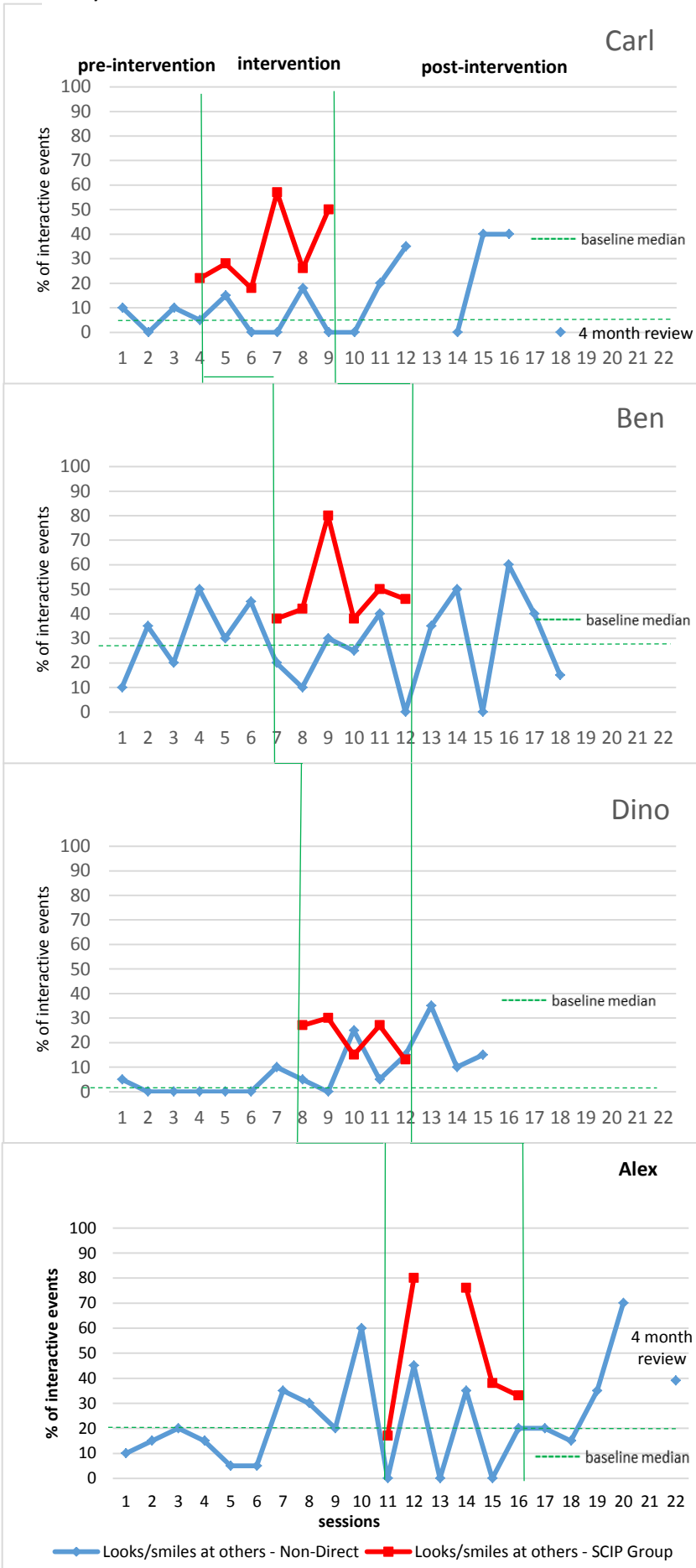


Fig 4.26 Percentage of 15 second intervals where neurotypical child; child with ASD, and child with language delay Looks/smiles at others in non-direct condition.

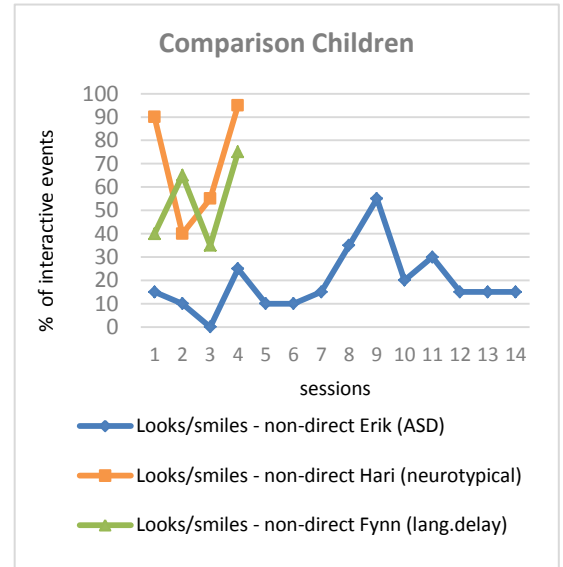


Fig 4.27 Percentage of 15 second intervals where children with ASD look/smile at others in direct and SCIP intervention condition.

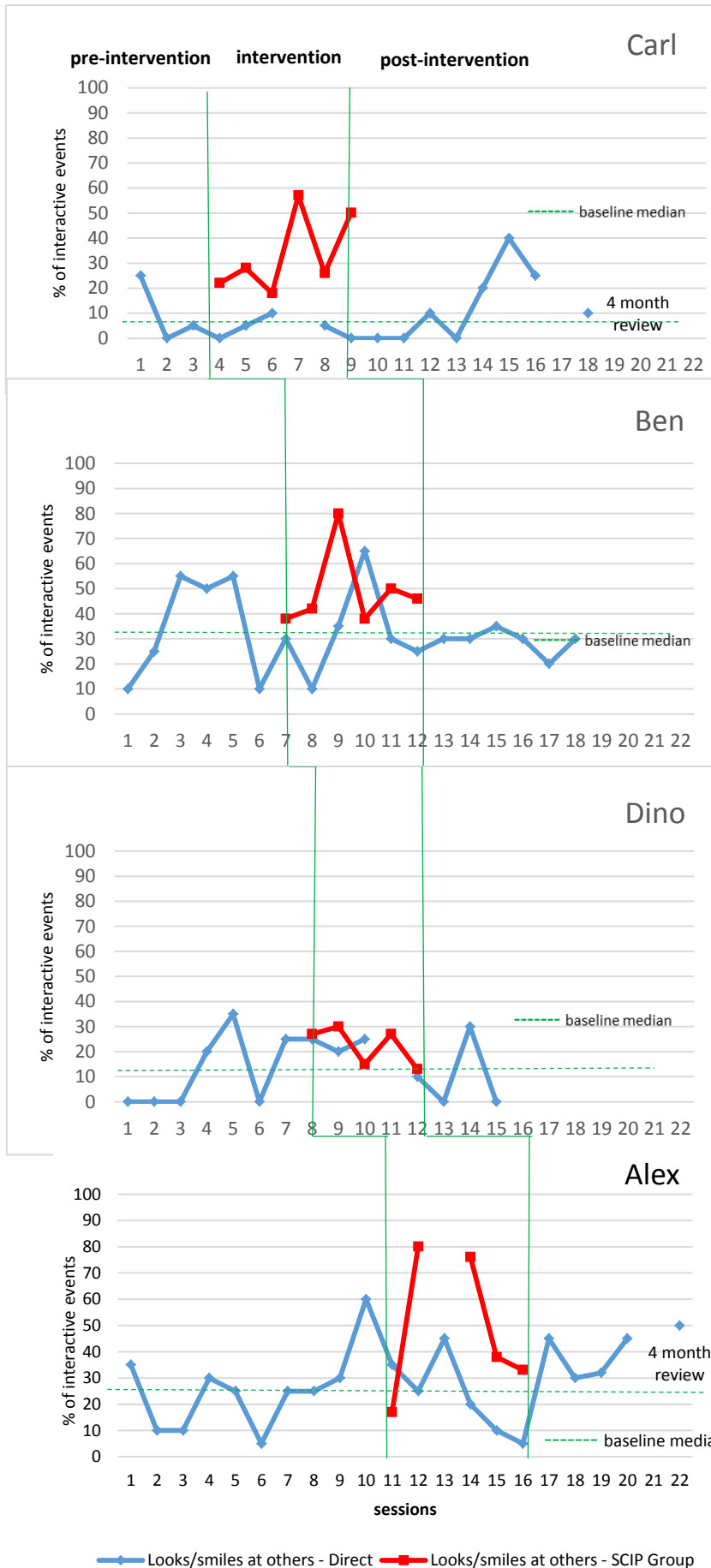
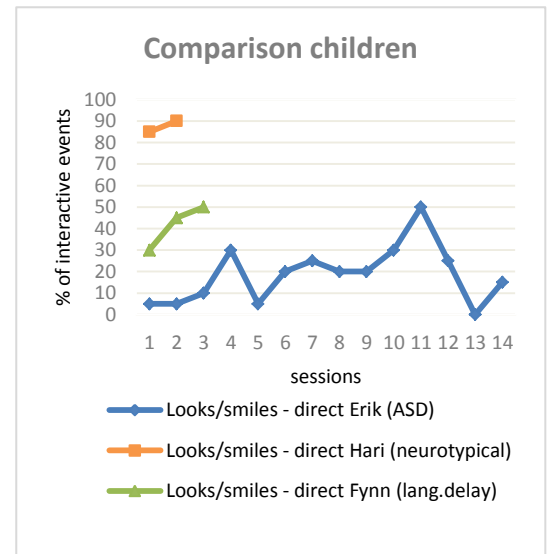


Fig 4.28 Percentage of 15 second intervals where child with ASD, neurotypical child, and child with looks/smiles at others in direct condition



Social communication behaviours observed visually in the SCIP intervention

The percentage occurrences of social communication behaviours in the SCIP intervention (Figures 4.1.-4.4) indicate variation across sessions, across behaviours, and variations across children. With very few exceptions (e.g. Carl's responses to bids for interaction, Fig.4.2) there is no indication that the four experimental children increase their use of the four social communicative behaviours during the SCIP intervention, and the graphs suggest considerable variation in communicative behaviours used.

Visual inspection shows differences across the social communicative behaviours. All four children's initiations of bids for interaction are infrequent, with only one occasion where initiations were observed in 30% of the 15-second intervals (Ben, session 7). The three other social communication behaviours rarely occurred below 30% of the intervals, with Dino showing the lowest scores. There are also visually apparent differences between the children's social interaction during the intervention. Dino's level of interaction appears lower than the other children's for all behaviours. With one exception (Response to Bids for Interaction, session 11) Dino uses the four measured social communication behaviour less than 40% of the observed intervals. Alex, in contrast shows both high and low frequencies across sessions, for example, his use of looks and smiles to others varies from 20% occurrence in his first SCIP session, rises to 80% in the second session and goes down to 30% in his final intervention sessions. The variation across sessions is discussed further below.

Social communication behaviours observed in non-direct, direct and preschool group conditions before and after intervention

Visual inspection of scores in pre-intervention sessions in comparison with scores in post-intervention sessions shows variability across communicative measures, between conditions, and between children. In approximately a third of the outcomes, there is visual evidence of apparent increases in social communication frequencies post-intervention. This is most noticeable for Carl who appears to increase his use of communicative words and gestures in all 3 conditions post-intervention.

However, the conditions in which there is some visual evidence of increased use of social communication behaviours post-intervention vary between children and across behaviours.

The condition most similar to the SCIP intervention is the preschool group – the intervention was based on the typical activities used in groups – however, only Carl showed apparent post-intervention increased frequencies in the preschool group for three out of four social communication behaviours. The other children appeared to show increases post-intervention in some conditions for some behaviours, raising doubts that apparent increases can be attributed to the intervention.

Tests of significance

In order to amplify the visual analysis, a non-parametric test was used following Pring, 2005. This involved splitting the pre-intervention sessions into two halves and finding the median value for both the first half and the second half of the sessions. A line through these values provided the average median and shows the trend of the baseline data. This is shown by the green dashed line on the graphs and is referred to here as the baseline. By continuing the baseline through the intervention, post-intervention and 4 month follow-up sessions a count could be made of the number of sessions scoring above the baseline trend for each child. A sign test was used to see if the number of sessions above baseline was significant ($p < 0.05$ on a one-tailed sign test). For a sign test to be significant, the number of observations above the baseline has to be significantly above chance (e.g. if there are 10 post-intervention observations, the child's score needs to be higher than baseline on at least 9 out of 10 to be significant at the $p < 0.05$ level). (Pring, 2005).

Tables 4.11 – 4.14 show the results of the sign test for each child’s use of the four social communication behaviours in the 3 conditions. Column 3 shows the number of post-intervention sessions above the baseline. Column 4 shows the number of 4-month follow-up sessions above the baseline.

Evidence of possible effects post-inter+vention using sign test

The number of post-intervention sessions above the baseline is consistent with the visual evidence suggesting that there are improvements post-intervention for some children in some conditions. All children appear to show an increase in the number of sessions above the baseline in at least one condition for responses to bids for interaction and for their use of communicative words/gestures. There are also indications of an increased numbers of sessions above the baseline for individual children on two measures: initiations of bids for interaction (Alex & Carl) and looks & smiles at others (Carl & Dino). For Alex and Carl, the social communication behaviour scores appear to be above the baseline trend for most sessions in the 4-month review observation. Dino and Ben moved to specialist preschools and a 4-month review was not possible.

Overall, there was considerable variation in the frequencies when a social communication behaviour was used. This reflects variations in the preschool contexts and in the high variability in behaviour exhibited by children on the autistic spectrum (NICE Guidelines, 2011; 2013). The lack of control over the contexts in which the observations were made limits the interpretation that can be made about observed changes post-intervention.

The child with a diagnosis of ASD – Erik – who did not receive the intervention until after the observations shows little change over time in the frequency of his use of social communication behaviours. As with the experimental children, there are variations between behaviours especially in his use of looks and smiles. These may be the result of the contexts in which he was observed.

The neurotypical and the language-delayed child were also observed during the direct, non-direct and preschool group conditions (though the number of observations varied due to opportunities to film and child absences). The variation in the observed social communication behaviours across sessions and across conditions is likely to reflect the variations in contexts. Comparisons of their social communication compared with that of the experimental children are explored below.

In summary, the variability in frequencies of observed social communication behaviours alongside the lack of increases in social communication behaviours in the SCIP intervention itself suggests that this study cannot provide evidence for the effectiveness of a 6-session Speech and Language Therapy intervention.

Table 4.11 Initiations of Bids for Interaction: pre-intervention scores and number of sessions above baseline*** during post-intervention sessions, and at 4 month review session.**

SCO Initiates Bid for Interaction	Pre-intervention baseline percentage of intervals in which behaviour occurs	Number of post-intervention session scores above baseline	Number of 4 month review sessions above baseline
Carl	%		
Non-direct	0	2/6	1/1
Direct	2.5	5/7	1/1
Preschool group	0	6/7*	1/1
Ben	%		
Non-direct	13.75	4/6	n/a
Direct	20	2/6	
Preschool group	0	3/6	
Dino			
Non-direct	1.25	2/3	n/a
Direct	0	0/3	
Preschool group	0	0/2	
Alex			
Non-direct	1.25	2/4	1/1
Direct	1.25	2/4	
Preschool group	5.0	1/4	

Table 4.12 Responses to Bids for Interaction: pre-intervention scores and number of sessions above baseline*** during post-intervention sessions, and at 4 month review session.**

SCO Responds to Bids for Interaction	Pre-intervention baseline percentage of intervals in which behaviour occurs	Number of post-intervention session scores above baseline	Number of 4 month review sessions above baseline
Carl	%		
Non-direct	1.25	4/6	1/1
Direct	5	7/7*	1/1
Preschool group	0	4/7	1/1
Ben			
Non-direct	1.25	3/6	n/a
Direct	18.75	1/6	
Preschool group	7.5	5/6*	
Dino			
Non-direct	1.25	3/3*	n/a
Direct	3.75	2/3	
Preschool group	1.25	0/2	
Alex			
Non-direct	5	3/4	1/1
Direct	12.5	4/4*	1/1
Preschool group	12.5	3/4	1/1

* sign test indicates that sessions scores are significantly above the baseline

** scores refers to % of intervals in a session when a behaviour was present

***baseline refers to the line through the median values for the pre-intervention sessions

Table 4.13 Communicative gestures/words: pre-intervention scores and number of sessions above baseline*** during post-intervention sessions, and at 4 month review session.**

SCO Uses communicative gestures/words	Pre-intervention baseline percentage of intervals in which behaviour occurs	Number of post-intervention session scores above baseline	Number of 4 month review sessions above baseline
Carl	%		
Non-direct	0	5/6*	1/1
Direct	10	6/7*	0/1
Preschool group	0	6/7*	1/1
Ben			
Non-direct	16.25	3/6	n/a
Direct	30	2/6	
Preschool group	22.5	2/6	
Dino			
Non-direct	1.25	2/3	n/a
Direct	1.25	2/3	
Preschool group	5	0/2	
Alex			
Non-direct	7.5	4/4*	1/1
Direct	7.5	4/4*	1/1
Preschool group	15	2/4	1/1

Table 4.14 Looks/smiles at others: pre-intervention scores and number of sessions above baseline*** during post-intervention sessions, and at 4 month review session.**

SCO Looks/smiles at others	Pre-intervention baseline percentage of intervals in which behaviour occurs	Number of post-intervention session scores above baseline	Number of 4 month review sessions above baseline
Carl	%		
Non-direct	6.25	4/6	0/1
Direct	7.5	4/7	1/1
Preschool group	3.75	7/7*	1/1
Ben			
Non-direct	28.75	4/6	n/a
Direct	32.5	1/6	
Preschool group	43.75	3/6	
Dino			
Non-direct	1.25	3/3*	n/a
Direct	12.5	1/3	
Preschool group	3.75	2/2*	
Alex			
Non-direct	20	2/4	1/1
Direct	26.25	4/4*	1/1
Preschool group	27.5	3/4	1/1

* sign test indicates that sessions scores are significantly above the baseline

** scores refers to % of intervals in a session when a behaviour was present

***baseline refers to the line through the median values for the pre-intervention sessions

Discussion of each social communication behaviour

Initiations of Bids for Interaction

The overall result for all children except Ben is the relatively low level of self-initiated bids in all conditions and during the SCIP intervention, in comparison with other social communication behaviours. Dino's use of initiations is markedly low in all conditions, and also in the SCIP intervention, and there is little difference between pre- and post-intervention scores. Even in the SCIP intervention group where initiations are actively encouraged, percentage frequencies of use for Ben, Alex and Carl are rarely above 30% - i.e. only occurring in 6 /20 fifteen-second intervals or less - suggesting core difficulties in this social communication function, and the difficulty of developing use of Initiations even in a highly structured small group.

Carl

Carl shows a low use of initiations in all conditions. Visual inspection shows that this is particularly marked in the pre-intervention sessions during the non-direct and preschool group conditions. Film observations show Carl spending much of the initial sessions either absorbed in a preschool area with his back turned away from the rest of the room, or pushing a toy trolley up and down the room. Over the course of the filming, there was increasing evidence of engagement in the preschool activities. The baseline rate of initiations was 0% for the non-direct and preschool group conditions and 2.5% for the direct session during the five minute sessions. The scores for the initiations in the 6 SCIP intervention sessions suggest a potential to initiate in specialised contexts.

The comparison of Carl's pre- and post-intervention scores appear to suggest an increase in frequency of initiations for the preschool group ($p < 0.05$). This may be due to context variations rather than an effect of the intervention.

The 4-month review score was above than the baseline in all three conditions.

Ben

Ben initiates interaction more frequently than the other children during the direct and non-direct conditions. During the filming and during the ADOS assessment, Ben frequently used a 'showing' behaviour. This was exemplified by Ben picking up pens or small objects holding them towards adults, sometimes naming them with a colour word (not always correctly), and then waiting for adults to name them. He then returned to whatever he was doing. The initiations did not extend beyond this show + name routine. There were few initiations in the preschool group.

Dino

Dino had the lowest level of initiations of the four children in the experimental group. In all conditions, frequencies of initiations were mainly zero with only occasional sessions in which Dino initiated in two 15-second intervals within a 5-minute filmed session. This low level of frequency of initiations was evident during the pre-intervention, the SCIP intervention and post-intervention sessions. Film observations show Dino spending much of his time in preschool either absorbed at the water or sand table, or outside exploring the preschool equipment on his own.

Alex

In the direct and non-direct conditions, Alex's scores for initiations generally ranged between 0%-30% of the time, with one outlying score of 55%. Even in the SCIP intervention where there was active focus on supporting the child's initiations, the highest outcome score for Alex was 19%.

The comparison of pre- and post-intervention initiations showed no differences, with only 2 out of 4 social communication behaviours scoring above the baseline. The 4-month review session scores were higher than baseline in both the non-direct and direct conditions.

Responses to Bids for Interaction

The frequency of responses to bids during the intervention showed little increase over the six intervention sessions except for Carl.

The number of post-intervention sessions that appear to score above the baseline shows an increase in one condition for each of the 4 children. The variation between children in which condition there were apparent increases may reflect the variations in preschool contexts; the variations in children's social behaviours over the sessions, as well as the small number of observations.

Carl

Carl shows a low level of pre-intervention responses to bids for interaction in all conditions. There appears to be a marginally higher score in the direct condition where staff were asked to focus specifically on gaining the child's shared attention. In the SCIP intervention, Carl appears to show a gradual increase over the sessions in his frequency of responding to bids.

There appears to be an increase in the post-intervention use of responses to bids for interaction in comparison with the pre-intervention baseline in the direct condition ($p < 0.05$). It is not possible to say if this is the effect of variations in the context.

Carl's 4-month review score was higher than the baseline in all three conditions.

Ben

Ben shows a low frequency of pre-intervention responses to bids for interaction in most conditions though, like Carl, the scores are slightly higher in the direct condition. In comparison with the other children, Ben appears to initiate interaction more frequently than he responds to bids for interaction in the non-direct condition. This goes against the evidence from neurotypical development (Bono et al., 2004) but the outcome may be affected by his repetitive 'showing' of objects to adults.

There appears to be an increase in the frequency of responses post-intervention for the preschool group condition in comparison with the baseline ($p < 0.05$). As the preschool group varied over time, no conclusions can be reached about this increase.

Dino

Dino shows a low level of pre-intervention response to bids for interaction in non-direct and preschool group conditions. Like Carl and Ben, the frequency of responses is slightly higher in the direct condition.

There appears to be an increase in the post-intervention frequency scores in the non-direct session ($p < 0.05$) and a small increase in the direct condition. These apparent increases may reflect the variations in the contexts used for collecting the data or the variability in Dino's social communication.

Alex

Alex shows a variable frequency in his pre-intervention responses to bids for interaction across all three conditions. Visual inspection of the SCIP scores suggests that response to bids increases when the skill is targeted, with percentage frequencies of bids reaching 90% in 2 out of 5 SCIP intervention sessions.

There appears to be an increase in the post-intervention frequency of responses to bids in the direct condition ($p < 0.05$) conditions in comparison with the baseline. Again the context variability makes this difficult to interpret.

Alex's 4-month review score was above the baseline in all three conditions.

Use of Communicative Gestures and Words

There appear to be increases in the frequencies of children's use of gestures/words between the pre- and post-intervention outcomes for Carl (all conditions) and Alex (2/3 conditions). These apparent increases may be the result of factors other than the intervention.

Carl

Carl shows a low level of pre-intervention use of words/gestures though, as in the response to bids' score, the frequencies of gestures/words appear to increase in the direct condition. Post-intervention scores for the use of gestures and words appear to be above the baseline ($p < 0.05$) in all conditions.

The 4-month review score was higher than baseline in all three conditions.

Ben

Ben uses gestures and words more frequently than the other children. As noted above, he frequently showed objects to adults and named them. In the intervention where the use of gestures and words was specifically targeted, Ben used communicative forms in functions other than naming such as gestures/words for greeting, choosing, anticipating and describing actions, and naming others.

There is no difference between the post-intervention scores and the baseline across the three conditions.

Dino

Dino's use of communicative gestures/words is very low pre-intervention but there appears to be a slight increase in the post-intervention scores compared with the baseline for 2 conditions but these do not reach significance using the sign test (Pring, 2005) and the number of observations is small. These minor changes over time may be the effect of many factors such as familiarity with the preschool or changes in the context of the observations.

Alex

Alex's use of communicative gestures/words is variable but visual inspection suggests a general increase in his use of communicative gestures and words over the observation period. There appears to be an increase in the number of post-intervention scores above the baseline in two out of three conditions ($p < 0.05$).

The 4-month review score was above the baseline in all three conditions.

Looks and Smiles at Others

The overall result for the children's looks and smiles at others appears similar to the results for their use of communicative words and gestures. There were apparent increases in looks/smiles at others post-intervention compared with the baseline in a range of conditions. This variation suggests that context difference may have affected results. For Carl, looks and smiles appear to increase post-intervention in the preschool group; for Dino, scores appear to increase in the direct and preschool group, while for Alex the frequency of looks/smiles appear to increase post-intervention in the non-direct condition. There was no difference between the baseline and post-intervention use of looking/smiling for Ben.

Evidence for an experimental effect is in doubt given the variability in results.

Carl

Carl's frequency of use of looks/smiles appears to increase post-intervention only in the preschool group condition. The variability in his use of this communication behaviour suggests that factors other than the intervention may have affected his score. (See further discussion in Study 3 below.)

Ben

Ben smiled as he explored the preschool and as he showed objects to adults. He also smiled at other children when they stood next to him, though it was unclear if this was an interactive attempt to share enjoyment. There was no difference between Ben's frequency of smiling and looking before and after the intervention.

Dino

Dino was a smiling child as he explored the preschool environment. There appears to be an increase in his use of looks/smiles post-intervention in the non-direct observations ($p < 0.05$). This may reflect context variations.

Alex

Alex was also a smiling child in the preschool activities. His baseline score was higher for looking and smiling at others than for any other social communication behaviour, and there appears to be an increased frequency post-intervention in the direct condition. Post-intervention results suggest an increased use of all four social communication behaviours in the direct condition. It is unclear why this condition for Alex was most likely to have post-intervention increases.

The 4-month review session was above the baseline in all conditions.

Comparison children***Erik***

Erik - the child with ASD who did not receive the SCIP intervention until after the observation period – scored close to 0% for frequency of initiations across all conditions. There are no signs of increased use of initiations over the 14 sessions. His scores are lower than all children in the experimental group.

Similarly, his frequency of responses to bids for interaction were close to 0% in the non-direct and preschool group conditions. There are, from visual inspection, indications of an increase in frequency of responses in the direct condition over the sessions.

Erik used communicative gestures/words from 0%-20% of the 15-second intervals observed in all conditions. There was no observed change over the 14 sessions.

Erik appears from inspection to use a more looks and smiles in the non-direct and direct condition towards the end of the observation period. This suggests changes in his social referencing over time, perhaps indicating his growing familiarity with the setting. (See Chapter 6 for further examination of social referencing.)

The context of the observations varied and this may have affected results.

Hari and Fynn

Social communication observations were also recorded for Hari, a child with neurotypical development and Fynn, a child with delayed language development. Both attended the same preschool as Eric. The number of sessions observed varied (mainly due to child absences) and there were also variations in the contexts where the children were observed. This makes comparison difficult. For example, the high variations in their responses to bids for interaction across sessions (from no observed responses to responses observed in 100% of the 15-second coding intervals) may reflect the opportunities for responding to bids in different contexts.

It may also reflect coding categories designed for children with ASD which did not code continuous intervals of shared play. For example, the non-directed sessions for Hari and Fynn were mainly recorded during outside play when they were running around with peers. After an initial response to a bid from one child to chase each other, there were few further bids for Hari and Fynn to respond once joint play was established. These important questions about differences in social communication depending on the context are discussed further below.

Hari, the neurotypical child, appears to initiate interaction more frequently than most children with a diagnosis of ASD in direct and non-direct conditions, the exception was Ben who initiated more frequently than Hari in some sessions due to his 'showing' routine (see above). The variation in scores for Hari alongside the low frequency of initiations in the preschool group may reflect the variations in context. His preschool group, for example, did not encourage children to initiate.

A comparison with the scores for Fynn suggests that most of the children with a diagnosis of ASD make fewer initiations in all preschool conditions than a child with delayed language. This may be due to variations in the observed contexts. The exceptions were the higher frequency levels of initiations for Ben in direct and non-direct conditions and for Alex in the preschool group. Although there appears to be a marginally higher rate of initiations for Fynn compared with children with ASD, it remains of concern that a child with language delay may be provided with few opportunities to initiate interaction.

The comparison children's response to bids are difficult to interpret given the variation from 0% -100% use of responses to bids during the 15-second intervals for both the neurotypical and language delayed child. These variations highlight the potential differences in opportunities for social communication across preschool 'freeflow' activities.

Both Hari and Fynn had higher frequencies of use of communicative gestures/words in most conditions in comparison with the experimental children. The two children also looked and smiled at others more frequently in most conditions than the children with a diagnosis of ASD. Hari in particular looked and smiled in over 80% of the observed 15-second intervals, with the exception of 2 sessions where he was running around the playground with others, often in the lead thus with no-one to smile/look at. Again, context is a major factor in the variation. The exception to Hari and Fynn's higher use of words/gestures was in the preschool group. This reflects the formal nature of their preschool group. For Hari, Fynn and Erik, the preschool group rule was for children to 'close their mouths, open their ears and keep their hands on their lap'.

Discussion

Overall, the results post-intervention and at the 4 month follow-up are small and difficult to interpret.

The frequency of joint attention behaviours used during the intervention varied between children and across intervention sessions. Furthermore, there was no evidence in this short intervention that the children's use of social communication behaviours increased.

An exception to this comes from the observations for Erik, the control child with a diagnosis of ASD, who attended 4 SCIP intervention sessions at the end of the observation period, following the same format as the children in the experimental group. The only difference was that there were no post-intervention observations, and there were only 4 small group sessions due to end of term activities.

In Figures 4.29 – 4.32, the graphs suggest that this one child appears to increase the frequency in his use of social communication behaviours during the SCIP intervention. Without larger samples and increased control over the contexts, little can be drawn from this finding.

Fig 4.29 % of 15 second intervals where control child with ASD initiates bids for interaction in SCIP intervention

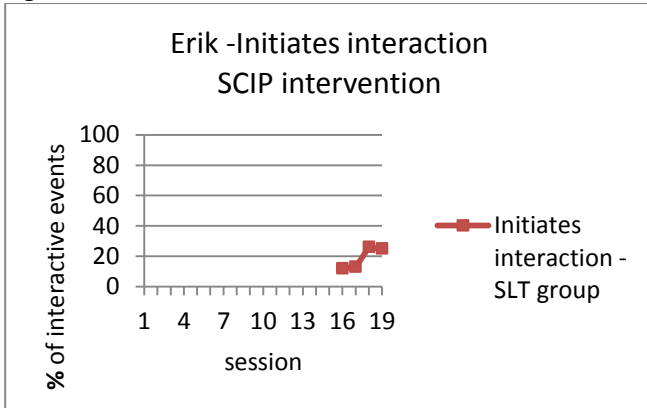


Fig 4.30 % of 15 second intervals where control child with ASD responds to bids for interaction in SCIP intervention

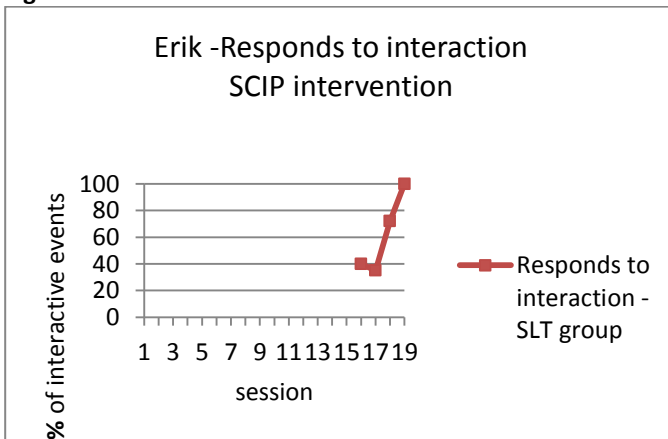


Fig 4.31 % of 15 second intervals where control child with ASD uses words/gestures in SCIP intervention

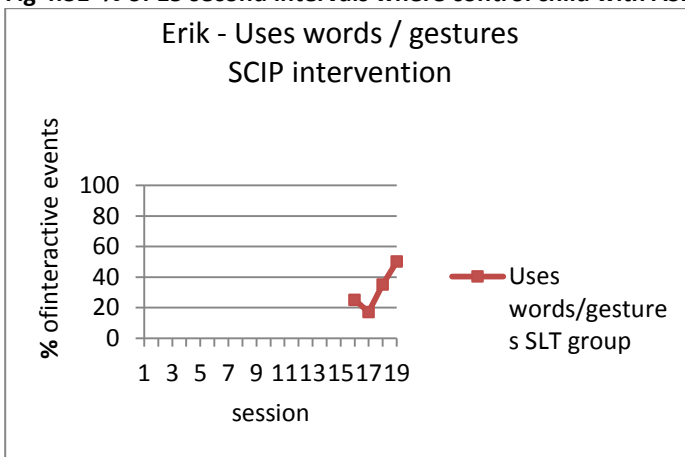
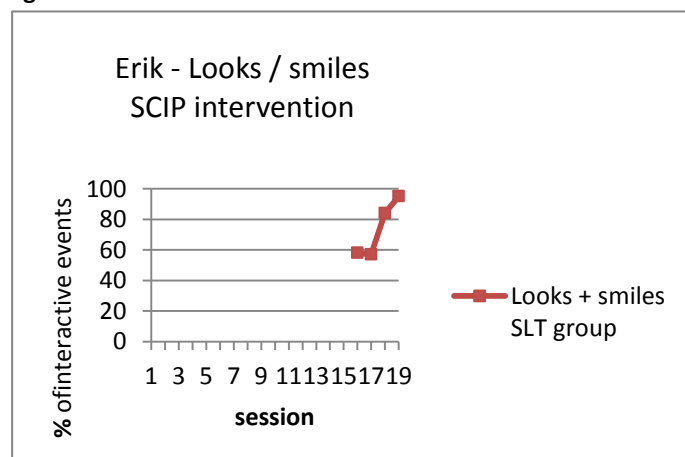


Fig 4.32 % of 15 second intervals where control child with ASD Looks/smiles at others in SCIP intervention



The SCIP project studies are unique in observing the child's behaviours in daily non-specialist preschool activities while the intervention is taking place. The graphs show results for both the SCIP intervention and the social communication behaviours in three preschool conditions. Visual inspection suggests that a few post-intervention scores are above baseline, but these may be due to context variations.

A question for future research is about the duration and intensity of specialist preschool intervention, and about ways to promote carryover of focussed interventions into daily activities.

Context and variation – limitations of the study observations

The variation in the scores across conditions indicates the variability of social communication in different contexts as well as the variability of children's interaction levels. The variation in outcome in different contexts demonstrated by the comparison children without ASD underline this point, as indicated above.

The preschool early years' curriculum promotes child exploration of learning spaces, with children moving from context to context with little pacing or structure introduced by adult practitioners. Opportunities for social communication vary between and within contexts and vary across preschools. For example, in the preschool attended by the comparison children, Erik, Hari and Fynn, the daily group session did not encourage children to initiate, focussing instead on children listening to a story or learning a song together. For Alex and Ben's preschool, in contrast, the group actively encouraged children to initiate and to contribute to making up new rhymes together or to retelling stories.

The attempt in this research study to observe children's social communication behaviours in their natural environment had assumed that there would be similarity in the conditions filmed, in particular in the shared preschool group condition. However, preschools took different approaches to group activities with, at one end, a preschool having a formal 15-minute listen-to-a-story session before going home, while at the other end a preschool introducing a group activity whenever a staff person felt that the children should be brought together for a short spontaneous song-and-rhyme routine.

The lack of an experimentally designed activity in which certain context variations could be controlled meant that observations in the three conditions varied due to context, not necessarily due to differences in the child's social communication development. An attempt was made to introduce a task that was comparable across settings, however it proved difficult to implement in the settings, making staff unhappy about this additional research requirement.

Future naturalistic research needs to consider how to reduce the context variations through use of a standard activity to measure change, while still taking into account children's play preferences and the constraints of the preschool environment. At the same time, researchers need to be aware of the 'translation' difficulties when using the results of clinic-based research to inform decisions about preschool practices that will support children with ASD.

The discussion below looks further at factors affecting the children's use of each social communication behaviour observed in this study, and explores ways suggested by the study that preschool nurseries might develop the opportunities for social interaction especially for children with a diagnosis of ASD.

Discussion of individual social communication behaviours

Discussion of Initiations of Bids for Interaction

By definition, a child with ASD will be less socially motivated to request social interaction and it is difficult to promote a behaviour that the child has not yet found to be of value. A few comments may help make sense of the lower results for initiation of bids in the SCIP intervention. First, research (e.g. Yoder & Stone, 2006) shows that it is hard to find opportunities in experimental interventions to promote child initiations.

Second, and logically related to this, initiations for joint attention are known to appear after responses to bids for joint attention in neurotypical development (e.g. Bono et al., 2004; Kasari et al, 2006). As the experimental children are young, predominantly nonverbal, and have only recently begun attending preschools, it is reasonable to predict that initiations will be less frequent than responses to bids in unfamiliar contexts, at least at first. Ben, however, provides an exception to the predicted developmental order. His frequent, and repetitive, 'showing' of objects to adults led to a higher score of initiations compared with his responses to bids for interaction. This finding underlines the need for individual profiles of children when planning interventions.

Third, the culture of preschools is based on the prevailing curriculum guidance (e.g. Wong & Kasari, 2012) that places an emphasis on children's independence. Practitioners place high value on children developing their own play routines and therefore do not prioritise children's ability to initiate interaction. The low level of adult-directed activities may be of value to children with typically developing social interaction skills, but for the child with ASD, it may have the effect of reducing their opportunities to learn how people engage together.

Discussion of Responses to Bids for Interaction

A child's responses to bids for interaction will depend on the opportunities provided by adults for the child to engage. As shown in observational studies (e.g. Wong & Kasari, 2012) children with ASD may spend longer periods unengaged or engaged with objects than neuro-typical or children with delayed development.

The effect of the preschool context on responses to bids is apparent in the results for Fynn, the child with language delay. There is a marked contrast between the outcomes for the three conditions with his score of 0% responses in the non-direct condition compared with his frequency of responses in the direct and preschool group of 30% and 100% respectively. This suggests that Fynn has the capacity to respond once activities are structured and he is encouraged to engage, but that there are fewer opportunities provided for responding to bids in non-directed activities.

The observations from direct and preschool conditions where it is assumed there would be more opportunities for the experimental children to respond to bids suggest that responses are variable. In Dino's preschool group, one that had opportunities to engage in joint activities, Dino made no response to bids for interaction in half the sessions.

Discussion of Communicative Gestures/Words

There appeared to be increases over time in the children's use of gestures and words especially for Carl and Alex. Carl who had been assessed as non-verbal at the start of the research was using a number of recognisable words by the end of the observations. In one film extract he tells his key worker the foods that the *Hungry Caterpillar* ate as they look at the pictures in Eric Carle's book. Over the observation period, Alex developed a small and effective vocabulary including: 'bye' (used for greetings and farewells, and to stop things happening) and 'ready-steady' used to show it was his turn or to show what he wanted.

Dino, the least verbal child, used communicative gestures in the SCIP intervention in up to 30% of the 15-second coding intervals.

These apparent increases may be due to maturation, to context factors or to other factors happening at the same time as the intervention.

Discussion of Looks and Smiles at others

Frequently, reduced looking & smiling towards others is noted for children with a diagnosis of ASD. The results from the SCIP intervention suggest that children with ASD can respond with looks and smiles to focussed adult engagement in preschools to support their social referencing skills, but the results show high variation.

The coding of looks and smiles was not always clear cut as children frequently smiled and looked without a clear referent. Dino was observed looking towards a group of children but it was unclear if he was observing what they were doing or was simply looking into the space where children played. If the children moved away he often kept staring in the same direction.

Alex rarely stopped smiling though it was unclear whether this was in response to social overtures or whether it reflected his inner state of enjoyment as he rushed around the preschool. Smiling, in particular, has received little attention in research (see Mosconi, Reznick, Mesibov, & Piven, 2009). It is a category in the ADOS schedule (Lord et al., 2000) that is differentiated into smiles that are for self and smiles that are to share enjoyment. This distinction is less easy to make in a busy preschool.

Interestingly, filmed extracts show other children looking at the smiling Alex without smiling themselves as if trying to understand the meaning of his smile. The response of peers to the experimental children's looks is further explored in Chapter 6.

Limitations and suggested future directions

There were a number of shortcomings to the research methodology. The sample is small and the children differed in terms of age, developmental levels and ASD severity. Only boys were observed. These factors are hard to control given the heterogeneity of children with a diagnosis of ASD and the low incidence (see Chapter 2). It is unclear from the results if factors such as age, learning ability or ASD severity affected results.

None of the experimental children increased the frequency of their use of social communication behaviours during the SCIP intervention, though there were indications of their potential for joint attention during the intervention. The youngest child, who also had the lowest score on the Griffiths Mental Development Scales (2006) and the highest (most severe) score on the ADOS (2012) showed the lowest level of social communication in all conditions and in the intervention. However, Carl, who was second lowest on the Griffiths Mental Development Scales (2006) and had the second highest (most severe) score on the ADOS (2012) appeared to use some social communication behaviours more frequently post-intervention. He was the only experimental child who seemed to make some progress over the 6 session intervention for some social communication behaviours. The sample is too small to tell if factors of age and ability play a role in predicting outcomes.

There were also differences in the preschools they attended in terms of size and age range. Although the staff followed the same curriculum and were all non-specialists, they varied in their experience of working with children with a diagnosis of ASD. The study intended to reflect the typical everyday experiences of the majority of children attending mainstream preschool provision, thus differences are inevitable. However, more studies are needed to increase the confidence that results are not due to particular features of the preschools or of the participants in this research project.

Outside factors such as child and staff absences led to limited data being collected for some children. For example, there were only a small number of observations post-intervention for Dino due to child illness and end of year activities. The small number of data points increases the likelihood of an individual result affecting overall results.

There is little comparative data about the social communication abilities of neurotypical children and children with other disabilities. The small amount of data collected in this study for a child with language delay and a neurotypical child showed the wide variation in social communication depending on the context and on the coding criteria. Further research is needed in preschools so that expectations for children with ASD can be realistically set.

Finally, there is a concern that the presence of the researcher during observations may have affected results. While the handheld camera allowed the researcher to be some distance from the child's activity, there may have been observer-effects.

Areas suggested for further study

The small group intervention was modelled on a standard SLT 6-session care package, with an additional staff training session. Evidence from other studies (e.g. Kasari et al., 2006; 2008; Wong, 2013) suggests that longer interventions are needed for outcomes to generalise and to be maintained. A larger scale research lasting over more than one term would help to assess the effects of increased specialist input.

The staff were highly motivated to help the children in the study. However, the one hour training and ongoing support may not have been sufficient to lead to changes in everyday preschool activities post-intervention. Increased training of staff including time to prepare resources such as visual supports needs to be explored to measure long term effects. (See Chapter 5 for further discussion of staff training needs.)

Future studies are also needed that include a wider range of children, including girls, so that the effects of children's individual profiles can be better understood

The intervention was carried out within the preschool and the children's family were not part of the training or the SCIP intervention. The families were supported by community services – who followed a similar social-developmental approach – but the parents did not receive specific training in the SCIP intervention approach. This was partly due to the need to control differences in parental support and partly due to availability of parents to participate in training due to family/work commitments. A further study is needed that looks at the effects of involving parents alongside the preschool staff in developing children's social interaction in everyday activities.

Further discussion of possible future directions follows the account of Study Two and Three in the next two chapters.

Chapter 5: The role of the practitioners' interaction

Study Two

Introduction

The main focus of the SCIP Project is the effectiveness of a small group intervention for children with ASD within mainstream preschools. The main outcome measures looked at are: the communicative functions of responding to bids for joint attention and initiating interaction, and the communicative forms of using words/gestures and looking/smiling at others. Joint attention is, by definition, bidirectional and the success of interventions focussing on shared engagement are interrelated with the skills of the communicative partner. Transactional approaches that see interpersonal support as central to the development of a child's social communication have been the focus of recent research (Wetherby & Prizant, 2000).

Key questions are whether training and specialist support for significant adults such as parents and school staff lead to changes in their interactive styles, and whether these changes lead to improvements in children's communicative outcomes. Current research into the effectiveness of parents and carers to promote communication skills of children with a diagnosis of ASD was discussed in Chapter 3, Sections 3 & 4. In summary, evidence indicates that significant adults (parents and carers) can develop strategies to support children's social communication and interactions and these can have positive effects on children's communication (e.g. Kashinath et al., 2006; Wetherby & Woods, 2006). The evidence is mixed, however, with some concluding that while parent-training has some positive results it has little impact on children's autism severity and there is little generalisation of social skills developed with parents to new contexts (Green et al., 2010). Other studies have concluded that the successes of parent-mediated programmes are affected by parental responsivity before training (Siller, et al., 2013).

Studies of parent-mediated interventions have prompted research into practitioner-mediated interventions. The research on the effectiveness of training preschool staff in ASD-focussed support has shown that it can lead to some positive gains (e.g. Keen et al., 2005; Kossovaki, et al., 2012, 2014). But studies are so far few and the area needs further exploration. The usual location for research studies is in specialist preschools (e.g. Kasari et al., 2006; 2008; Kossovaki et al., 2012; 2014) with almost no systematic studies of the effectiveness of training staff in mainstream settings. There are number of practical reasons for this such as the low numbers of children with a diagnosis of ASD in regular preschools given its relative low incidence, and also because heterogeneity of preschool organisation makes environmental factors hard to control.

However, differences between kinds of settings may mean that research findings in specialist preschools are not generalizable to regular ones. In comparison with regular preschools where there may only be one child with a diagnosis of ASD (and some years none) specialist units for ASD have a higher level of support per child, and trained staff will usually be supervised by specialist advisory teams. They are thus very different in terms of resources and expertise from the regular non-specialist community preschools (in the UK) where staff: pupil ratios will be lower; staff training in ASD will be infrequent, and resources and time to implement strategies will be less.

Children with a diagnosis of ASD can present practical and organisational difficulties for the non-specialist school. For example, many are still in nappies at 3 years, and there may be additional safety issues requiring higher levels of supervision. While additional funds and support may be available for regular preschools through the local authority, these can take time to access. With rising numbers of children with a diagnosis of ASD entering mainstream preschools due to inclusive policies and early diagnosis, there is a need to find effective and accessible training methods based on evidence-based practices (Charman et al., 2011).

The focus of this study is to examine the effect of a small scale social communication intervention on the interpersonal skills of the preschool practitioners working with the children taking part in the SCIP project. SCIP Study Two⁷ filmed staff interacting with 5 children with a diagnosis of ASD in adult-directed 5 minute sessions in 5 mainstream preschools twice weekly during one school term. One of these children acted as a control and did not receive the intervention until after the study was completed. Two additional children – 1 with language delay and 1 who was neurotypical - were filmed for 2 direct sessions each during the same time period. Recruitment of the children is detailed in Chapter 4. The preschools differed in a number of ways (see Chapter 4 for details) but none were specifically resourced for children with complex communication difficulties. In most cases, additional funding had not been allocated directly for the individual children's support (see Table 4.7) although each preschool had access to a (limited) special needs budget. Staff had some awareness of ASD but none had attended specialist training sessions in ASD. The preschool policies were totally inclusive, with staff seeing it as their role to meet each child's needs. They were enthusiastic about additional training through their involvement in the SCIP research.

Study Two hypothesis

The study looks at changes staff made to their interactive styles with the participants during direct activity sessions following the SCIP training and intervention.

It is hypothesised that there will be an increase in strategies used by early years' practitioners to develop children's social communication following the SCIP intervention.

Study Two Design

The study of the staff interactions used the film extracts from Study One and thus followed the same design – single-subject multiple-baselines-across-subjects. Participants, preschools, and observation methods are the same as in Study One.

⁷ This study formed part of the Masters programme for two students, Aisling Burke and Emma Goodwin. I am very grateful to them for their data coding and contributions to this section.

SCIP Early Years Practitioners (EYPs)

The four target children in the SCIP studies had a named key worker. (In most settings, one staff member is the key worker for 4-5 children, responsible for monitoring their needs and providing individual support as required.)

All key workers were female and had at least NVQ (national vocational qualification) Level 3. One was also trained as a SENCo; another was in the process of training for this role. Two of the preschools had previously been involved in specific projects looking at communication as part of ECAT-Every Child a Talker 2009-2011. All EYPs had attended local authority training that would have included language and communication topics. Details of staff knowledge and assumptions about ASD were not further explored. The study limitations due to the lack of this data is discussed further below.

Although each child in the experimental group had an assigned key worker, other staff also shared in the child's support. This was partly a logistic necessity to allow staff to take breaks. It was also partly to ensure that the children did not become dependent on one key worker. There is often a tension between providing a child with ASD with consistent and predictable care by reducing the number of adults he/she interacts with, and at the same time ensuring that the child is flexible enough to cope with changes in adult care. For this study, the disadvantage of flexible support was that the direct sessions were run by a number of EYPs reducing the study's control over variations in the EYP interactions.

The key workers for Carl, Ben and Dino attended all the SCIP intervention sessions. Alex's key worker was only able to attend 3 SCIP sessions.

Staff Training

Details of the SCIP staff training and intervention are provided in Chapter 4.

Coding categories

The focus of Study 2 was Interpersonal Support – the ways in which the staff members respond to the child; encourage the child to initiate; use an interactive style that is at the child’s language level; scaffold the child’s communication through modelling play and language, and provide feedback.

The coding categories were based on those used in current research studies (e.g. Kashinath et al., 2006; Wetherby and Woods, 2006) and those used in the SCERTS Profile for assessing carer’s transactional support (Prizant et al., 2006). In the SCERTS model, the optimum support from carers is described as: ‘provides enough structure to support a child’s attentional focus, situational understanding, emotional regulation, and positive emotional experience, but that also fosters initiation, spontaneity, flexibility, problem-solving, and self-determination’ (Prizant et al., 2003, p.310). Initial trials of five SCERTS-based profiling categories demonstrated that they captured the main types of interpersonal support provided by staff.

Table 5.1: Categories for coding each practitioner’s interactions with target children

Coding Categories	Description
Responding to the child	Follows the child’s lead Imitates the child’s language and actions
Adjusting communication	Simplifies language Supports with gestures and pictures
Modelling social communication	Models play Models appropriate language
Providing feedback	Praises success Regulates behaviour
Fostering initiation	Offers choices Waits for child to initiate Uses time delay

The coding protocol for each category is in Appendix 5.

Participants, Setting and Materials

The children included in this study were the same as in Study One. Details of their recruitment and pre-study assessment are outlined in Chapter 4.

The coding of the practitioner's interaction was restricted to the direct condition (see Chapter 4 for details of the study conditions). This was considered likely to provide the best opportunity to observe the staff members' support strategies as they were asked to interact deliberately with the target child for 5 minutes.

Practitioners were asked to follow the child if he left an area during the 5 minutes. If other children joined (something impossible to prevent in single-room preschools), practitioners were asked to keep the target child as the focus but to include the other children as appropriate.

The direct condition was originally designed to be the same for each experimental child. However, in initial trials, it proved difficult in some settings to introduce a new set of materials/activities, especially where there was no separate space for the one-to-one activity, and where practitioners could not leave specific areas without affecting staff ratios. Additionally, staff felt that specific activities would go against responding to the child's preferences and lead to the child becoming distressed. In free-flow preschools where children can choose which areas to explore, and where structured activities are not generally part of the daily routine, staff were resistant to a predetermined direct condition.

The lack of a consistent direct condition is likely to have affected the opportunities for practitioners to use the strategies introduced in the training and intervention. Some contexts provide more opportunities to, for example, provide feedback than others. This reduces the ability to interpret the results.

Data collection and coding

The amount of filmed direct sessions for each child is shown below.

Table 5.2 Total number of direct sessions before and after staff training

CHILD	Number of direct sessions pre staff training	Number of direct sessions post staff training	4-month review
Alex	8	12	1
Ben	6	12	-
Carl	3	14	1
Dino	4	11	-
Eric	13	n/a	
Fynn	2	n/a	
Hari	2	n/a	

The data was coded using partial interval coding as for Study One based on Steiner et al. (2013) in their analysis of parent interaction. Each five minute direct session was divided into intervals of 30 seconds. Each 30 second interval was analysed for the use of the transactional strategies. This provided 10 intervals of 30 seconds in which a staff member used one or more strategies. The total number of intervals in each 5 minute session was converted into a percentage score showing frequency of use of each strategy.

Inter-rater reliability

The same randomisation process was used as for Study One. Each direct session was given an alphabetic letter from a shuffled pack. A masked coder was then randomly allocated 2 sessions (10%) for each child to code. Although the rater was aware of the purpose of the study, randomisation ensured that he did not know if the session came from a pre- or post-intervention session.

The main researcher's coding was compared with the rater's and the percent agreement was calculated using the inter-rater formula (e.g. Steiner et al., 2013):

$$\frac{\text{number of agreements}}{\text{number of agreements plus number of disagreements}} \times 100$$

The chart below gives the % agreement for each transactional strategy. Average agreement was >80% for all coding categories.

Table 5.3 Percent agreement between masked rater and main researcher

	Rater 1
Responds to the child	87.0%
Adjusts communication	82.5%
Models communication	91.88%
Provides feedback	91.63%
Fosters initiations	95.38%

Analysis

Analysis of the results was the same as for Study 1. Initially, visual inspection was used to identify trends. Further analysis of the data included the use of a non-parametric test based on Pring (2005). The pre-intervention sessions were divided into two halves and the median % scores for each half were calculated. A line was drawn between the two median values to show the baseline trend (termed 'baseline' in the study results). The number of post-intervention sessions that scored above the baseline was calculated and tested for significance using a sign test (Pring, 2005). This test is designed to increase the confidence about trends identified by visual inspection

The graphs show the percentage use of each communication strategy by the early years' practitioners during the 5 minute direct sessions. The graph uses red square shapes for the sessions run by the child's key worker in order to identify any differences between the key worker's use of strategies from that of other staff members, shown by blue diamonds.

In Carl and Ben's preschools, the key workers both attended all the intervention sessions and were able to support the experimental child in the direct condition for 73% and 67% of the sessions respectively. Alex's key worker was only able to attend half the intervention sessions and supported almost half the one-to-one sessions. In Dino's case, although the key worker attended all the intervention sessions, she was unavailable for the one-to-one sessions except on two occasions.

As Dino's assigned key worker was no more likely to support Dino than another member of the team, no distinction was made between the different EYPs interacting with him.

The results are limited by the lack of consistency in both the contexts of the direct condition and the variations in the staff member supporting the child. This staff variation proved to be inevitable especially in the large children's centres where staff work variable shifts, and have additional duties such as covering absent staff preventing them from focussing on one individual child. In Alex's case, the key worker had to take unplanned leave during the course of the project. The staff changes are not untypical in preschools and while they may have affected any conclusions that can be drawn from this study, they highlight challenges facing policy makers about the practitioner support for children with a diagnosis of ASD.

The green vertical line divides the pre- and post-intervention period, i.e. the sessions before and after the staff training. The solid red horizontal line represents the baseline frequency of strategies used by all practitioners during the direct sessions before the staff training and the SCIP group intervention. The dashed red horizontal line represents baseline frequency of strategies used by Carl, Ben and Alex's key workers during the direct sessions before the staff training and the SCIP group intervention. There is no key worker baseline for Dino.

The table below the graphs show the number of direct sessions post-staff training that are above the pre-intervention baseline. A non-parametric one-tailed sign test was used (Pring, 2005) to see if there was a significant increase in the strategies used post-intervention. This helped to amplify the trends observed visually. Significant results at the $p < 0.05$ level are asterisked and highlighted.

Results are also included for the three comparison children. Graphs are included for Erik, the child with a diagnosis of ASD who did not receive the SCIP intervention as part of the study. Data points are included on the graph to show the use of

strategies by staff in the two direct sessions observed for Hari and Fynn. All three children attended the same preschool. There was no assigned key worker.

Results

Visual inspection of the graphs shows variability of outcomes across sessions, across children and between the strategies examined. A few trends can be observed.

For Carl, all staff showed some increase in their responsiveness and appear to have provided more opportunities for Carl to initiate. They also appear to use feedback and reinforcement more often. Ben's key worker appears to use modelling language and play strategies more frequently during later sessions. For Alex, all staff appear to increase their communication adjustments post-intervention, while his key worker appears to model play and language more after the intervention, and also to develop opportunities for Alex to initiate. The majority of staff do not appear to use feedback and positive reinforcement often.

These trends may reflect other factors such as the different contexts used for the direct condition and/or the variability in the child's responsiveness.

Fig 5.1 Percentage of 30 second intervals where EYP used strategy to respond to child before and after SCIP training

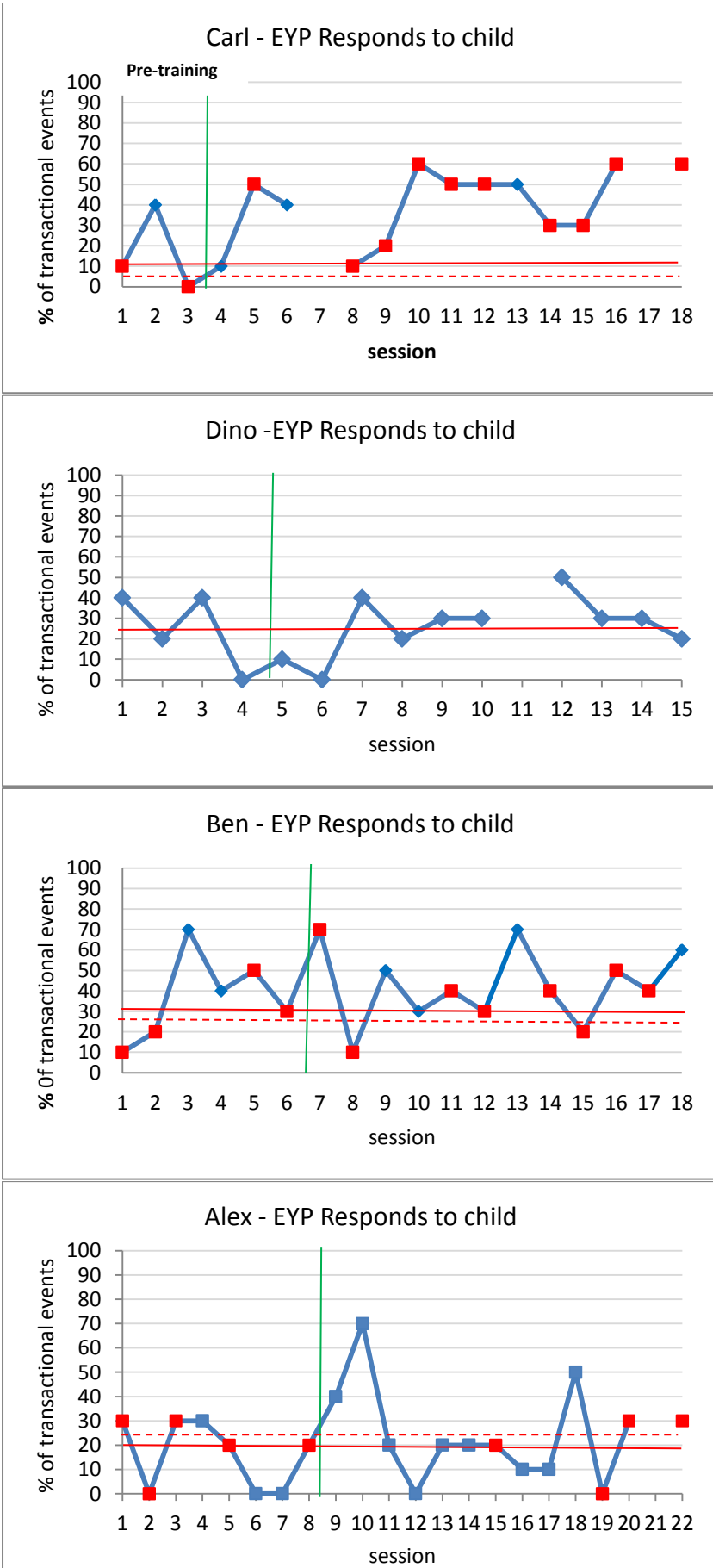
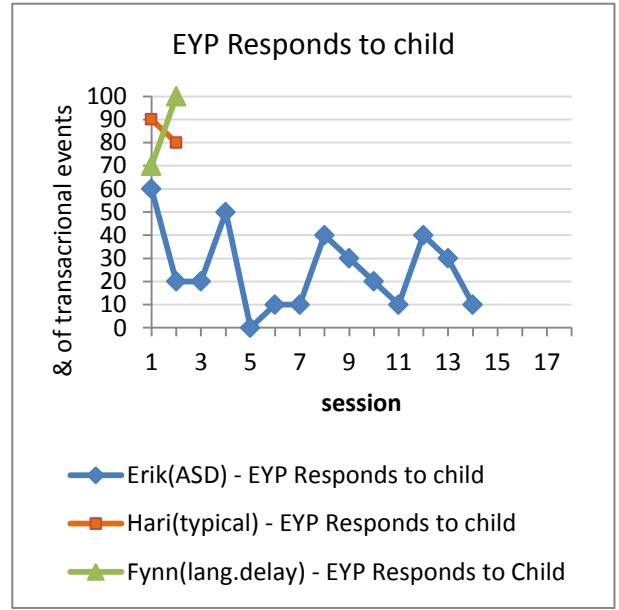


Fig 5.2 Percentage of 30 second intervals where EYP used strategy to respond to child in control and comparison group



— baseline for all staff
 - - - baseline for key worker

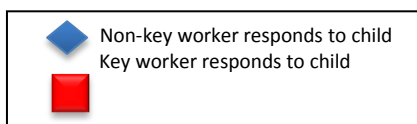


Fig 5.3 % of 30 second intervals where EYP used strategy to adjust communication before and after SCIP training

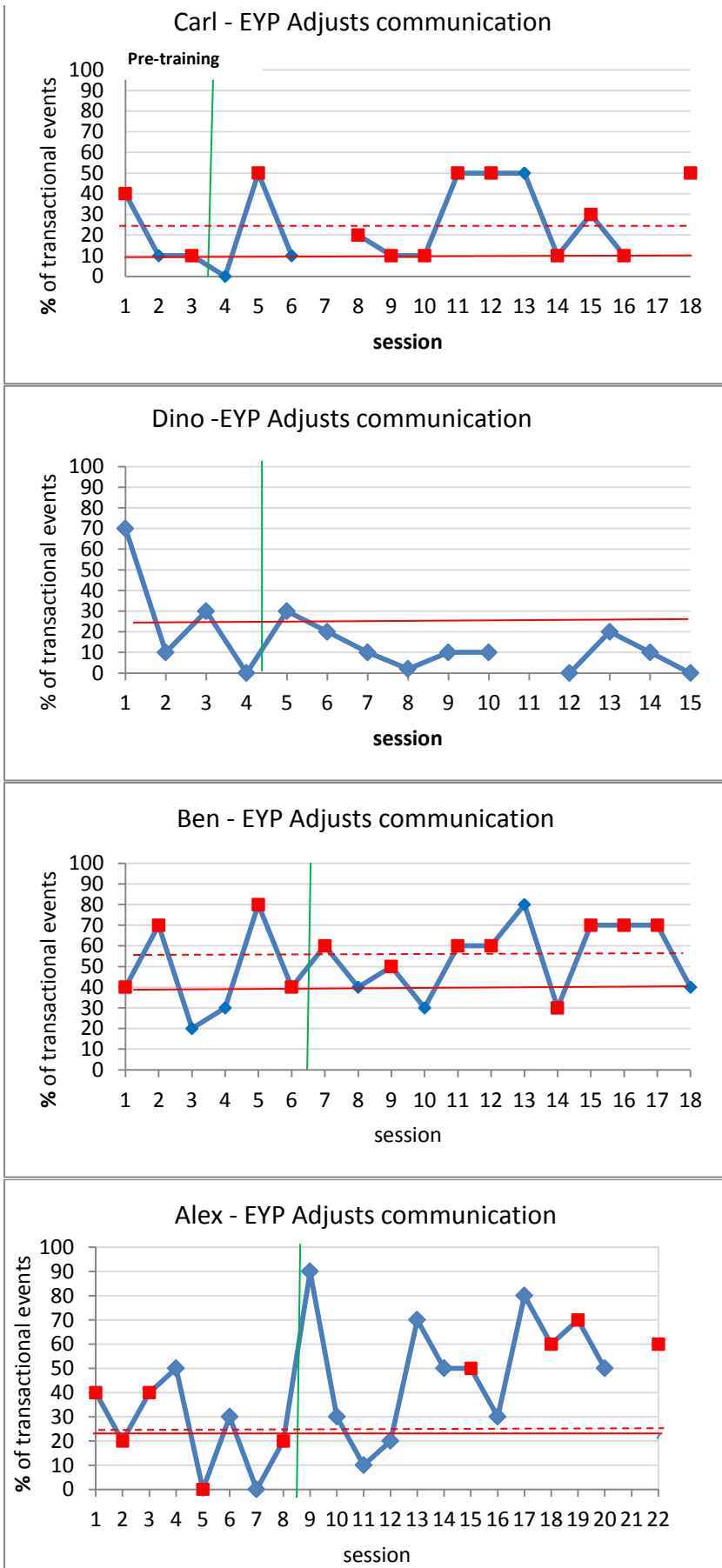
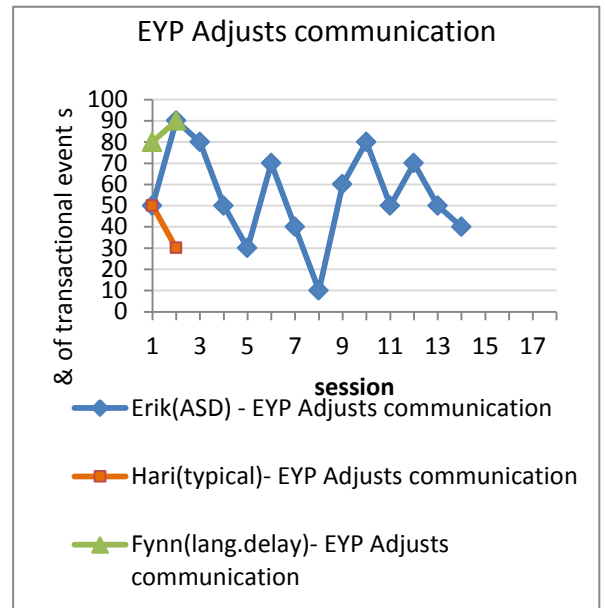


Fig 5.4 Percentage of 30 second intervals where EYP used strategy to adjust communication with control and comparison children



— baseline for all staff
 - - - baseline for key worker

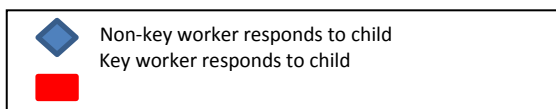
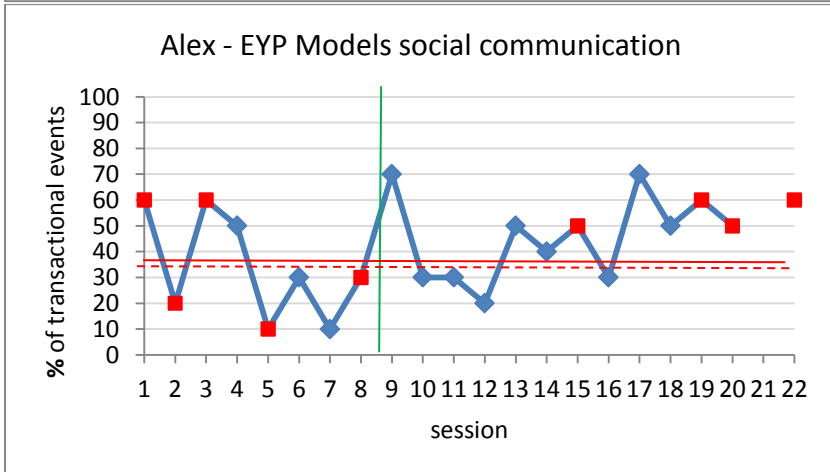
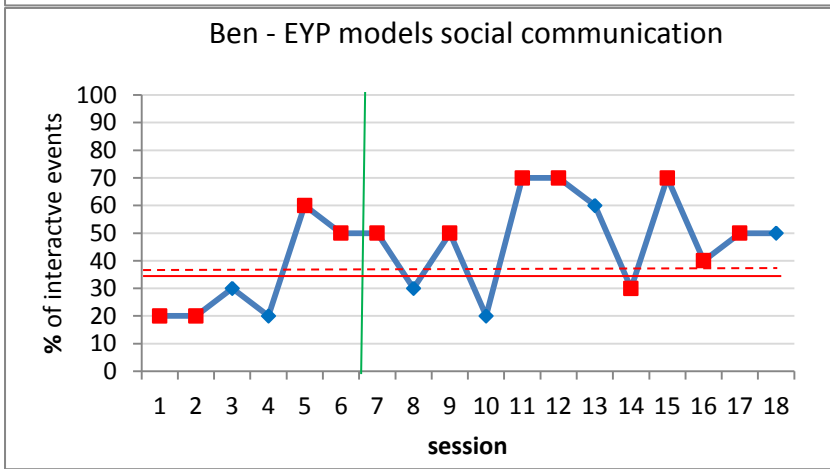
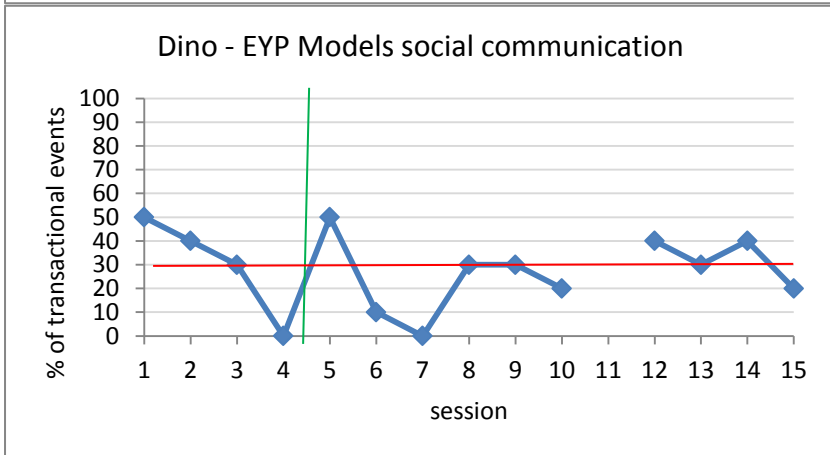
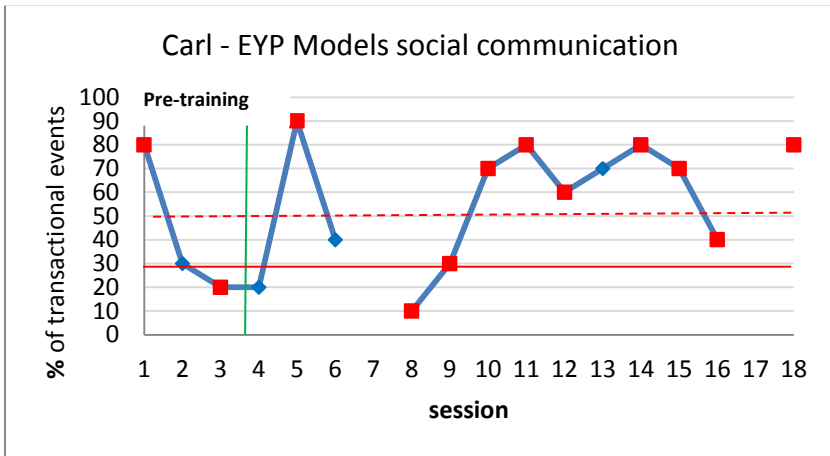
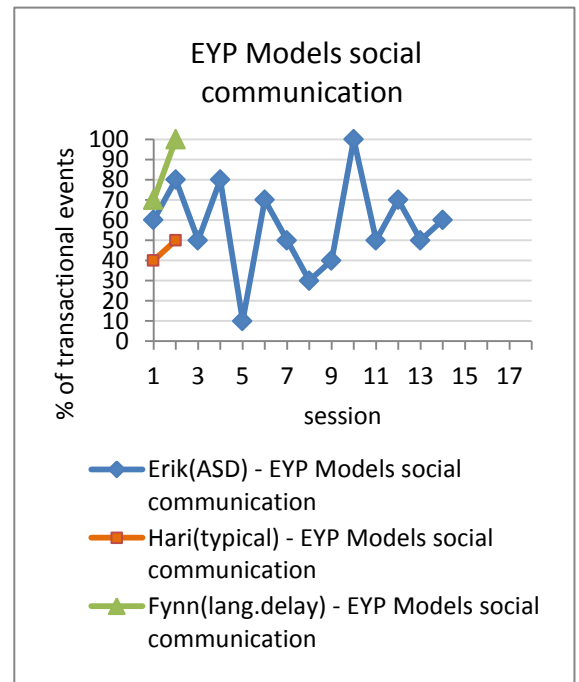


Fig 5.5 %of 30 second intervals where EYP used strategy to model communication before and after SCIP training



◆ Non-key worker responds to child
■ Key worker responds to child

Fig 5.6 Percentage of 30 second intervals where EYP used strategy to model communication with control and comparison children



— baseline for all staff
- - - baseline for key worker

Fig 5.7 % of 30 second intervals where EYP used strategy to give feedback before and after SCIP training

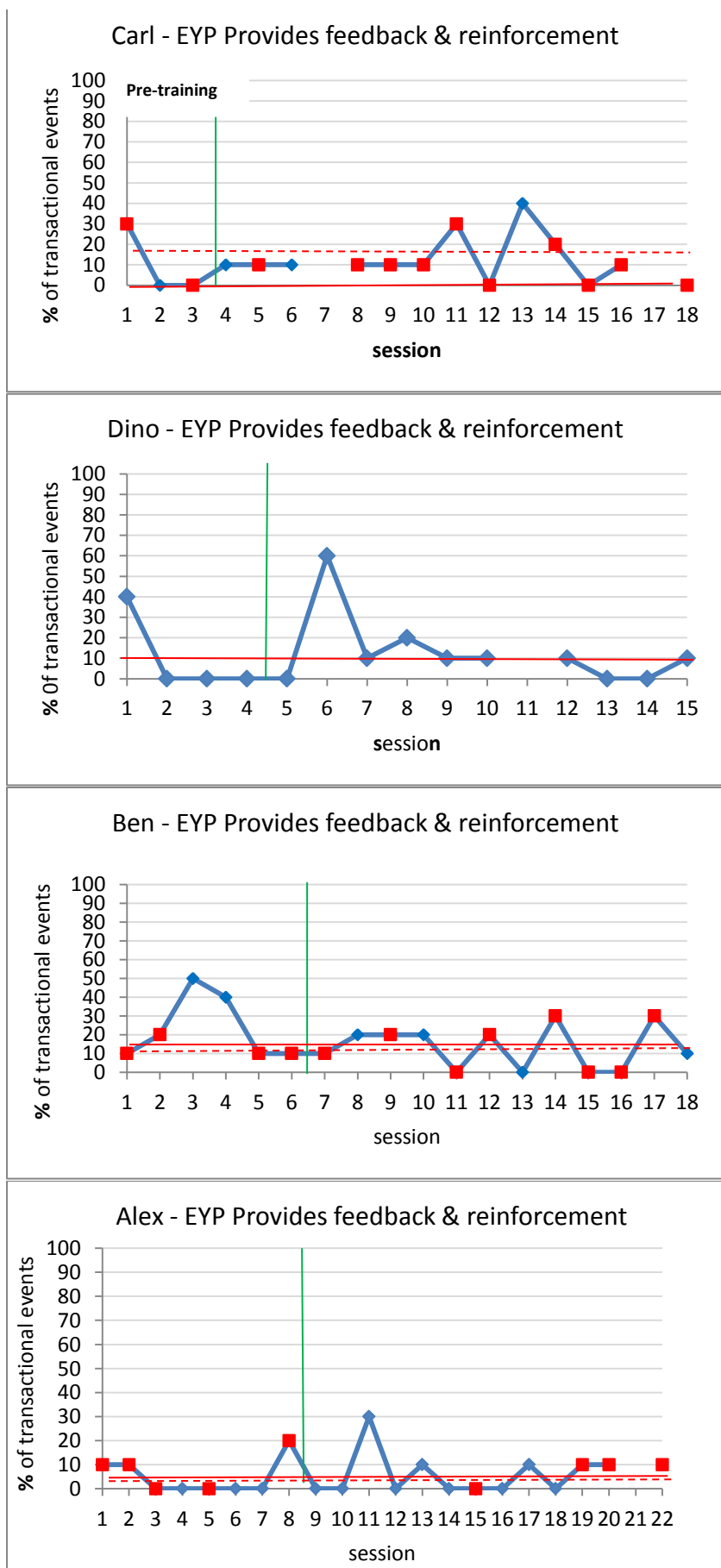
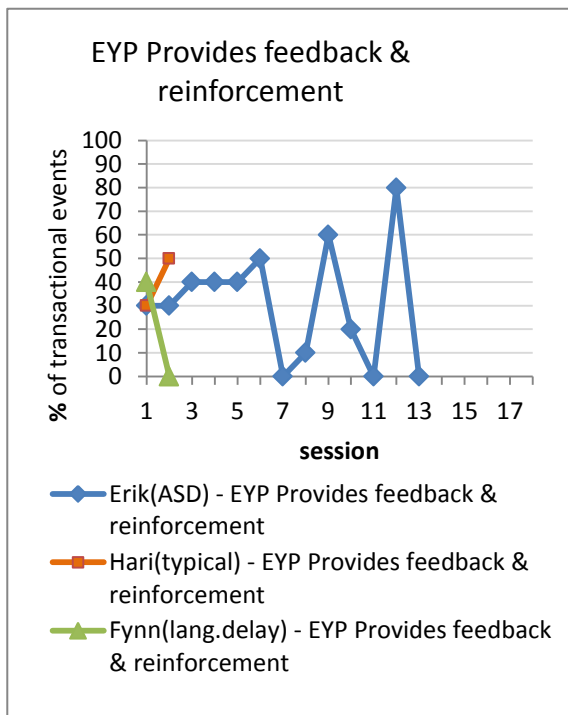


Fig 5.8 Percentage of 30 second intervals where EYP used strategy to give feedback with control and comparison children



◆ Non-key worker responds to child
■ Key worker responds to child

— baseline for all staff
- - - baseline for key worker

Fig 5.9 % of 30 second intervals where EYP used strategy to foster initiation before and after training

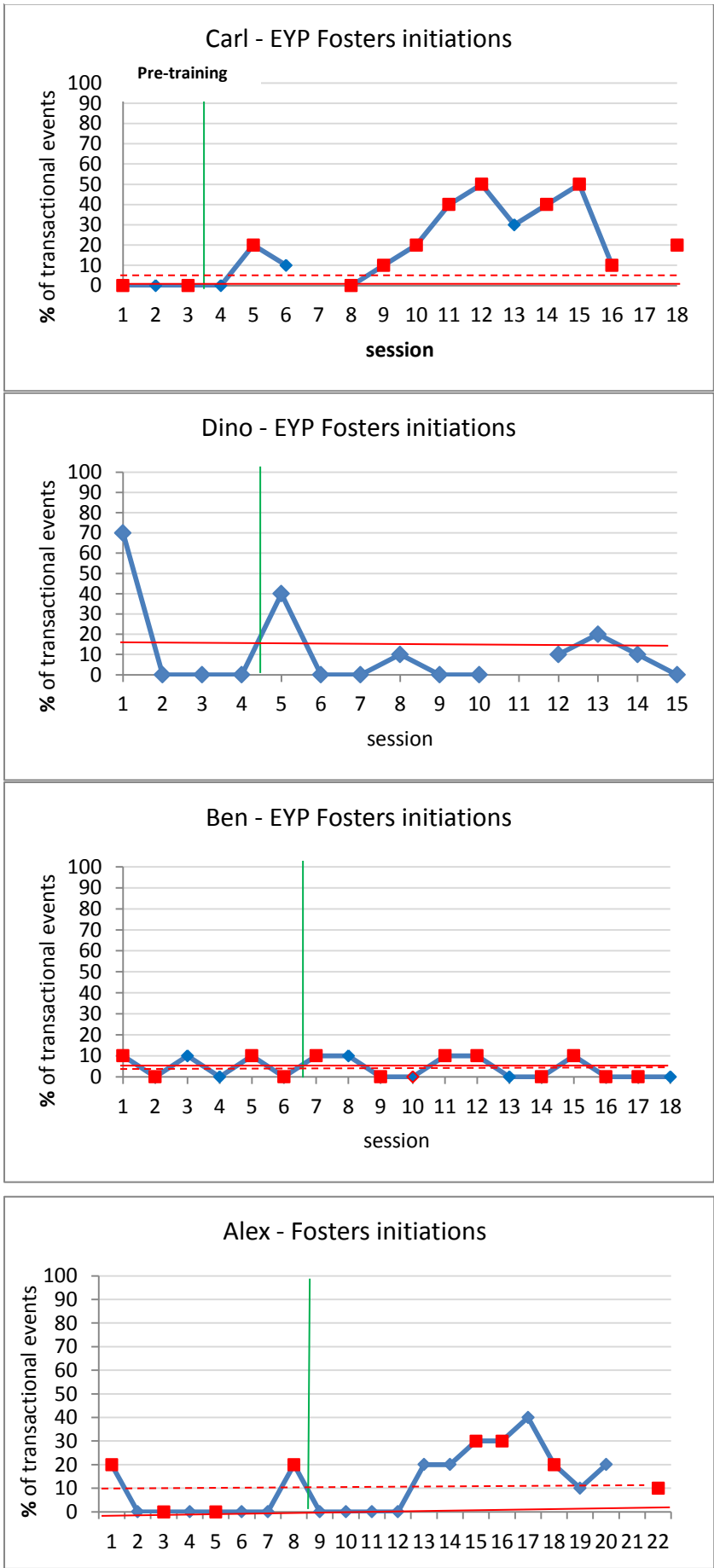
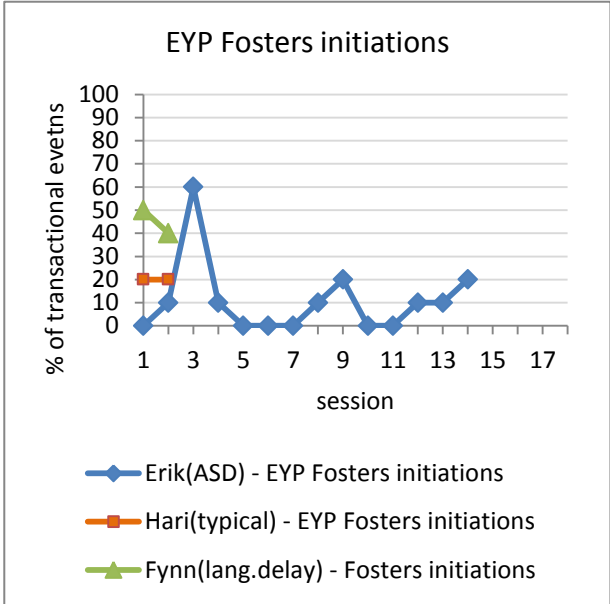
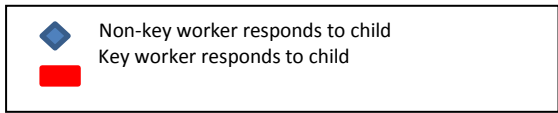


Fig 5.10 Percentage of 30 second intervals where EYP used strategy to foster initiation with comparison children



— baseline for all staff
 - - - baseline for key worker



A non-parametric test was used in order to examine the outcomes further, and to increase confidence for the visual analysis. The baseline score was calculated as described in the Analysis section above. The number of post-intervention scores above this median was calculated and then tested for significance using a sign test (Pring, 2005).

Table 5.4 shows the results of the sign test for each of the strategies used by the EYPs. A separate column is included to show the increases in strategy use for the child's key worker only. The key workers attended all the SCIP intervention sessions with the exception of Alex's key worker. They thus had increased opportunities to observe, try out and discuss strategies specifically targeted to develop the experimental child's use of joint attention. Unfortunately, the key worker was not able to be filmed in all direct conditions. In Dino's case, the practitioner rarely participated in the one-to-one session due to other preschool commitments. This lack of consistency makes any comparison of results inconclusive.

Post-intervention outcomes appear to suggest a change in the preschool staff's use of some strategies for some children. However, this may reflect the opportunities for interpersonal support provided by the activities chosen for the direct condition or other factors such as interruptions from other children, as well as variability in the experimental child's responsiveness. The results also suggest that over the course of a term, practitioners appear to make little change in their use of strategies specifically designed for children with reduced social communication abilities. Observations of the films suggested that staff behaved in similar ways as they would with neurotypical children. This is supported by observational studies such as Wong and Kasari (2012)

The final column in Table 5.4 shows, for Alex and Carl, the number of sessions in the 4-month review observation session that scored above the baseline. In all but one case, the strategies appear to be used more frequently at this review session than during baseline.

Table 5.4 EYPs' use of transactional strategies: pre-intervention baseline scores and number of sessions above baseline during post-intervention and at 4 month review

Support strategy:	Pre-intervention baseline % of intervals in which support strategy is used by all EYPs	Number of post-training scores above baseline for all EYPs	baseline % of intervals in which support strategy is used by key worker	Number of post-training session scores above baseline for key worker	Number of 4 month review sessions above baseline
Responds to child					
Carl	10	11/12* p<0.05	5	8/9* p<0.05	1/1
Dino	25	6/10	-		n/a
Ben	30	8/12	27.5	6/8	n/a
Alex	20	5/12	25	1/3	1/1
Adjusts communication					
Carl	10	6/12	25	4/9	1/1
Dino	27.5	1/10	-	-	n/a
Ben	40	8/12	57.5	6/8	n/a
Alex	25	10/12 * p<0.05	25	3/3* p<0.05	1/1
Provides feedback					
Carl	0	10/12* p<0.05	15	2/9	0/1
Dino	10	2/10	-	-	n/a
Ben	15	6/12	12.5	4/8	n/a
Alex	5	3/12	5	2/3	1/1
Models play and social communication					
Carl	30	9/12	50	6/9	1/1
Dino	30	3/10	-	-	n/a
Ben	35	9/12	37.5	7/8* p<0.05	n/a
Alex	37.5	8/12	35	3/3 p<0.05	1/1
Fosters initiation					
Carl	0	10/12* p<0.05	0	8/9 * p<0.05	1/1
Dino	17.5	2/10	-	-	n/a
Ben	5	5/12	5	4/8	n/a
Alex	0	8/12	10	3/3* p<0.05	1/1

Results for individual strategies

EYP Strategy – Responds to child

The use of the Responds to Child strategy was variable. Visual inspection suggests high variability across sessions, suggesting that opportunities for responding varied according to the context. The exception is the data for Carl's where the practitioner's responsiveness appears to be more frequently observed over time. A non-parametric one-tailed sign test (Pring, 2005), confirms the higher frequency of use of this strategy in sessions post-intervention for Carl's EYPs ($p < 0.05$). The 4 month review scores for staff responses to Alex and Carl were also above the baseline. When the data for the children's key workers were analysed separately, the apparent increase in the strategy use post-intervention was significant for Carl's key worker ($p < 0.05$) and close to significant for Ben's. Both of these attended all intervention sessions and also attended the majority of the one-to-one sessions (direct condition). However, the direct conditions were observed in different contexts affecting interpretation of results post-intervention.

The 13 direct sessions for staff interacting with Erik, the control child with a diagnosis of ASD, showed a similar variation and from visual inspection there appears to be little difference over time. The two direct sessions for the comparison children - Fynn with language delay and Hari who was neurotypical - showed a higher rate of EYP responses to the child than to any of the children with ASD. Only in three sessions (2 for Ben; 1 for Alex) were scores equal to the language delayed child's *lowest* score. EYP responses to the neurotypical child were higher than all responses to the children with ASD. The possibility that these differences were due to the contexts observed is discussed below.

EYP Strategy- Adjusts communication

Visual analysis of the graphs again shows considerable variation across sessions. There appear to be more sessions post-intervention in which staff adjusted their communication for Alex. Using a non-parametric one-tailed sign test (Pring, 2005) the increase was significant for Alex ($p < 0.05$). The follow-up scores for Alex and Carl were also above the baseline. There appear to be fewer sessions with Dino and Carl

where staff adjust their communication compared with Ben and Alex. For Dino, adjustments were observed in under 50% of sessions for all but two direct sessions. However, the coding did not include staff being silent and this may have been an appropriate adjustment for non-verbal children.

The 13 direct sessions for Erik, the control child with a diagnosis of ASD, showed a high level of variation but with no observable difference over time. Interestingly, the staff appeared to use this strategy more frequently in some sessions than staff did for the children in the experimental group. This may reflect the context in which the observations were made. The more formal preschool attended by Erik had regular table-top activities where children had specific tasks such as card-making or writing their names. Once again, the results may reflect variations in contexts, each with different opportunities for communication strategies.

The communication adjustment strategy was used more frequently in the 2 direct sessions with Fynn, the child with language delay, than with the children with ASD. The scores for Hari were similar to the average scores for the children with ASD.

EYP Strategy - Models Play and Social Communication

Visual inspection of the graphs shows, as with other results, high variability between sessions though overall modelling seems to be used more frequently than other strategies. There appeared to be an increase in the use of modelling post-intervention for Carl, Ben and Alex and there were more scores above the baseline when Ben and Alex's key workers were looked at separately.

The 13 direct sessions for Erik, the control child with a diagnosis of ASD, showed a similar variation in the staff use of modelling. The two direct sessions for each of the comparison children involved staff modelling play and language at frequencies higher than the baseline scores for the experimental children's sessions. Again it is notable that the staff interacting with the language-delayed child showed higher use of a supportive strategy than for the child with ASD in the same preschool.

EYP Strategy - Provides feedback and reinforcement

Visual inspection of the graphs shows the overall low rate of praise and feedback for the children with ASD in the experimental group. However, there appears to be an increase in the use of feedback for Carl over the direct sessions. A sign test (Pring, 2005) confirms that post-intervention scores for Carl's preschool staff were above the baseline.

The EYPs interacting with the control child with ASD (Erik) appear to provide feedback and reinforcement more frequently than the EYPs in the experimental group, an outcome that may be related to the task-focussed activities in Erik's direct sessions (see discussion below). The two direct sessions for the comparison children - Fynn with language delay and Hari who was neurotypical - showed a higher average % of EYP feedback and reinforcement than used for the target children, but the scores were comparable with those of staff feedback to Erik who attended the same preschool.

EYP Strategy - Fosters initiations

Visual analysis shows the overall low level of opportunities provided by staff for the children to initiate, though there is visual evidence of more frequent use of this strategy for Carl and Alex. Comparison of the baseline score with the post-intervention uses of the strategy showed an increase ($p < 0.05$) for staff interacting with Carl, and for Alex's key worker.

Except for one session, EYPs interacting with Erik had a similar low level use of the fostering initiations strategy.

The outcomes for the use of fostering initiation with the comparison children were higher than the baseline scores for the experimental children. The EYPs appear to use strategies to foster initiation more frequently when interacting with a child with language delay.

Discussion

The challenge for staff in busy, free flow preschools is to develop meaningful, shared activities with children with a diagnosis of ASD. By definition, these children have less motivation to initiate joint activities and are less likely to respond to bids for engagement. Study Three asked whether a focussed training and intervention for children with ASD would lead to changes in the staff interactions. The outcome variables were five aspects of interpersonal support that are 'associated with practices that support optimal engagement and learning for children with and without disabilities' (Prizant et al., 2006, p.26). Use of such support, it is argued in transactional approaches, provides the child with successful interpersonal experiences, helping children to be motivated to engage with adults and peers.

Study of the interaction patterns of early years' practitioners is a relatively new, and little researched area (see Chapter 3, Section 4). Most research in preschools has involved staff in specialist centres, and few observations have been made of adult interaction in mainstream nurseries. This small single case study of staff interaction with four target children in four different early years' settings raises many questions, highlights the difficulties of naturalistic studies where conditions are hard to control, and indicates areas that merit further investigation.

Overall, the results showed variable and inconsistent increases in the types of interpersonal support provided by staff over time. There were a few instances where the post-intervention scores were different in comparison with the baseline. However, these may reflect variations in the opportunities for staff to use available strategies due to the different contexts in which they were observed. Further, the key worker who had observed the intervention sessions was not always the person observed interacting with the child in the direct condition. In Alex's case, the key worker had only been able to attend half the intervention sessions. These limitations reduce the ability to reach conclusions, though concerns are raised about the usefulness of short, low dosage interventions, typical in current non-specialist nurseries.

The results for the individual support strategies are discussed further below.

Discussion of results for each interpersonal strategy

Responding to the child

This strategy focuses on the adult's responsiveness to the child's interest. In many interventions, especially those looking at parent interactive styles, the adult is encouraged to 'follow the child's lead'. Studies summarised in Chapter 3 (e.g. Siller et al., 2013; Siller & Sigman, 2002; Tomasello & Farrer, 1986) concluded that parent synchrony with the child – the ability to respond to the child's focus - was a major determinant in developmental outcomes. Leekham and Ramsden (2006) found in their study of dyadic social orientation that the overall number of attempts to engage with the child did not affect social orientation. What did affect orientation was the adult following the child's focus. They concluded that interaction with a child may be time-consuming and counter-effective unless the adult begins by responding to the child's focus.

The EYPs were aware of ways to respond to the child, and the training had emphasised the importance of following the child's lead. They discussed over the intervention period the importance of developing joint attention. There were sessions where EYPs demonstrated frequent responses to the child. However, the overall results for the responses towards children with ASD compared with the level of responses shown to the comparison children suggest that responding to children with ASD presents a challenge to staff that differs from the challenge of responding to a child with delayed language or with age-appropriate abilities.

The impression from the film extracts of interactions with Fynn and Hari, in comparison with the same staff interactions with Erik, was one of reciprocal enjoyment in the activity. These children were in the same preschool and were supported by the same EYPs thus the results cannot be fully explained by differences in the context or in the adults.

Adjusting Communication

Coding in this category focussed on instances when staff adjusted their communication to meet the needs of the preverbal children. A more detailed look at the language used by EYPs suggests that while staff have considerable experience of adjusting their communication with young children who are developing as communicators. However, preverbal children with a diagnosis of ASD may present a greater challenge. Below is a 40 second extract from Alex's film transcript demonstrating staff language level.

The key worker is trying to encourage Alex to come outside by taking the ball he is carrying. Alex is distressed that his ball is taken:
 EYP: You can hold the ball...we're going out, we're going to go outside...come on
 Alex: Bye
 EYP: what do you mean 'bye'?... are you going out now?...come on....are you coming.... You're going outside to play... can W___ have a go? W___ have a go?...
 Let's go... Let's go.

The EYP's language used in this example is supportive and encouraging, and accompanied by gestures such as showing the ball, and holding open the door. It would be appropriately adjusted for most children in the preschool room. However, for a child with severely delayed social interaction skills who used around 5 multi-purpose words (e.g. Alex used 'bye' as a greeting and a farewell, and also to stop an activity) this level of adult language is above his receptive level.

This strategy coded both language adjusted to the child's level, and gestures used to support language. The strategy did not code times where staff are silent, i.e. deliberately using *not talking* as a support for the child's communication. Lack of this coding may have affected results. For example, Dino was often playing at the water or sand table during his direct sessions. He was usually fully absorbed by the water or sand, apparently paying little or no attention to those present. Staff would join him and try to engage with him by playing alongside, using neither words nor gestures. Playing alongside in silence is a strategy often used in preschools to help the child focus on learning by reducing the extra processing load of language (Wilcox-Herzog & Kontos, 1998). However, its effectiveness as a strategy for children with ASD is questionable.

Alex and Ben used more words/vocalisations and gestures in the direct sessions than Carl and Dino, and this may have had an interactive effect with the communication styles of the staff. This hypothesis is supported by the frequency in which staff adjusted their communication with one of the comparison children, Fynn. Although Fynn was language delayed, he had a higher level of social engagement with EYPs; he frequently imitated words used by staff and smiled at adults each time he repeated a new word. His increased use of language over the observation period may have made it easier for adults to adjust their language – i.e. when there is a verbal response from the child, adults can adjust their language more easily to the appropriate level.

Modelling Social Communication

The use of this strategy was, on average, more frequent than for other strategies for all staff in interaction with all children. Modelling play and language is central to practitioners' role of facilitating children's learning. The use of modelling will vary in different contexts and the variability of activities in the direct condition may have affected outcomes.

Many of the comparison children's direct sessions involved staff demonstrating specific tasks such as copying a staff-made playdough Humpty Dumpty. This may have affected the frequency of modelling used by staff in Erik, Fynn and Hari. This raises questions about the effect of more structured tasks with intentional modelling of social communication especially for children with special needs.

Providing Feedback

Coding in this category focused on praise and feedback that had a specific focus on children's engagement with the adult. It did not include general smiling unless that could be seen as a specific response shared with the child. The overall low scores for use of praise and feedback is surprising given the warmth of the EYPs towards the children apparent in the film extracts.

Smiling and expressions like 'that's lovely' are frequently observed in staff interactions with young children. But, for children with ASD, these forms of encouragement may not be specific or explicit enough for children to recognise or to see them as functionally salient. Wong and Kasari (2012) concluded after observing adult interaction in preschools that staff 'seldom responded to or praised children for attending to their requests for joint attentionand rarely recognised or reinforced shows and points as joint attention behaviours' (Wong & Kasari, 2012, p.2050).

Frequently, staff in this research project did not appear to adapt their feedback to meet the level of the child's social skills. A closer examination of the film extracts showed EYPs smiling when the child was not looking their way, or EYPs missing opportunities to acknowledge children's often idiosyncratic bids for interaction. This is the same argument as the one suggested for the level of 'adjusts communication': when interacting with pre-verbal, socially delayed 3 year olds, staff may be less likely to react to behaviours that other 3 year olds developed as infants, for example, to praise behaviours such as pointing or bidding for joint attention.

The higher frequencies of positive feedback observed for the control child, Erik, may have resulted from the more structured curriculum in Erik's preschool. Children were expected to complete tasks during each session such as threading beads or writing their names. Staff tended to acknowledge each step in these tasks. Closer analysis of the filmed sessions suggested that praise and feedback was used more often for tasks completed than for social engagement.

Fostering Initiation

The category 'fosters initiations' looked at the times that the EYP provided opportunities for the child to initiate by waiting; pausing before an action, or offering a choice. Staff in Kossovaki et al.'s studies (2012; 2014) reported that their comparable strategy of 'providing time' was a difficult one to implement as EYPs were concerned that waiting might look as if they were not interacting. Staff in the SCIP training similarly discussed in the post-study meeting whether waiting for the child to initiate was appropriate or even possible given that the children with ASD were still learning to respond to bids for interaction. As Yoder and Stone put it, initiating joint attention occurs in response to internal signals of interest and as such is 'notoriously difficult to teach children with ASD' (Yoder & Stone, 2006, p.426).

Limitations and future directions

As already discussed in Chapter 4, the results of the SCIP studies are limited to a small number of children and their EYPs in specific preschools, and no generalisations can be made until there are more comparable studies. The advantage of the study was that it took place in the child's everyday preschool context as opposed to a clinical setting. The disadvantage is that it resulted in lack of control over variables such as the size and composition of the preschool; the activities observed; the staff experience and training, and the availability of the same staff member for the direct sessions. One notable variation was in the materials used for the direct session.

To reiterate an earlier point, the direct session was initially planned by the main researcher around the same set of activities for each child. However, staff expressed unease about activities with unfamiliar toys as this went against the principle of responding to each child's individual interest. The direct session was therefore redesigned as a 5 minute sequence in which the EYP was asked to interact with the child in his chosen activity. As a result, the direct sessions varied in the opportunities for using interactive strategies.

Factors affecting use of strategies

There are a number of possible factors affecting the staff's ability to implement strategies that aim to develop a child's interpersonal abilities and these might form the focus for future research.

The experience and knowledge of staff

The study suffered from a lack of information about the staff's previous training and experience of working with children with ASD. Only one setting employed a graduate teacher, the others all had NVQ Level 3, but none had specific experience of working with children with ASD, and previous training had only included information about language development in general. The Study would have been improved with an interview/questionnaire to ascertain prior experience and knowledge.

Specialist training of preschool staff may need to increase as more children with special needs are included in regular preschools. The term key worker does not mean specialist knowledge. In most preschools the term is used to indicate the person responsible for particular children (often 4-5).

Beurkens et al. (2013) suggest that specific interaction strategies may be needed to enable adults to pace, structure and make adjustments to everyday interactive activities when supporting children with ASD.

The 1 hour training and additional support during the filming sessions is typical of the type of support given to practitioners when a child with ASD begins at a preschool. However, such 'dosage' is low and may be insufficient to lead to immediate effects. The key workers attended all intervention sessions for three out of four children but there were no opportunities for staff to share what they observed in the group, and the key worker was not always the person who later worked with the child in structured activities. More opportunities for staff to discuss and to reflect on ways to enhance their interaction with children with ASD may be needed to enable practitioner skill development.

Bidirectionality of interactions

Social interactions are bidirectional but in the context of interactions with children with ASD the relationship is not equal in the way it is with neurotypical children or children with language delay (Beurkens et al., 2013; Broberg et al., 2012). Beurkens et al. (2013) showed, for example, that parent interaction with children aged 4-14 years (N=25) was higher with children with higher language ability. It worked the other way too. Children used more language when interacting with parents who were more responsive. The SCIP study was not able to assess whether EYP interactions were affected by the children's developing language skills though indications of bidirectionality can be seen from the higher scores in all categories for staff interacting with the child with language delay, Fynn.

Fynn was in the same nursery as Erik and Hari so the higher levels of support are less likely to be due to factors in the setting, or differences in staff characteristics. The more likely explanation is that staff find it easier to adjust their levels of interpersonal support when a child has delay in an area such as language, than when a child has difficulty with social communication and social interaction.

Put another way, it is easier to respond to a child who has neurotypical social engagement skills irrespective of delays in other areas. It is easier to model appropriate behaviour if the child imitates what you do indicating that your support is at the child's developmental level; it is more likely that staff will give positive feedback if the child shows interest in your reaction; it is easier to foster initiation when a child is keen to engage. The reverse also holds true: responding to children is more challenging if they turn their back or walk away; modelling is more challenging if the child is engaged in solitary, repetitive play; praise and feedback is less likely when the child does not seek adult acknowledgement; attempts to foster initiations are likely to decrease when the child shows low interest in engaging.

Time needed to practise interpersonal support skills

Although the interpersonal strategies introduced in the training were familiar, staff had little time reflect in detail on ways to implement them with the target children and about additional supports needed. For example, adapting their communication to the child's developmental level involves support with pictures and gestures. The study time scale did not allow staff to prepare picture supports and only a few were trained in the use of gesture systems such as Makaton. The type of interaction introduced in the training emphasised the need to exaggerate how they modelled play and communication, and how they gave feedback. Using more animation takes time and confidence for staff to develop. Staff may also need explicit directions such as those given in Schertz, Odom, Baggett, and Sideris (2013) in their joint attention programme for 2 year olds. For example, Schertz et al. (2013) make explicit when and how to show pleasure: 'Show excitement to give meaning to the social aspect of joint attention. Mute excitement when child engages for the purposes of requesting rather than for social sharing' (Schertz et al., 2013, p.253).

Similarly, increasing opportunities for a child to initiate, something that involves adding pauses, takes practice and confidence. As noted above, Kossyvakis et al. (2012; 2014) found that staff were less confident about using silent pauses as it could look to others as though they were not interacting. Pausing could also lead to other children taking over. Staff in Ben's preschool discussed, in a follow-up meeting after the project ended, the difficulty of waiting for Ben to initiate as other children at an activity table would jump in as soon as there was a pause.

The preschool context

As has been underlined, the target children were attending mainstream preschools that followed the EYFS curriculum. The curriculum promotes independent learning through child-led exploration. Staff provide rich learning opportunities and are trained to facilitate experiences with few direct adult-led activities. Most of the preschools had a free-flow approach such that children could move between rooms, and go inside and outside at will. In only one preschool was there a programme of specific tasks that each child was expected to complete.

The preschools did not have separate spaces available for one-to-one sessions. This meant that other children often came and joined in when a direct session was being filmed which sometimes caused the target child to move away or divided the staff member's attention. It is important that training for staff acknowledges the setting in which staff work and develops strategies that can include the presence of other children.

Conclusions

This small study of staff interaction strategies with children with ASD suggests a number of research areas that are increasingly important as early diagnosis and preschool inclusion policies increase the numbers of children with ASD in mainstream preschools.

- More research is needed on the type and intensity of training that would lead to changes in interactive styles of EYPs working with children with ASD.
- Studies are needed to compare the interaction of staff with children with ASD with different verbal abilities and also with children with other developmental delays.
- Research is needed to measure the effects of increased post-training staff support
- More research is needed about the effects of different preschool settings on use of interpersonal support strategies, and the most effective ways to adapt the settings to meet the special social interaction needs of children with ASD.

This study had many limitations, discussed above, especially around the variation in contexts where staff found opportunities for one-to-one activities while responding to the child's play preferences. Each context provides different opportunities for social interaction, and training may need to focus more on helping staff see how a child's individual choices can be structured and paced to allow for social communication skills to be targeted.

A further limitation was the lack of a consistent practitioner being observed in the one-to-one conditions. This limited any conclusions made about the effectiveness of training, as training varied between practitioners. This is a problem for future research studies carried out in natural environments. It is also a challenge for policy makers. Children with ASD who are included in regular preschool settings will rarely have an individual support practitioner, partly due to lack of funding but also because the child needs to be able to move around areas and interact with a range of practitioners.

It is suggested that a child with ASD needs all practitioners to be trained in the use of strategies that will support their social communication. A dilemma of preschool inclusion is how to resource practitioner training when numbers of children with ASD attending preschools is relatively low.

Staff are committed and motivated to include and support all children irrespective of disabilities. But it remains unknown how preschool size, intake, space and resources, plus the design of the curriculum affect the ability of staff to meet all the complex needs of children, notably those with a diagnosis of ASD. More studies in natural environments are necessary in order to help develop preschools' ability to include children with ASD such that they benefit from the social interaction opportunities.

Research is also needed to explore the level of training that will lead to increased levels of staff ability to develop interpersonal abilities. Use of feedback sessions with filmed materials may be a route worth exploring. Staff watched film extracts of their interaction in the training and commented in the post-study discussion on the value of watching themselves. This is not a new idea (e.g. Cummins, Stokes, & Weir, 2013) but one that often flounders due to time; resources, and issues of confidentiality.

A core question emerging from the study is how best to enable early years' practitioners to become communicative partners building on the child's initiations and providing models and responses that develop meaningful interactions. The goal is: 'to have children construct a self-generated (self-constructed) knowledge base of communicative routines, means, and functions, and eventually for them to communicate flexibly and spontaneously across people and contexts' (Prizant et al., 2000, p.200). This can only develop with everyday support from well-trained adult communicative partners such as parents and practitioners.

Chapter 6 : The development of social referencing in preschools

Study Three

Introduction

The third SCIP study focusses on one area – social referencing– that forms part of a key research question about attentional patterns in children ASD. The naturalistic films of young children in preschools collected for this project provided an opportunity to observe in depth the ways that 5 children with ASD looked at others, and also to compare their ways of looking with children considered neurotypical and language delayed. Studies of social attention have mainly been carried out in controlled conditions such as tracking young children’s eye movements while being shown pictures; toys, or video extracts (e.g. Chawarska, Macari, & Shic, 2013; Dawson et al., 2004; Shic et al., 2014; Swettenham et al., 1998). But few have studied preschool children’s attentional focus in everyday activities (Keen et al., 2005; Wong & Kasari, 2012).

The variation in contexts used for filming in the project limits conclusions that can be drawn about the experimental children’s social referencing. But a few observations suggest areas for future research in preschool settings.

Background research

The early hours and months of an infant’s life are characterised by responses to social stimuli such as human faces and human voices (see Hobson, 1993; Hobson, 2002) suggesting that humans come into the world with a bias towards integration in a social world (e.g. Bruner, 1983; Tomasello, 2003). Social and communicative capabilities are compromised in a child with ASD but it remains unclear when the reduced response to social stimuli begins. Research studies have looked for evidence of compromise to these basic social predispositions, either at birth or during the early months in order to help understand the developmental trajectory of children with ASD.

Shic et al. (2014) put it thus:

From a theoretical perspective, understanding the early ontogeny of the disorder provides a window into those critical processes that support the unique developmental progressions that leads to communicative and social competence in typical development. From a practical perspective, increased understanding of the early prodromal symptoms of ASD not only might pave the way for early identification of ASD but might also help to map out the relevant developmental targets for intervention.... (Shic et al., 2014, p.231.)

Some hypothesise (e.g. Dawson, 2008; Dawson et al., 2004) that the developmental progression referred to by Shic et al. (2014) involves atypical attention towards social stimuli in young infants. This, they argue, hinders the cortical specialisation process for social information thus leading to reduced interest and later avoidance of social aspects of the world. Dawson refers to the 'social-motivation hypothesis' (Dawson, 2008) to explain the gradual reduced response to social stimuli. This hypothesis is supported by evidence that infants at 20 months show a preference for looking at objects rather than people (e.g. Swettenham et al., 1998).

There is no agreement yet about which aspects of social attention are most predictive of later difficulties and that can differentiate between children who go on to receive a diagnosis of ASD versus other developmental disabilities. There is also no clear picture of the developmental trajectory of features such as smiling and looking for typically and atypically developing children (Mosconi, Reznick, Mesibov & Piven, 2009).

Researchers have looked at the development of different types of social attention. Dawson et al. (2004) compared social orienting (e.g. response to humming; to name; to snapping fingers and to patting hands on knees); joint attention (e.g. child's ability to respond to a point or eye gaze to share attention) and attention to distress (e.g. time spent looking at person and degree of concern to distressed expression). Their sample included children with ASD (N=72), developmental delay (N=34) and typical development (N=39).

The children with ASD had the lowest outcomes on all measures. They concluded that joint attention was the best discriminator of children with autism from those with other disorders, but that the combination of joint attention and social orienting improved the predictive scores.

Mosconi, et al. (2009) differentiated 4 types of social attention in a longitudinal study of children with ASD (N=53 at 2 years; N=27 at 4 years). They measured social referencing (looking directly at a person's face); joint attention responding (sharing attention in response to pointing or eye gaze); orienting to name (responding to a person calling their name), and social smiling (clear and appropriate smiling to a person). At two years of age, three of these measures were significantly impaired in comparison with typically developing children (N=15 at age 2; N=20 at age 4 years). The exception was social smiling that did not show differences from the typically developing child until age 4 years. In addition, the researchers noted a lack of improvement in social orienting over the 2 year period for the children with ASD. This raises questions about the importance of the preschool years for promoting social experiences for children with ASD in order to find opportunities to develop social attention.

There have been attempts to see if some social abilities are more basic than others, i.e. play a primordial role (e.g. Dawson, Meltzoff, Osterling & Rinaldi, 1998). However, a recent comprehensive review of neurodevelopmental studies of ASD in infants (Jones et al., 2014) concluded that a range of behavioural markers of ASD including social orientation begin to emerge during the second year but with no obvious developmental order. Further, there is little evidence to indicate impairments in infants below 9 months: '...6-month-old infants who later develop ASD appear to use communicative and emotional cues to regulate simple interactions relatively successfully' (Jones et al., 2014, p.3).

In summary, current evidence shows that towards the end of the first year, children who will go on to receive a diagnosis of ASD begin to show disruptions in the use of social abilities such as eye gaze; gestures; attention shift towards people (e.g. Rozga et al., 2011; Swettenham et al., 1998) but it is not clear if one skill is necessary for another to develop. There are also insufficient comparative studies to show how disruption in social skills in children who go on to be diagnosed with ASD differs from disruption in children with other forms of delayed development.

The methodological challenges outlined in Chapters 2 and 3 are relevant to studies of early social attention. In the published research, samples are small and differences between results may reflect sample bias. Many studies have been based on either retrospective studies using home videos as data – a method with inbuilt biases; or on prospective studies of children with a sibling with a diagnosis of ASD – a method that arguably uses a special subset of the population of children with ASD (Jones, et al. 2014). Most research is also limited to US and Europe where parental support and environmental conditions may affect the results.

In this research context, where there are more questions than answers, the data from the SCIP project was looked at to see if trends could be observed about the social orientation of the studied children over a term in preschool. Furthermore, data was available to test whether a small scale intervention could affect the social forms used by children, specifically the frequency of looks towards adults and peers.

Study Three hypothesis

This study looks at the number of times that children looked towards adults and peers during non-direct activity sessions before, during and following the SCIP training and intervention.

It is hypothesised that there will be an increase in the number of times that children with ASD look towards adults and peers following the SCIP intervention.

Study Three design and methodology

The study of social referencing used the film extracts from Studies One and Two, and thus followed the same design – single-subject multiple-baselines-across-subjects. Participants, preschools, and observation methods are the same as in the two studies reported above.

SCIP Study Three⁸ analysed 5 minute film extracts of 5 children with a diagnosis of ASD interacting in non-direct sessions in 5 mainstream preschools twice weekly during one school term. A social communication group (SCIP intervention) was introduced for the 4 experimental children (Alex, Ben, Carl and Dino) after a staggered number of weeks. One child (Erik) acted as a control and did not receive the intervention until after the study observations were completed. Two additional children – 1 with language delay (Fynn) and 1 who was neurotypical (Hari) - were filmed for 3 non-direct sessions during the same time period. Selection of the children is detailed in Chapter 4.

The non-direct session was chosen for this study of social orientation as it provided opportunities for the child to look towards both peers and adults in a naturalistic condition. It was also felt that the non-direct session provided a useful contrast from the more controlled environments normally used in the experimental studies that feature in the research. In all but two extracts (both for Carl) there were other peers present during the filming. The use of the non-direct sessions had inbuilt limitations in the range of contexts that the children chose when their play was unstructured. This makes any differences in observations over time attributable as much to context variations, or variations in children's behaviour in different sessions, as to effects of the intervention. However, observations from the studies may suggest areas for future investigation using methods in which the contexts are controlled.

⁸ This study draws on a dissertation project for Lindsey Beer and Lara Maisey that formed part of their Msc in Speech & Language Therapy. My thanks to them for valuable discussions.

Coding

The coding category used for Study Three was *Looking at Others* as described in Study One. The coding criteria for Study 3 followed the definition given by Mosconi et al. (2009) for social referencing:

Instances in which the child is observed looking directly at another person's face. It must be clear that the child is looking at the person's face and not another part of the body and not a proximal object. Also, the child must fixate on the person's face, rather than glancing past him/her. (Mosconi et al., 2009, Appendix A)

The nature of the filming in a busy preschool with a handheld camera meant that at times the focus of the child's eye gaze was not clear. For example, the film might only capture the back of the child's head when he was moving fast around the playground, or the child might appear to be looking towards a child or adult but as that person was not in shot it was unclear if the child was looking directly at him/her or at what they were holding. Dino, in particular, would stare for some seconds towards a person involved in an activity but it was not clear if he focused on the person or on something held by the person such as a fluttering ribbon.

Alex's social referencing was also difficult to code at times as he looked towards the camera frequently and it was unclear if he was directing his gaze to the camera or to the person holding the camera. A strict protocol was kept in which 'looks' were only recorded when it was clear that the child's look was fixated on a person. Looks to the camera were only included when the child's behaviour indicated that attention was socially directed towards the person not the camera.

Setting and Materials

The non-direct sessions occurred in a variety of preschool contexts as the protocol was to follow the child in his chosen activities. In Carl's case, two non-direct sessions were in areas away from other children (an upstairs room, and the hallway). These had been selected by Carl. A staff member was supervising

him. As Carl did not look at children in any of the observed non-direct sessions, the inclusion of sessions without children present is felt unlikely to have affected the results.

The typically developing child was filmed in the playground for three non-direct sessions; the child with delayed language was filmed in the playground twice and once while at a playdough activity table.

Analysis

The *Looks at Others* coding category from Study One was reanalysed with three variations. First, only looks were included in the analysis. If the child had been observed smiling as part of interactive play without looking, this observation was not counted in Study Three. Second, a count was made of *Looks at Adult* vs *Looks at Child* (these had not been differentiated in Study 1). Where it was unclear whether the child was looking at an adult or child or both, it was recorded for both categories – this happened very rarely. Third, the overall number of looks was analysed rather than the percentage of looks during a 15 second interactive event. Thus if a child was splashing in the water and looked up twice at a child playing alongside him during a 15-second time interval, this was coded as: '2 looks at child' and entered as a score of '2'. (In Study 1 the coding would be: '1 looks at others event', scoring 5% of total looks.).

As in Study 1 & 2, a baseline trend was calculated for the pre-intervention sessions. This value was reached by splitting the pre-intervention sessions into two halves and calculating the median value for scores in each half. A line was drawn between these median values to indicate the baseline trends. On the graphs and tables this is called the baseline.

Inter-rater reliability

The coding of Looks at Others was double coded for Study One with high inter-rater agreement. The agreement between the raters using the formula

$$\frac{\text{Number of agreements}}{\text{Number of agreements plus number of disagreements}}$$

was

Table 5.1 % inter-rater reliability

	Rater 1	Rater 2
Looks at others	89.1%	88.15%

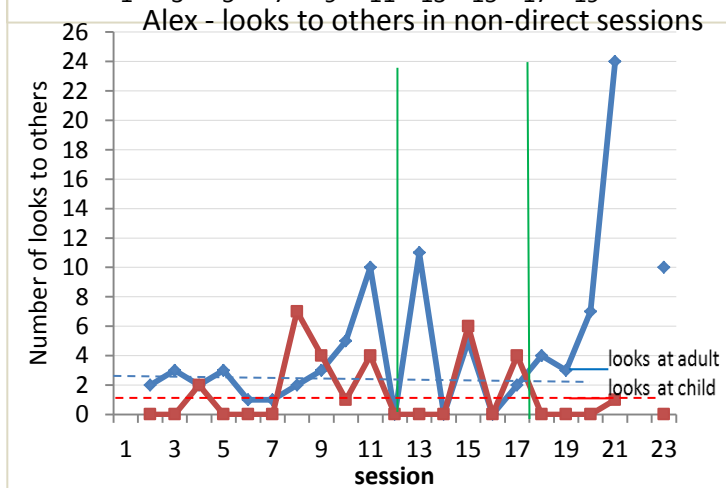
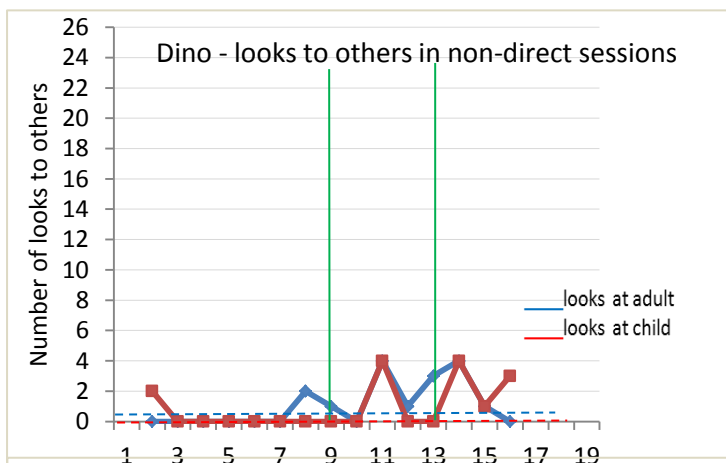
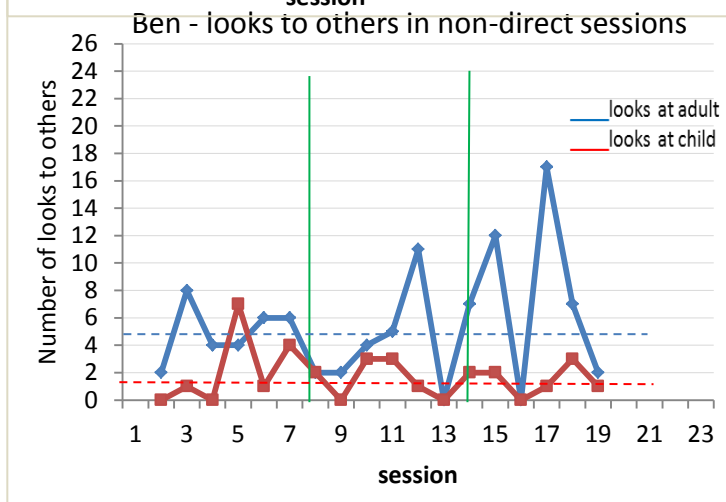
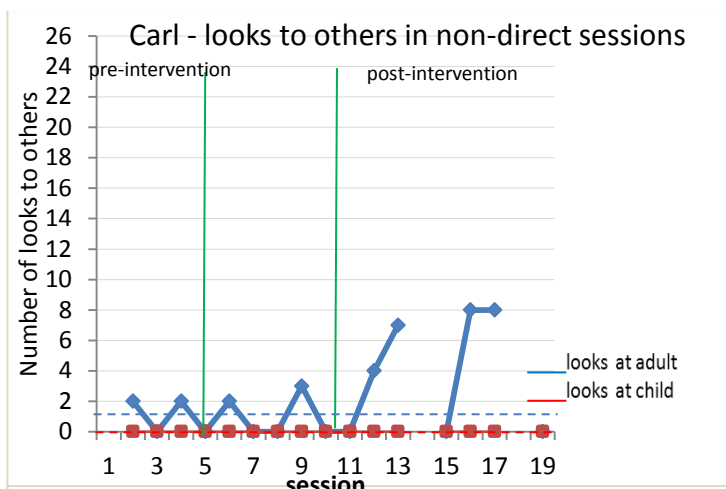
It was therefore not re-coded for this study.

Results

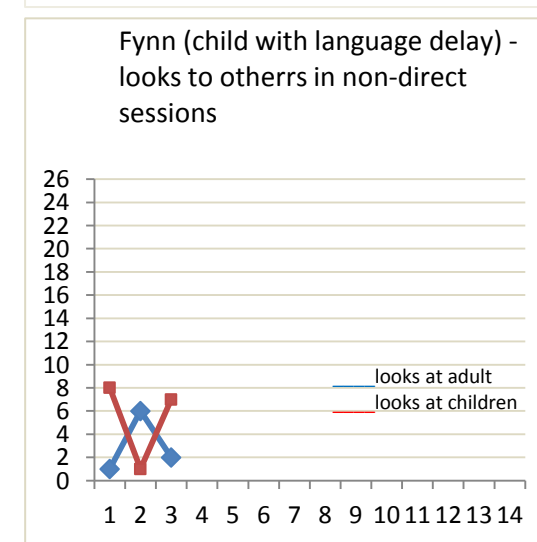
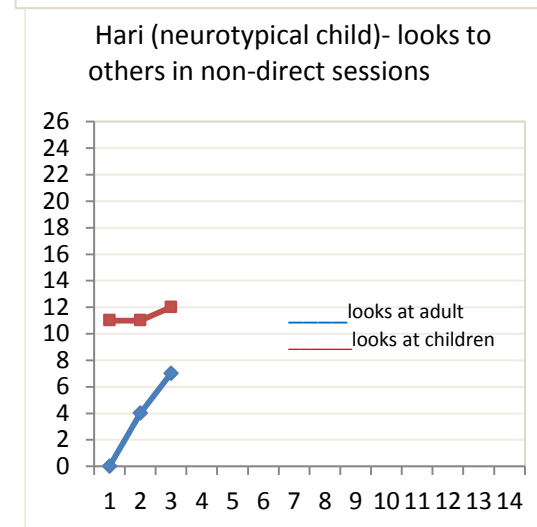
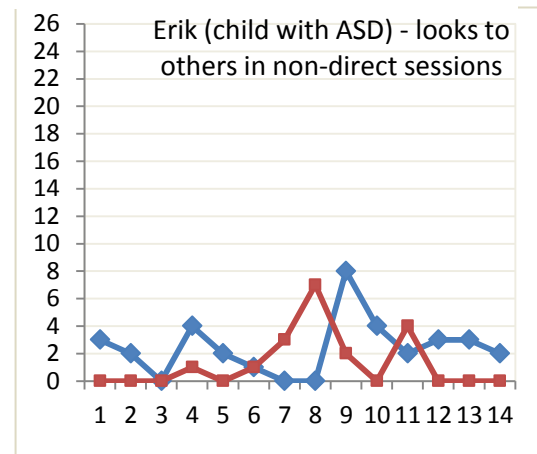
The overall scores are presented below in graph form – Figures 6.1-6.4 - for visual inspection as described in Studies 1 & 2 and based on Pring (2005). The sessions in which the SCIP intervention took place are marked by the green vertical lines.

A comparison was made between the baseline number of looks and the post-intervention number of looks using a non-parametric test (Pring, 2005) as described above. The baseline trends of looks to adults and looks to child are shown on the graphs with a dashed blue (adult) and red (child) line

Figures 6.1-6.4 Number of looks to adults and children during non-direct sessions for experimental children with ASD



Figures 6.5-6.7 Number of looks to adults and children during non-direct sessions for comparison children



--- Baseline -Looks at adult
 --- Baseline -Looks at child

Overall, the children with a diagnosis of ASD look at adults more than children and in one case (Carl) there are no looks towards children in any of the non-direct sessions. While contexts varied for the non-direct condition, there were very few contexts in which looks towards children was greater than looks towards adults. There are instances when Ben and Alex seem to be looking towards adults more frequently which may reflect particular contexts which increased their attention to adults.

Erik (child with ASD) shows a similar amount of variation as the experimental children. In over half the observed sessions, Erik does not look towards peers (8/14) whereas he looks towards adult at least once in all but 3/14 observed non-direct sessions. Hari (neurotypical child) appears to look towards peers more often than he looks towards adults in all three sessions. He looked at peers 11 or 12 times in each of the three 5 minute sequences of non-direct play. Fynn (with language delay) looks towards peers more often than adults in two out of three sessions. This small number of observations in different contexts prevents any conclusions being reached from these results. It does suggest the need for more systematic observations of preschool children's social referencing.

Visual inspection suggests that post-intervention looks to adults may be above pre-intervention results for Alex. However, the variation between sessions and the lack of control over context make any interpretation open to question. Comparison of the number of looks post-intervention above the baseline values using a non-parametric test (Pring, 2005 and detailed in Chapters 4 and 5) suggested that Dino and Alex used social referencing more frequently (sign test $p < 0.05$) post-intervention following the SCIP intervention (see also Study 1 results for Looks and Smiles at Others). The table below shows that Dino appears to increase his looks towards peers more often post-intervention. Alex appears to look towards adults more often post-intervention compared with the baseline.

It is possible that these results reflect changes in context or variations in children's behaviour.

Table 5.2 Looks to adults and children: baseline scores and number of sessions above baseline in post-intervention sessions, and at 4 month review session

Carl Looks at others	Baseline score for looks in non-direct sessions	Number of post- intervention sessions above baseline	Number 4 month review sessions above baseline
Non-direct – looks to adult - looks to child	1.0 0.0	4/6 0/6	0/1
Ben Looks at others	Baseline score for looks in non-direct sessions	Number of post- intervention sessions above baseline	Number 4 month review sessions above baseline
Non-direct – looks to adult - looks to child	4.5 1.5	4/6 3/6	n/a
Dino Looks at others	Baseline score for looks in non-direct sessions	Number of post- intervention sessions above baseline	Number 4 month review sessions above baseline
Non-direct – looks to adult - looks to child	0.25 0.0	2/3 3/3* p<0.05	n/a
Alex Looks at others	Baseline score for looks in non-direct sessions	Number of post- intervention sessions above baseline	Number 4 month review sessions above baseline
Non-direct – looks to adult - looks to child	2.25 1.25	4/4* p<0.05 0/4	1/1 0/1

As noted in Chapter 4 maturation and time in preschool may play a part in the increases in looking and smiling for children with a diagnosis of ASD.

Discussion

There is limited evidence for an increase in social referencing post-intervention. (The different way of scoring by number of looks accounts for the higher frequency of looks in Study 3 compared with Study 1.) But more studies are needed that includes comparison of similar contexts. The visually striking feature of the graphs is the variations in outcomes. This may reflect the difference between non-direct contexts. It also raises the question about opportunities selected by the child with a diagnosis of ASD to interact with others when left to direct his/her own play.

Individual children's scores are discussed below. This is followed by further discussion of the study's limitations and areas for further investigation.

Carl

In almost half the non-directed sessions, there were no examples of Carl social referencing with adults. These were times when Carl was absorbed in activities, such as pushing a car along the edge of a table. The most notable feature of Carl's social referencing is his lack of looks towards peers. His interaction matches peers with the profile described by Wing and Gould (1979) as *aloof*. Although there were many instances when Carl shared an activity table with another child, or when children were playing around him, Carl seemed unaware of their presence. He would, for example, walk through the middle of a child's play area, or take a toy from a child without looking at the child's face. His social attention to adults differed with examples of Carl offering objects to staff and looking at them, and looking up at them when engaged in physical games such as spinning around. These were infrequent.

Ben

Ben's scores for looking at others reflect features of his social communication already noted in Chapter 4. Ben's initiations that involved showing + naming objects to adults are reflected in the frequency of looks to adults. His looks towards children are less frequent than looks to adults but still occur in 13 of the 18 sessions. Film observations showed that his looks towards children differed from those to adults. Whereas, he mainly looked at adults while showing objects, he looked towards children when they cried; when they were doing something different such as throwing paper in the air, or when they came near to him. Interestingly, children approached Ben on a number of instances as if to involve him in their play. For example, on two occasions a child was pretending to be a dog and came over to Ben on all fours making dog noises. Ben looked at the child but made no move to copy or to react. On some occasions, Ben would look at a child as if examining the child's face, and the child would move away. His interaction with peers matches the profile described by Wing and Gould (1979) as *passive* and occasionally *active-odd*

Dino

Dino scores the lowest in frequencies of looks but the results suggest a slow increase over time with more frequent looks towards peers post-intervention compared with the baseline score. His interaction with peers fits the profile described by Wing and Gould (1979) as *passive*.

Dino's looks were often directed towards two specific children (one girl, one boy) who seemed to take on the role of looking after Dino. They would come over to the activity areas where he was playing and actively attempt to interact. In one instance a 4 year old boy introduced a game of peek-a-boo with Dino. This attempt by peers to initiate play with a child with ASD was rarely observed in any filmed session and is discussed further below.

Alex

Alex, like Ben, shows a high degree of variability in his social referencing; with sessions without any looks contrasting with sessions with more social referencing. Alex engaged in more short interactive play routines with adults such as joining in games with bubbles or balls. During these activities he looked back and forth between adults and peers. These variations in his engagement with adults may be reflected in the apparent increase in looks towards adults post-intervention compared with the baseline. This was not matched by an increase in looks to peers. Alex was more likely to look at one of his peers when they had an object he wanted. In one session, a child deliberately took one of his toys and set up a game of chase. Alex joined in the chase though seemed more intent on regaining his toy than joining in a shared chase game. His interaction with peers fits the profile described by Wing and Gould (1979) as *active-odd*.

Erik

Erik has similarly variable frequencies of looks at the other children and adults with many sessions where he did not reference peers. In the non-direct sessions when he referenced a child, he watched as they played, but did not engage with them. This fits the Wing and Gould (1979) *passive* profile.

Comparison children – Fynn and Hari

Overall, there is tentative evidence to support the hypothesis that the children with ASD differ in the nature and frequency of looking at peers in comparison with a child with language delay and typically developing child, though the nature of these differences needs further study.

Fynn and Hari, like the children with ASD, varied in their social referencing between sessions. The level of adult supervision was lower for the two children (especially the neurotypical child, Hari) thus lowering the opportunities to reference adults. Observations from the films showed the high level of involvement of Hari with other children. In sessions 1 and 3, Hari was running around the playground and stopping to play on equipment. He frequently checked that his peers were following him, or watched and copied what they were doing, e.g. imitating actions on the climbing frame. In session 2, Hari was in the playground building a tower of mega-blocks with a peer and made frequent visual checks with the child and with an adult about the progress of the tower.

Fynn's looks towards peers were less frequent than Hari's but again observations from the film suggested that the main function was one for *active* social referencing during shared engagement. In sessions 1 and 2, Fynn was running around with peers in the playground. In the second session he was mainly chasing others but the coding of looks did not include looking at the *back* of children. In the third session, Fynn was in the book corner with a group of children where he watched and copied peers as they acted out animal noises.

Both children actively referenced peers during these particular sessions.

Whereas Hari's interaction seemed to be co-operative, collaborating with peers in a co-ordinated way, Fynn's play seemed less well developed. He seemed to watch more than act as a joint partner in other children's game. Wolfberg, DeWitt, Young & Nguyen (2015) would delineate Fynn's play as having a 'common focus' and Hari's play as having a 'common goal' (p.831).

Limitations and future directions

The small, heterogeneous sample limits the generalisations that can be made. However, while this close study of the social referencing of children with a diagnosis of ASD in non-direct preschool sessions has many limitations, in particular the variations in contexts, it has suggested a number of areas for further research.

First, there were a few indications of social referencing developing over time. Further studies are needed to ensure that results are not due to context variations. The trend highlights the potential for focussing on preschool opportunities to target social referencing.

Second, 4 out of 5 children with ASD showed some referencing of peers, albeit lower than the amount referencing of adults, and lower than the number of looks to peers observed for the comparison children without ASD. Dino's rate of looking at peers appeared to occur slightly more frequently over time, though this may have been the result of context variations. More data is needed about the frequency of looks towards peers in naturalistic conditions, and factors affecting social referencing of peers.

Third, the coding method does not indicate the communicative functions of the child's looks – all looks were considered communicatively equal. From watching the film extracts, the impression gained was that the referencing of peers by the children with ASD mainly functioned to observe rather than to join in as an interactive partner. There often seemed to be a lack of understanding about the social rules of looking – the intentions behind a look. For example, Dino watched a child who was about to swing on a rope. The child gestured for Dino to move in case she hit him. Dino went on looking as the child gestured, but he did not move. Similarly, Ben watched as children tossed shredded paper over each other's heads with much laughter. Although he seemed interested in their faces, he made no attempt to join in with the play or to laugh with them.

These observations contrasted with the sessions of the neurotypical child and the child with language delay. Their looks towards peers were part of a shared activity such as building a tower with peers (Hari) or a chasing game (Fynn) and the children's looks were usually reciprocated with a return look or an action.

The ways of looking at children observed for children with ASD may be important starting points for children who are developing social referencing skills. Michelle Winner (2007) uses the expression 'thinking with your eyes' to discuss the social function of looking. Research is needed to develop a way of categorising the functions of social referencing so that a developmental trajectory of social referencing can be mapped for children with ASD.

Fourth, although all children with ASD used social referencing during at least half the non-direct sessions there were many sessions where the children did not reference either an adult or child. Given that all sessions (except 2 for Carl) took place in busy, active, people-full preschools, this absence of looking suggests both a reduced motivation to attend to others and at the same time suggests a loss of opportunity to build on their emerging ability to notice others. The few studies of children in preschool have noted that children with ASD often spend longer unengaged, or engaged with objects than children with other disabilities or than typically developing children (Wong & Kasari, 2012). The implication is that children who lack the ability or the motivation to engage with others will not seek out the available opportunities for social interaction in the way that other children will.

Finally, in a few instances, neurotypical children were observed approaching the children with ASD and attempting to initiate interaction. However, the children with ASD did not appear to know how to respond except to look closely at the child which usually led to the peer walking away. These observations suggest opportunities to involve peers in ways to support interaction with children with ASD.

Peer-mediated interventions

These potential opportunities for peer engagement were either not noticed or not acted upon by staff members. Yet they suggest areas that might be developed in preschools through peer-mediated initiatives.

There is a growing number of research studies looking at peer-support for children with ASD though few have been carried out with preschool children (for overview, see Wolfberg & Schuler, 2006). Nelson, Nelson, McDonnell, Johnston and Crompton (2007) developed a 'Keys to Play' intervention where children in 4 preschools were encouraged to invite children with ASD (N=4, 1 in each preschool) to join them in an activity. The children with ASD were encouraged to say '*I want to play*'. This intervention had limited but encouraging success in increasing child engagement in activities.

Laushey and Heflin (2000) introduced a preschool peer-buddy intervention for 2 children with ASD in a US preschool (children were aged 5-6 years given the older school-starting age in US). The typically developing children were trained in ways to play such as: asking for an object and responding to requests; getting another person's attention; waiting for turns; looking towards a person who is speaking. A 'passive' buddy was also included as a control. The results for the two children with a diagnosis of ASD showed an increase in the number of positive interactions when they were paired with a trained buddy compared with times they were paired with a 'passive' partner. Although a very small study, it lends evidence that peer-mediated training may be effective.

Wolfberg and Schuler (2006) discuss an Integrated Play Group Model (developed by Wolfberg, 2003) in which children with ASD are guided in ways to interact with peers with specific guidance on ways of copying; playing side by side; sharing a focus and turn-taking. Outcomes from preliminary studies of use of such groups (mainly with >5 years olds) suggest that it decreases solitary play and increases social initiations (Wolfberg et al., 2015).

So far only small scale peer-mediated intervention studies exist and most depend on adults directing children on how to engage rather than building on initiations by peers. A line of research suggested by this project data is to develop strategies for peers to support children with ASD in everyday activities. Although the SCIP intervention included opportunities for children to look at each other, the emphasis was for the children to copy and respond to the adult. Inclusion of focussed peer-led activities may help children with ASD to gain experience in responding to children's bids for interaction and to encourage them to initiate interactions with peers.

Study Three conclusions

In conclusion, from the data presented in Study Three, there is tentative evidence of social referencing towards peers and adult being used by children with ASD that differs from social referencing of neurotypical and language delayed peers.

This may reflect variations in contexts observed. In addition, the children with a diagnosis of ASD in the study each had differing patterns of social referencing. A larger sample is needed to develop profiles to describe children's ways of looking. Such profiles may lead to focussed interventions with children with ASD and their peers to help support the development of their social interaction.

Chapter 7: Conclusions, limitations and future directions

Summary of research principles

The shared underlying assumption of intervention studies is that the social and communication impairments of children with ASD limit their opportunities for language and social learning in the early years. There is cumulating evidence (see Chapter 3) that intervention can positively affect the child's social development, and lead to improved social interaction outcomes. Positive effects are likely to be mediated by pre-treatment child characteristic and symptom severity as well as the responsiveness of communication partners (e.g. Gulsrud, Helleman, Freeman & Kasari, 2014; Yoder & Stone, 2006).

There is a convergence of research evidence that informs current US and UK policies for supporting children with a diagnosis of ASD around three key issues: the age at which intervention should begin, the areas that should be targeted, and the role of the communication partner (e.g. NRC, 2001; NICE, 2013).

First, growing (though still limited) evidence suggests that introducing intervention strategies at an early age for children with a diagnosis or at risk of a diagnosis of ASD can support the developmental trajectory and improve children's capacity for social engagement. Such intervention is being piloted with some success with children at risk of ASD as young as 12-18 months (e.g. Bradshaw, Steiner, Gengoux & Koegel, 2015; Rogers et.al., 2014; Steiner et.al., 2013).

Second, emerging (but equally limited) evidence suggests that targeting *joint attention* –one of the core impairments of ASD – can lead to improvement in children's ability as social communicators and thus enable them to access the social opportunities for interaction with peers and adults.

Third, a handful of research studies indicate the importance of responsive partners in determining children's communication outcomes. The partners studied are

mainly parents, though a few studies have looked at the role of practitioners and peers in affecting children's interpersonal development.

The evidence is not available at present to indicate which joint attention intervention programmes are most effective; who should deliver the programmes, in which contexts and under what conditions. There exist different, but increasingly converging, approaches (e.g. Ingersoll, 2010, and see Chapter 3) and the majority of interventions agree on certain key principles. These are that approaches for children with ASD should be:

- appropriate to the developmental level of the child
- based on the child's everyday activities
- overseen by responsive adults (parents and practitioners)
- designed to meet the priorities of the child's family and educational setting
- implemented as early as possible

Putting these principles into practice in preschools can be challenging especially when early age of diagnosis and inclusion policies has greatly increased the numbers of children in mainstream early years' educational settings without specialist practitioners. Parent and practitioner training may not be at a level to meet the needs of these children, and specialist services may not have the resources to provide the necessary support. In addition, the early years' curriculum is predicated on developing the learning of children who already have emerging social skills. It is not designed to meet the needs of children with limited interpersonal abilities and complex social communication difficulties (e.g. Wong & Kasari, 2012, and see Chapter 3).

This research Project set out to look at the effectiveness of a social communication intervention that matched as closely as possible the type of programme that is offered by Speech and Language Therapists for children with a diagnosis of ASD in regular local preschools. It differed from nearly all current research in being set in non-specialist settings with staff who, although experienced and motivated, lacked specific training in meeting the needs of children with ASD.

The experimental design also differed from many studies in that observations of the children's behaviour during the SCIP intervention were made in the child's preschools with his peers and familiar practitioners. Further, the observations were made concurrently with matched observations of the child's behaviour in everyday preschool activities. In addition, observations were made of the patterns of staff interaction and their use of support strategies during the observation period in the children's everyday activities. It thus aimed to have ecological validity.

The gains in ecological validity need to be balanced against the loss of control over such factors as the contexts of the observations; the availability of practitioners; the variability in the practitioner training, and the variability between preschools' practices. These variations limit any interpretations that can be made about the results. Future studies need to address these concerns.

The study also observed three children who did not receive the intervention: one with a diagnosis of ASD; one with delayed language, and one considered neurotypical. Methodological concerns outlined above limit any conclusions that can be made from the results of these observations. Future studies are needed that provide comparative data about the range of social communication abilities in preschools.

Summary of Findings

Study One

The three SCIP studies focussed on different aspects of the intervention. Study One looked specifically at the effectiveness of a small group intervention to increase the children's social communication: their responses to bids for interaction; their initiations of bids for interaction; their use of communicative gestures & words, and their use of communicative smiles & looks. Observations were made before, during and after the intervention, as well as during the intervention itself.

Overall, the experimental children's use of the targeted social communication did not show improvements over the six sessions. The intervention was based on a typical level of support provided to preschools by Speech and Language therapists services. This raises questions about the intensity and 'dosage' level needed to affect outcomes.

Comparison of post-intervention outcomes with the pre-intervention baseline suggested some apparent increases in social communication behaviours but these varied between children and across conditions. Differences in the contexts used for observations; differences between practitioners supporting the children, and the variations in behaviour of children with a diagnosis of ASD make any interpretation of the results open to question.

Study Two

SCIP Study Two looked at changes in the practitioner strategies after the SCIP staff training and intervention. Again, observed changes in the use of strategies post-intervention varied across practitioner and across settings. Information was not collected about the experience and knowledge of the practitioner before the study began. It was also not possible to ensure that the same practitioner was observed interacting with the experimental child. These factors are likely to have affected results. Additionally, one child's key worker had not be able to attend 3/6 of the

intervention sessions. These limitations need to be addressed in future studies. Factors such as the short training session and the time needed to adapt to new strategies need further exploration. The study raises policy questions about the time and resources provided for staff when a child with ASD is included in the mainstream preschool without additional specialist-trained staff.

Study Three

Study Three looked specifically at the children's social referencing. This is an area that has received scarce research attention with such young children. The results confirmed the low level of social referencing of children with ASD (as expected by the criteria used for a diagnosis of ASD) but also highlighted the lower level of social referencing of peers. In one case, no looks at peers were observed in unstructured play during the whole observation period. The results need to be interpreted with caution given the variations in the contexts of the observations.

The small study raised questions about staff support to encourage social referencing, about ways to foster peer interaction, and the possibility of involving peers in the support of children with ASD.

Current research findings suggest that focussing on joint attention in specially engineered interventions leads to levels of social engagement that are more frequent than in everyday contexts. This indicates that children with ASD have the potential to join in shared activities with adults and peers. But little research has been done looking at ways to translate such results into mainstream preschools without specialised practitioners. The development in abilities for social engagement is not clearly evident in everyday activities after staff training and a 6 session specialist intervention for children. This may be due to the limitations of the research design. It may also be that more is needed in terms of staff training and specialist support if the children are to develop the social communication skills that would enable them to access the social opportunities provided by preschool settings and prepare them for future educational settings.

Limitations and future directions

Experimental design

The methodological challenges in providing an evidence base for effective practices are explored in Chapter 2. The current prevalence of single-subject experimental designs (SSEDs) reflects the difficulties of large scale randomised trials with a heterogeneous population sharing a low incidence developmental disorder without clear biomarkers. Smith (2012) notes a swing towards recognising that SSEDs can provide strong evidence of what works and for whom (Nickels, Howard, & Best, 2011). Most importantly, SSEDs contribute to clinical outcome research by identifying potential therapies. Evidence of therapy efficacy is, following Robey and Schultz's model (1998), an essential step before tests of effectiveness in practice. Pring (2004) emphasises the need for researchers to prioritise efficacy studies based on a clear theoretical rationale as well as clinical experience. 'Researchers need to discover what can be achieved' (Pring, 2004, p.299) under optimal conditions. If positive effects are found, then effectiveness studies can follow to test whether an approach works in clinical practice and the costs in terms of money and resources needed to implement the approach.

Ecological validity

In this Project, the test of efficacy of small group intervention took place in a natural setting. By implementing the intervention within mainstream preschools, the SCIP project aimed to overcome some of the issues of translating laboratory results into everyday practice. This accords with the recommendation of Dingfelder and Mandell (2011) that 'in order for efficacious intervention to be successfully implemented, the community contexts must be considered explicitly throughout all phases of research' (Dingfelder & Mandell, 2011, p.603). Conditions were optimised by having a specialist speech and language therapist present in the setting twice weekly, providing advice and support during the intervention period. The intervention was led by the main researcher ensuring fidelity of both the staff training and implementation of the small group.

It was, however, less optimal than more controlled studies in that the contexts observed varied from session to session; staff members observed also varied across conditions; the previous experience and training of staff was not collected; the implementation of the intervention was affected by child and key worker absences, and some sessions were missed due to competing preschool activities. This variability limits any interpretations about the outcomes.

In-depth focus on individual children in mainstream preschools has the potential to provide valuable insights into the complex and multidirectional relationships between a child and his or her environment (Bruinsma et al., 2004). This study highlights the difficulties of intervention research and points to ways that studies can be improved through greater control of observed contexts and more data about factors such as practitioner training.

Sample size and nature

The small sample, with only one control child with a diagnosis of ASD, limits the generalisability of the results. The sample was all male and although the number reflects the prevalence of boys with a diagnosis of ASD (NICE Guidelines, 2013) replication of the intervention is needed with female preschoolers.

More research is needed to understand the effects of pretreatment characteristics such as the child's IQ, age, gender, parental background; severity of ASD as measured by ADOS, and co-occurring difficulties on the outcomes of a particular intervention. It was unclear if ADOS severity scores (Lord et al., 2012) and learning levels (Griffiths, 2006) affected outcomes. For example, as discussed in Chapter 4, the child who was observed to use social communication behaviour least frequently pre- and post-intervention scored as the most severe on the ADOS (Lord et al., 2012). However, the child who received the second severest ADOS score was the child who appeared to make gains in the use of some social communication behaviours post-intervention in comparison with the other experimental children.

Outcome measures

Coding decisions were made that may make comparability of results across studies problematic. This raises a central research issue about outcome measures. To give one example, following Kasari et al. (2006; 2008) and Prizant et al. (2006) the coding category *joint attention* did not include, in the SCIP studies, requests for objects unless the child's requests had the intention of wanting shared focus. Other researchers such as Kossvaki et al. (2012) have included all requests, including imperative requests, in measures of joint attention. Although not discussed by researchers, the line between different types of requests is blurred and it could be argued that object-requests form a first step in seeing others as agents (Yoder & Stone, 2006). In addition, joint attention was not further differentiated in the SCIP studies into, for example, supported and co-ordinated JA (see Chapter 3, Adamson et al., 2004; Adamson et al., 2009).

A further limitation of the study was the coding decision to measure frequencies of interactive events and not duration. A way of measuring interactive behaviours in terms of 'time engaged' with an adult may capture differences between children and of opportunities for social engagement.

Perceptions of autism

Assumptions were made at the beginning of the study that staff in the preschools had a basic understanding of the nature of ASD and of more general areas such as the development of language. These were overviewed in the staff training. However, in a one hour training only a basic introduction was possible and no checks were made about staff prior perceptions of autism; previous training, and beliefs about the interventions that might be helpful.

Mercer, Creighton, Holden, & Lewis (2006) noted the wide range of parental beliefs about the causes of autism that, they argue, might influence their judgements about the helpfulness of interventions. For example, parents in Asian communities tend to prioritise social skills as social membership is highly valued in many

communities. Mercer et al. (2006) contrast this with US parents who tend to prioritise expressive language development. Maljaars et al. (2011) noted that goals found in US preschools are often around communicative forms such as using words rather than around communicative functions such as requesting a peer to play with them. They discussed the importance of preschools increasing the range of communicative functions. Future research might include pre-intervention information about EYPs' perceptions of SLT intervention goals and the possible effect this has on choice and implementation of intervention strategies.

The study, as with the majority of published research, has assumed that joint attention is a behaviour shared across cultures. However, joint attention behaviours may vary in function across different ethnic and socio-economic groups. A hint of such difference is suggested by Bakeman, Adamson, Konner, & Barr (1990) who found that social interaction patterns in infancy among the !Kung people in Botswana was markedly different from interaction in Western cultures. The authors raise the question about whether the type of shared play that is seen as the foundation for much later social, cognitive and language development is a necessary condition.

Possible cultural differences may have implications for the generalisation of interventions that are specifically based on Western practices. The focus on joint attention through play with objects may be less generalizable to homes where adults have not had similar play experiences, lack toys and lack childhood memories of joint interaction from which to draw.

Intensity and duration

More studies are needed to understand better how to stimulate development in social functioning and communication. Of particular interest is whether generalisation of effects may be improved by increasing the intensity and duration of treatment, or by combining preschool teacher-delivered with parent-delivered treatments.

Kaale et al. (2014) went further in their discussion of the limited effects of intervention on children's outcomes. They asked whether the small increases in children's joint attention were due to dosage and intensity of the intervention, or whether mainstream preschools had too few specialist staff to support children with ASD. Does 'the severity of the core social deficits require highly trained professions to induce changes outside familiar persons and situations' (Kaale et al., 2014, p103). They emphasise the importance of conducting multisite analyses of moderators and mediators in order to determine if inclusive policies can match the provision of specialist preschools.

Few studies have looked at ways of linking home and school interventions (Rickards, et al., 2007) and this seems an important research gap to fill.

Context and setting

The variations in contexts in which children were observed in the studies reported above limited the interpretations that could be made about any post-intervention changes in social communication behaviours. This was a methodological inadequacy. The variations within and between preschools also raise the difficulties of translating any clinic-based research findings into preschools where lack of consistent learning activities is inbuilt in the Early Years' Curriculum.

Preschools appear ideally placed to support the child with ASD providing play experiences with peers and adults. However, key questions lie around the adaptations needed to maximise the opportunities for co-ordinated attention to a person and object – the starting point for communicative exchanges (e.g. Bruner, 1983; Lieberman & Yoder, 2012).

Coordinated attention provides the means for a child to observe and to learn from observations of adults about ways of interacting on a daily basis in natural environments. Lieberman and Yoder (2102) in their meta-analysis of studies involving preschool children with ASD highlight the need to focus on play as the context for intervention strategies.

The current preschool curriculum places high value on each child's exploration of rich learning environments with staff facilitating this in ways that do not impose a predetermined structure. Respect is given to the different routes that children will take to master various skills. However, this predominantly non-directed approach may not be sufficient for children with a diagnosis of ASD to overcome the barriers that result from their reduced social skills. More deliberate engineering of the environment may be needed for children with ASD in preschools (Beurkens et al., 2013).

Practitioners may also need additional support in developing ways of responding to each child's focus of attention. In SCIP Study Two, the findings suggest that while practitioners are caring and supportive, they may not have fully acknowledged the communicative differences between the children with ASD and the children of comparable age and ability. This was apparent, for example, in the use of praise and feedback that rarely acknowledged children's response to bids or attempts to initiate bids for shared attention.

Research on parent-child interaction has shown the importance of synchrony with the child (see Chapter 3). In talking about parents' responsivity, Broberg et al., (2012) conclude that parent interpersonal behaviour does not function independently of the child's behaviour and responsiveness. 'Either partner in the 'dance' between parent and child is capable of disrupting the interaction and altering its nature in ways that can have lifelong consequences' (Broberg, et al., 2012, p.244). 'Parent' could be substituted by 'preschool practitioner' raising questions about the role of preschools to affect children's social communication outcomes.

Next steps in community-based research

Dingfelder and Mandell (2011) conclude that alongside existing RCTs and research under controlled conditions there is also community-based participatory research 'in which researchers partner with community settings to test interventions using rigorous research designs' (Dingfelder & Mandell, 2011, p.607).

The SCIP studies attempted to demonstrate the possibility of carrying out community-based research. Although there are design shortcomings detailed above, the findings suggest that a single subject experimental design is possible to implement and could be adapted for use by practising speech and language therapists working alongside parents and practitioners.

Such research would increase the data available about children's social development following joint attention focussed interventions. Studies could also further develop knowledge about practitioner strategies and factors affecting changes in their ways of supporting interpersonal abilities. Integrating research in preschools with research looking at parent- and peer-mediated interventions could lead to more holistic programmes that recognise the complex reciprocal dance that forms the core of social communication.

References

- Adamson, L.B., Bakeman, R., & Deckner, D.F. (2004). The development of symbol-infused joint engagement. *Child Development, 75*, 1171–1187.
- Adamson, L.B., Bakeman, R., Deckner, D.F. & Ronski, M. (2009). Joint engagement and the emergence of language in children with autism and Down syndrome. *Journal of Autism and Developmental Disorders, 39*, 84-96.
- Aldred, C., Green, J., & Adams, C. (2004). A new social communication intervention for children with ASD: Pilot randomised controlled treatment study suggesting effectiveness. *Journal of Child Psychology and Psychiatry, 45*, 1420-1430.
- American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorder: DSM-4* (4th Ed.). Washington, DC: American Psychiatric Publishing Inc.
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorder: DSM-5* (5th Ed.). Arlington, VA: American Psychiatric Publishing Inc.
- Baird, G., Charman, T., Baron-Cohen, S., Cox, A., Swettenham, J., Wheelwright, S., & Drew, A. (2000). A screening instrument for autism at 18 month of age: a six year follow-up study. *Journal of American Academy of Child and Adolescent Psychiatry, 39*, 694-702.
- Baird, G., Simonoff, E., Pickles, A., Chandler, S., Loucas, T., Meldrum, D., & Charman, T. (2006). Prevalence of disorders of the autism spectrum in a population cohort of children in South Thames: the Special Needs and Autism Project (SNAP). *The Lancet, 368* (9531), 210-215.

Bakeman, R., & Adamson, L. (1984). Coordinating attention to people and objects in mother-infant and peer-infant interaction. *Child Development*, 55 (4), 278-1289.

Bakeman R., Adamson L. B., Konner M., Barr R. G. (1990). !Kung infancy: the social context of object explorations. *Child Development*, 61, 794–809.

Bates, E., Bretherton, I., Snyder, L., Beeghly, M., Shore, C., McNew, S., & Garrison, A. (1988). *First words to grammar: Individual differences and dissociable mechanisms*. New York, NY: Cambridge University Press.

Bates, E., Thal, D., Whitesell, K., Fenson, L., & Oakes, L. (1989). Integrating language and gesture in infancy. *Developmental Psychology*, 25, 1004-1019.

Bates, E., Dale, P., & Thal, D.(1995). Individual differences and their implications for theories of language development. In P. Fletcher and B. MacWhinney (Eds.) *The Handbook of Child Language*. Oxford: Blackwell.

Bettelheim, B. (1967). *The empty fortress*. New York, NY: The Free Press.

Beurkens, N.M., Hobson, J.A., & Hobson, R.P. (2013). Autism severity and qualities of parent-child relations. *Journal of Autism and Developmental Disorders*, 43(1),168-78.

Bloom, L. & Tinker, E. (2001). The intentionality model and language acquisition: engagement, effort, and the essential tension in development. *Monographs of the Society for Research in Child Development*,. 66 (4), 1-91.

Blumberg, S., Bramlett, M., Kogan, M., Schieve, L., Jones, J., & Lu. M. (2013). Changes in prevalence of parent-reported autism spectrum disorder in school-aged U.S. children: 2007 to 2011–2012. *National Health Statistics Reports*, 65. Hyattsville, MD: National Center for Health Statistics.

- Bogdashina, O. (2003). *Sensory perceptual issues in autism and Asperger syndrome: different sensory experiences, different perceptual worlds*. London: Jessica Kingsley.
- Bondy, A.S., & Frost, L.A. (1994). *PECS: The Picture Exchange Communication System*. Cherry Hill NY: Pyramid Consultants.
- Bono, M.A., Daley, T., & Sigman, M. (2004). Relations among joint attention, amount of intervention and language gains in autism. *Journal of Autism and Developmental Disorders*, 34, 495-505.
- Bottema-Beutel, K., Yoder, P.J., Hochman, J.M., & Watson, L.R. (2014). The role of supported joint engagement and parent utterances in language and social communication development in children with autism spectrum disorder. *Journal of Autism and Developmental Disorders*, 44, 2162-2174.
- Boyd, B.A., Odom, S.L., Humphreys, B.P., & Sam, A.M. (2010). Infants and toddlers with autism spectrum disorder: early identification and early intervention. *Journal of Early Intervention*, 32, 75-98.
- Bradshaw, J., Steiner, A., Gengoux, G., & Koegel, L. (2015). Feasibility and effectiveness of very early intervention for infants at-risk for autism spectrum disorder: a systematic review. *Journal of Autism and Developmental Disorders*, 45 (3), 778-94.
- Broberg, M., Ferm, U., & Thunberg, G. (2012). Measuring responsive style in parents who use AAC with their children: development and evaluation of a new instrument. *Augmentative and Alternative Communication*, 28 (4), 243-253.

- Bruinsma, Y., Koegel, R., & Koegel, L. (2004). Joint attention and children with autism: a review of the literature. *Mental Retardation Developmental Disabilities Research Review*, 10 (3), 169-75.
- Bruner, J. (1983). *Child's talk: learning to use language*. Oxford: Oxford University Press.
- Brunner, D.L., & Seung, H. (2009). Evaluation of the efficacy of communication-based treatments for autism spectrum disorders: a literature review. *Communication Disorders Quarterly*, 31 (1), 15-41.
- Bryson, S., Zwaigenbaum, L., Brian, J., Roberts, W., Szatmari, P., Rombough, V., & McDermott, C. (2007). A prospective case series of high-risk infants who developed autism. *Journal of Autism and Developmental Disorders*, 37 (1), 12-24.
- Carpenter, M., Pennington, B., & Rogers, S. (2002). Interrelations among social social-cognitive skills in young children with autism. *Journal of Autism and Developmental Disorders*, 32, 91-106.
- Casenhiser, D.M., Shanker, S.G., & Stieben, J. (2011). Learning through interaction in children with autism: Preliminary data from a social-communication based intervention. *Autism*, 17 (2), 220-241.
- Casenhiser, D. M., Binns, A., McGill, F., Morderer, O., & Shanker, S.G. (2015). Measuring and supporting language function for children with autism: evidence from a randomized control trial of a social-interaction-based therapy. *Journal of Autism and Developmental Disorders*, 45 (3), 846-857.
- Cass, H. (2011). Current perspectives in diagnosis of autism. Paper presented at Research Autism Conference. The 'autisms': important perspectives on autism. May 19th: London. Paper available from www.researchautism.org.uk.

- Chandler, S., Christie, P., Newson, E., & Prevezer, W. (2002). Developing a diagnostic package for 2 to 3-year-olds with autism, *Autism*, 6 (1), 47-69.
- Charman, T. (1998). Specifying the nature and course of the joint attention impairment in autism in the preschool years: implications for diagnosis and intervention. *Autism*, 2, 61-79.
- Charman, T. (2003). Why is joint attention a pivotal skill in autism? *Phil. Trans. Royal Society. London*, 358, 315-324.
- Charman, T., Howlin, P., Aldred, C., Baird, G., Degli Espinosa, F., Diggle, T., Kovshoff, H., Law, J., Le Couteur, A., MacNiven, J., Magati, I., Martin, N., McConachie, H., Peacock, S., Pickles, A., Randle, V., Slonims, V., and Wolke, D. (2003). Research into early intervention for children with autism and related disorders: methodological and design issues: Report on a workshop funded by the Wellcome Trust, Institute of Child Health, London, UK, November 2001. *Autism: The International Journal of Research and Practice*, 7 (2), 217-225.
- Charman, T., & Stone, W. (Eds.) (2006). *Social and communication development in autism spectrum disorders*. New York/London: The Guilford Press.
- Charman, T. (2010). Developmental approaches to understanding and treating autism. *Folio Phoniatica et Logopaedica*, 62, 166-177.
- Charman, T., Pellicano, L., Peacey L., Peacey, N., Forward, K., & Dockrell, J. (2011). What is good practice in autism education? Centre for Research in Autism and Education CRAE Department of Psychology and Human Development Institute of Education University of London. Report commissioned by Autism Education Trust. <http://www.autismeducationtrust.org.uk>.

Chawarska, K., Klin, A., & Volkmar, F. (Eds.)(2008). *Autism spectrum disorders in infants and toddlers: Diagnosis, assessment and treatment*. New York: Guilford Press.

Chawarska, K., Macari, S., & Shic, F. (2013). Decreased spontaneous attention to social scenes in 6-month-old infants later diagnosed with autism spectrum disorders. *Biological Psychiatry, 74*, 195-203.

Chiang, C-H., Soong, W-T., Lin, T-L., & Rogers, S.J. (2008). Nonverbal communication skills in young children with autism. *Journal of Autism and Developmental Disorders, 38*, 1898-1906.

Cummins, K., Stokes, J., & Weir, H. (2013). The use of video to put interaction at the centre of supporting parents' communication with children. *Health and Social Care Education, 2* (1), 6-10.

Dawson, G. (2008). Early behavioural intervention, brain plasticity, and the prevention of autism spectrum disorder. *Development and Psychopathology, 20*, 775-803.

Dawson, G., Meltzoff, A., Osterling, J. & Rinaldi, J. (1998). Children with autism fail to orient to naturally occurring stimuli. *Journal of Autism and Developmental Disorders, 28*, 345-358.

Dawson, G., Toth, K., Abbott, R., Osterling, J., Munson, J., Estes, A., & Liaw, J. (2004). Early social attention impairments in autism: social orienting, joint attention, and attention to distress. *Developmental Psychology, 40* (2), 271-283.

Dawson, G., Rogers, S., Munson, J., Smith, M., Winter, J., Greenson, J., Donaldson, A., & Varley, J. (2010). Randomized, controlled trial of an intervention for toddlers with autism: The Early Start Denver model. *Pediatrics, 125* (1), 17-23.

Department for children, schools and families (2009). The National Strategies Early Years Inclusion Programme: supporting children on the autism spectrum. www.standards.dcsf.gov.uk.

Department for Education Standards and Testing Agency (2014). Early years foundation stage profile: handbook. www.gov.uk.

Dickinson, D.K. & Tabors, P.O. (Eds.) (2001). *Beginning literacy with language*. Baltimore: Paul H. Brookes.

Dingfelder, H. E., & Mandell, D. S. (2011). Bridging the research-to-practice gap in autism intervention: an application of diffusion of innovation theory. *Journal of Autism and Developmental Disorders*, 41, 597–609.

Dollaghan, C. (2004). Evidence-based practice in communication disorders: what do we know, and when do we know it? *Journal of Communication Disorders*, 37, 391-400.

Drew, A., Baird, G., Baron-Cohen, S., Cox, A., Slonims, V., Wheelwright, S., Swettenham, J., Berry, B., & Charman, T. (2002). A pilot randomized control trial of a parent training intervention for pre-school children with autism. Preliminary findings and methodological challenges. *European Child and Adult Psychiatry*, 11, 266-272.

Dykstra, J.R., Boyd, B.A., Watson, L.R., Crais, E.R., & Baranek, G.T. (2012). The impact of the Advancing Social-communication And Play (ASAP) intervention on preschoolers with autism spectrum disorder. *Autism*, 16, 27-44.

Eldevik, S., Hastings, R.P., Jahr, E., & Hughes, J.C. (2012). Outcomes of behavioral intervention for children with autism in mainstream pre-school settings. *Journal of Autism and Developmental Disorders*, 42 (2), 210-220.

Feinstein, A. (2010). *A History of Autism*. Chichester: Wiley-Blackwell.

Fernell, E., Hedvall, A., Norrelgen, F., et al. (2010). Developmental profiles in preschool children with autism spectrum disorders referred for intervention. *Research in Developmental Disabilities, 31* (3), 790–799.

Fleming, B., Hurley, E., & the Goth (2015). *Choosing autism interventions: a research-based guide*. Hove: Pavilion Publishing and Media Ltd.

Folstein, S., & Rutter, M. (1977). Infantile autism: a genetic study of 21 twin pairs. *Journal of Child Psychology and Psychiatry, 18*, 297-321.

Gillett, J., & LeBlanc, L. (2007). Parent-implemented natural language paradigm to increase language and play in children with autism. *Research in Autism Spectrum Disorders, 1* (3), 247–255.

Goldstein, H. (2002). Communication intervention for children with autism: a review of treatment efficacy. *Journal of Autism and Developmental Disorders, 32* (5), 373-396.

Green, J., Charman, T., McConachie, H., Aldred, C., Slonims, V., Howlin, P., Le Couteur, A., Leadbitter, K., Hudry, K., Byford, S., Barrett, B., Temple, K., Macdonald, W., Pickles, A., & the PACT consortium. (2010). Parent-mediated communication focused treatment in children with autism. *Lancet, 375* (9732), 2152 – 2160.

Green, J., Wai Wen, M., Guirand, J., Holsgrove, S., McNally, J., Slonims, V., Elsabaaagh, M., Charman, T., Pickles, A., Johnson, M.: the BASIS Team. (2013). Intervention for infants at risk of developing autism: A case series. *Journal of Autism and Developmental Disorders, 43* (11), 2502-2514.

Greenspan, S.I., & Weider, S. (1998). *The child with special needs: encouraging intellectual and emotional growth*. Reading, Mass.:Perseus Books.

Greenspan, S.I., & Weider, S. (2006). *Engaging autism*. Cambridge, Mass.: Da Capo Press.

Griffiths Mental Development Scales - Extended Revised: 2 to 8 years (GMDS-ER 2-8). (2006) (3rd Edn). Oxford: Hogrefe Publications.

Gulsrud, A., Helleman, G., Freeman, S., & Kasari, C. (2014). Two to ten years: developmental trajectories of joint attention in children with ASD who received targeted social communication interventions. *Autism Research*, 7(2), 207-15.

Gutstein, S., & Sheeley, R. (2002). *Relationship development intervention with young children: social and emotional development activities for Asperger syndrome, autism, PDD and NLD*. New York: Jessica Kingsley.

Happé, F., & Ronald, A. (2008). The 'fractionable autism triad': a review of evidence from behavioural, genetic, cognitive and neural research. *Neuropsychological Review*, 18 (4), 287-304.

Hansen, S., Schendel, D., & Parner, E. (2015). Explaining the increase in the prevalence of autism spectrum disorders: the proportion attributable to changes in reporting practices. *Pediatrics*, 169 (1), 56-62.

Hardan, A.Y., Gengoux, G.W., Berquist, K.L., Libove, R.A., Ardel, C.M., Phillips, J., Frazier, T.W., & Minjarez, M.B. (2014). A randomized controlled trial of pivot response treatment for parents of children with autism. *Journal of Child Psychology and Psychiatry*, online 27 Oct, 2014, DOI: 10. 1111/jcpp.12354.

- Harris, S., Kasari, C., & Sigman, M. D. (1996). Joint attention and language gains in children with Down syndrome. *American Journal on Mental Retardation*, 100, 608-619.
- Hedvall, A., Fernell, E., Holm, A., Johnels, J., Gillberg, C., & Billstedt, E. (2013). Autism, processing speed, and adaptive functioning in preschool children. *The Scientific World Journal*. Volume 2013, article ID: 158263.
- Hobson, R.P. (1990). On psychoanalytical approaches to autism. *American Journal of Orthopsychiatry*, 60 (3), 324–336.
- Hobson, R.P. (1993, reprinted 2004). *Autism and the development of mind*. Hove: Psychology Press.
- Hobson, R.P. (2002). *The cradle of thought. Exploring the origins of thinking*. London: Panmacmillan.
- Hobson, R.P. (2014). The coherence of autism. *Autism*, 18 (6), 6-15.
- Horner, R.H., Carr, E.G., Halle, J., Odom, S., & Wolery, M. (2005). The use of single-subject research to identify evidence-based practice in special education. *Exceptional Children*, 71 (2), 165-179.
- Howlin, P., Goode, S., Hutton, J., & Rutter, M. (2004). Adult outcome for children with autism. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, 45 (2), 212–229.
- Hulme, C., & Snowling, M. (2009). *Developmental disorders of language learning and cognition*. London: Wiley-Blackwell.

Hwang, B., & Hughes, C. (2000). The effects of social interactive training on early social communicative skills of children with autism. *Journal of Autism and Developmental Disorders*, 30 (4), 331-343.

Ibanez, L., Grantz, C. & Messinger, D. (2012). The development of referential communication and autism symptomatology in high-risk infants. *Infancy*, 1-21.

Information Analysis Directorate (2014). *The prevalence of autism (including Aspergers syndrome) in school age children*. Department of Health, Social Services and Public Safety. Downloaded from www.dhsspsni.gov.uk/iad.htm.

Ingersoll, B. (2008). The social role of imitation in autism: implications for the treatment of imitation deficits. *Infants & Young Children*, 21 (2), 107–119.

Ingersoll, B. (2010). Teaching social communication: a comparison of naturalistic behavioural and development, social pragmatic approaches for children with autism spectrum disorders. *Journal of Positive Behaviour Interventions*, 12 (33), 33-43.

Ingersoll, B., & Schreibman, L. (2006). Teaching reciprocal imitation skills to young children with ASD using a naturalistic behavioural approach: effects on language, pretend play, and joint attention. *Journal of Autism and Developmental Disorders*, 36 (4), 487-505.

Ingersoll, B., & Lalonde, K. (2010). The impact of object and gesture imitation training on language use in children with autism spectrum disorder. *Journal of Speech, Language, and Hearing Research*. 53, 1040-1051.

Johnson, C.P. (2008). Recognition of autism before age 2 years. *Pediatrics in Review*, 29, 86-96.

- Jones, E., Gliga, T., Bedford, R., Charman, T., & Johnson, M. (2014). Developmental pathways to autism: a review of prospective studies of infants at risk. *Neuroscience and Biobehavioural Reviews*, 39, 1-33.
- Juneja, M., Mukherjee, S., Sharma, S., Jain, R., Das, B., & Sabu, P. (2012). Evaluation of a parent-based behavioural intervention program for children with autism in a low-resource setting. *Journal of Pediatric Neuroscience*, 7 (1), 16-18.
- Kaale, A., Smith, L., & Sponheim, E. (2012). A randomised controlled trial of preschool-based joint attention intervention for children with autism. *Journal of Child Psychology and Psychiatry*, 53, 97-105.
- Kaale, A., Fagerland, M., Martinsen, E., & Smith, L. (2014). Preschool-based social communication treatment for children with autism: 12-month follow-up of a randomised trial. *Journal of the Academy of Child & Adolescent Psychiatry*, 53 (2), 188-198.
- Kanner, L. (1943). Autistic disturbances of affective contact. *Nervous Child*, 2, 217-50. Reprinted (1968). *Acta Paedopsychiatrica*, 35 (4), 100-36.
- Kasari, C., Sigman, M., Mundy, P., & Yirmiya, N. (1988). Caregiver interactions with autistic children. *Journal of Abnormal Child Psychology*, 16, 45-56.
- Kasari, C., Freeman, S., & Paparella, T. (2006). Joint attention and symbolic play in young children with autism: a randomised controlled intervention study. *Journal of Child Psychology and Psychiatry*, 47 (6), 611-620.
- Kasari, C., Paparella, T., Freeman, S., & Jahromi, L. (2008). Language outcome in autism: randomised comparison of joint attention and play interventions. *Journal of Consulting and Clinical Psychology*. 76 (1), 125-137.

- Kasari, C., Gulsrud, A.C., Wong, C., Kwon, S., & Locke, J. (2010). Randomised controlled caregiver mediated joint engagement intervention for toddlers with Autism. *Journal of Autism and Developmental Disorders*, 40, 1045-1056.
- Kashinath, S., Woods, J., & Goldstein, H. (2006). Enhancing generalised teaching strategy use in daily routine by parents of children with autism. *Journal of Speech, Language, and Hearing Research*, 49, 466-485.
- Keen, D., Sigafoos, J., & Woodyatt, G. (2005). Teacher responses to the communicative attempts of children with autism. *Journal of Developmental and Physical Disabilities*, 17 (1), 19-33.
- Koegel, R. L., & Koegel, L. K. (Eds.) (1995). *Teaching children with autism: Strategies for initiating positive interactions and improving learning opportunities*. Baltimore: Paul H. Brookes.
- Koegel, L. K. (1995). Communication and language intervention. In R. L. Koegel & L. K. Koegel (Eds.), *Teaching children with autism: Strategies for initiating positive interactions and improving learning opportunities* (pp.17–32). Baltimore: Paul H. Brookes.
- Koegel, L. K. (2000). Interventions to facilitate communication in autism. *Journal of Autism and Developmental Disorders*, 30, 383-392.
- Koegel, R. L., & Koegel, L. K. (2006). *Pivotal Response Treatments for autism: communication, social, and academic development*. Baltimore: Paul H. Brookes.
- Koegel, L.K., Koegel, R.L., Fredeen, R.M., & Gengoux, G.W. (2008). Naturalistic behavioural approaches to treatment. In K. Chawarska, A. Klin, & F. Volkmar (Eds.) *Autism spectrum disorders in infants and toddlers: Diagnosis, assessment and treatment* (pp. 207-242). New York: Guilford Press.

Kogan, M., Blumberg, S., Schieve, L., Boyle, C., Perrin, J., Ghandour, R., Singh, G., Strickland, B., Trevathan, E., & van Dyck, P. (2009). Prevalence of parent-reported diagnosis of autism spectrum disorder among children in the US, 2007. *Pediatrics*, 124 (5), 1395-403.

Kosyvaki, L., Jones, G., & Guldberg, K. (2012). The effect of adult interactive style on the spontaneous communication of young children with autism at school. *Journal of research in special educational needs*, 39 (4), 173-184.

Kosyvaki, L., Jones, G., & Guldberg, K. (2014). Training teaching staff to facilitate spontaneous communication in children with autism: adult interactive style intervention (AISI). *Journal of research in special educational needs*. DOI: 10.1111/1471-3802.12068.

Kuhl, P. (2010). Brain mechanisms in early language acquisition. *Neuron*, 67(5), 713–727.

Landa, R. (2008). Diagnosis of autism spectrum disorders in the first 3 years of life. *Nature Clinical Practice Neurology*, 4, 138-147.

Landa, R., & Garrett-Mayer, E. (2006). Development in infants with autism spectrum disorders: a prospective study. *Journal of Child Psychology and Psychiatry*, 47, 629-638.

- Landa, R.J., Holman, K.C., O'Neill, A.H., & Stuart, E.A. (2011). Intervention targeting development of socially synchronous engagement in toddlers with autism spectrum disorder: A randomised controlled trial. *Journal of Child Psychology and Psychiatry*, 52, 13-21.
- Laushey, K., & Heflin, L. (2000). Enhancing social skills of kindergarten children with autism through the training of multiple peers as tutors. *Journal of Autism and Developmental Disorders*, 30 (3), 183-193.
- Leekham, S.R., Lopez, B., & Moore, C. (2000). Attention and joint attention in pre-school children with autism. *Developmental Psychology*, 36, 261-273.
- Leekham, S., & Ramsden, C. (2006). Dyadic orienting and joint attention in preschool children with autism. *Journal of Autism and Developmental Disorders*, 36 (2), 185-197.
- Lieberman, R., & Yoder, P. (2012). Play and communication in children with autism spectrum disorder: a framework for early intervention. *Journal of Early Intervention*, 34 (2), 82-103.
- Lord, C., Risi, S., Lambrecht, L., Cook, E., Leventhal, B., DiLavore, P., Pickles, A., & Rutter, M. (2000). Autism Diagnostic Observation Schedule – Generic: A standard measure of social and communication deficits associated with the spectrum of autism. *Journal of Autism and Developmental Disorders*, 30 (3), 205-223.
- Lord, C., Rutter, M., DiLavore, P., Risi, S., Gotham, K., Bishop, S., Luyster, R., & Guthrie, W. (2012). *Autism Diagnostic Observation Schedule, (2nd Edn): ADOS-2*. Los Angeles, CA : Western Psychological Services

- Lord, C., Wagner, A., Rogers, S., Szatmari, P., Aman, M., Charman, T., Dawson, G., Durand, M., Grossman, L., Guthrie, D., Harris, S., Kasari, C., Marcus, L., Murphy, S., Odom, S., Pickles, A., Scahill, L., Shaw, E., Siegel, B., Sigman, M., Stone, W., Smith, T., & Yoder, P. (2005). Challenges in evaluating psychosocial interventions for autistic spectrum disorders. *Journal of Autism and Developmental Disorders*, 35(6), 695-708; discussion 709-11.
- Lovaas, O. (1977). *The autistic child: language development through behaviour modification*. New York: Irvington.
- Luyster, R., Kadlec, M., Carter, A., & Tager-Flusberg, H. (2008). Language assessment and development in toddlers with autism spectrum disorders. *Journal of Autism and Developmental Disorders*, 38, 1426–1438.
- Magiati, I., Charman, T., & Howlin, P. (2007). A two-year prospective follow-up study of community-based early intensive behavioural intervention and specialist nursery provision for children with autism spectrum disorders. *Journal of Child Psychology and Psychiatry*, 48 (8), 803-812.
- Maljaars, J., Noens, I., Jansen, R., Scholte, E., & van Berckelaer-Onnes, I. (2011). Intentional communication in nonverbal and verbal low-functioning children with autism. *Journal of Communication Disorders*, 44, 601-614.
- Matson J., & Shoemaker M. (2009). Intellectual disability and its relationship to autism spectrum disorders. *Research in Developmental Disabilities*, 30(6), 1107-1114.
- Matson, J., Worley, J., Fodstad, J., Chung, K-M., Suh, D., Jhin, H., Ben-Itzhak, E., Zacor, D., & Furmiss, F. (2011). A multinational study examining the cross cultural differences in reported symptoms of autism spectrum disorders: Israel, South Korea, the United Kingdom, and the United States of America. *Research in Autism Spectrum Disorders*, 5 (4), 1598-1604.

Manolson, A. (1992). *It takes two to talk*. Toronto, Canada: The Hanen Center.

McConachie, H., & Diggle, T. (2006). Parent implemented early intervention for young children with autism spectrum disorder: a systematic review. *Journal of Evaluation in Clinical Practice*, 13 (1), 120-129.

McConnell, S. (2002). Interventions to facilitate social interaction for young children with autism: review of available research and recommendations for educational intervention and research. *Journal of Autism and Developmental Disorders*, 32 (5), 351-372.

Meadan, H., Ostrosky, M., Zaghlawan, H., & SeonYeong, Y. (2009). Promoting the social and communicative behavior of young children with autism spectrum disorders: a review of parent-implemented intervention studies. *Topics in Early Childhood Special Education*, 29 (2), 90-104.

Meltzoff, A. (1999). Origins of theory of mind, cognition and communication. *Journal of Communication Disorders*, 32, 251-269.

Mercer, L., Creighton, S., Holden, J., & Lewis, M. (2006). Parental perspectives on the causes of an autism spectrum disorder in their children. *Journal of Genetic Counselling*, 15 (1), 41-163.

Mesibov, G., & Shea, V. (2011). Evidence-based practices and autism. *Autism*, 15 (1), 114-133.

Mosconi, M., Reznick, J., Mesibov, G., & Piven, J. (2009). The Social Orienting Continuum and Response Scale (SOC-RS): A dimensional measure for preschool-aged children. *Journal of Autism and Developmental Disorders*, 39 (2), 242-250.

Mundy, P., Sigman, M., & Kasari, C. (1994). Joint attention, developmental level, and symptom presentation in autism. *Development and Psychopathology*, 6 (3), 389-401.

Nadel, J., & Aouka, N. (2006). Imitation: some cues for intervention approaches in autism spectrum disorders. In T. Charman, & W. Stone (Eds.), *Social & communication development in autism spectrum disorders: Early identification, diagnosis, & intervention* (pp. 219-235). New York/London: Guilford Press.

National Research Council. (2001). *Educating children with autism*. Washington, DC: National Academy Press, Committee on educational interventions for children with autism, Division of behavioural and social sciences and education.

National Institute for Health and Clinical Excellence (NICE). (2011). *Autism diagnosis in children and young people: recognition, referral and diagnosis of children and young people on the autism spectrum*. NICE Clinical Guideline 128. Sept 2011, <http://guidance.nice.org.uk/cg128>.

National Institute for Health and Care Excellence (NICE). (2013). *Autism: the management and support of children and young people on the autism spectrum*. NICE Clinical Guideline 170. August 2013, <http://guidance.nice.org.uk/cg170>.

Nelson, C., Nelson, A., McDonnell, A., Johnston, S., & Crompton, A. (2007). Keys to Play: a strategy to increase the social interaction of young children with autism and their typically developing peers. *Education and Training in Developmental Disabilities*, 42 (2), 165-181.

Nickels, N., Howard, D., & Best, W. (2011). On the use of different methodologies in cognitive neuropsychology: drink deep and from several sources. *Cognitive Neuropsychology*, 28 (7), 475-485.

Odom, S., Brown, W., Frey, T., Karasu, N., Smith-Carter, L., & Strain, P. (2003). Evidence-based practices for young children with autism: Evidence from single subject design research. *Focus on Autism, 18*, 176-181.

Odom, S. L., Boyd, B., Hall, L., & Hume, K. (2010). Evaluation of comprehensive treatment models for individuals with autism spectrum disorders. *Journal of Autism and Developmental Disorders, 40*, 425-436.

Odom, S. L., Collet-Klingenberg, L., Rogers, S., & Hatton, D. (2010). Evidence-based practices for children and youth with autism spectrum disorders. *Preventing School Failure, 54*, 275-282.

Odom, S. L., Hume, K., Boyd, B., & Stabel, A. (2012). Moving beyond the intensive behavior therapy vs. eclectic dichotomy: Evidence-based and individualized program for students with autism. *Behavior Modification, 36* (3), 270-297.

Odom, S. L., Cox, A., & Brock, M. (2013). Implementation science, professional development, and autism spectrum disorders: National Professional Development Center on ASD. *Exceptional Children, 79*, 233-251.

Ospina, M., Seida, J., Clark, B., Karkhaneh, M., Hartling, L., Tjosvold, L., Vandermeer, B., & Smith, V. (2008). Behavioural and developmental interventions for autism spectrum disorder: a clinical systematic review. *PLoS ONE, 3* (11), e3755.

Osterling, J., & Dawson, G. (1994). Early recognition of 1 year infants with autism: a study of first birthday home videotapes. *Journal of Autism and Developmental Disorders, 24*, 247-257.

Ozonoff, S., Young, G., Carter, A., Messinger, D., Yermiya, N., Zwaigenbaum, M., Bryson, S., Carver, L., Constantino, M., Dobkins, K., Hutman, T., Iverson, J., Landa, R., Rogers, S., Sigman, M., & Stone, W. (2011). Recurrence risk for autism spectrum disorders: a baby siblings research consortium study. *Pediatrics*, 128 (3), 2010-2825.

Pasco, G., Gordon, R. K., Howlin, P., & Charman, T. (2008). The Classroom Observation Schedule to Measure Intentional Communication (COSMIC): an observational measure of the intentional communication of children with autism in an unstructured classroom setting. *Journal of Autism and Developmental Disorders*, 38 (10), 1807-1818.

Pajareya, K., & Nopmaneejumruslers, K. (2011). A pilot randomized controlled trial of DIR/Floortime parent training intervention for pre-school children with autistic spectrum disorders. *Autism*, 15 (5), 563-577.

Parner E., Schendel D., & Thorsen P. (2008). Autism prevalence trends over time in Denmark: changes in prevalence and age at diagnosis, *Archive of Pediatric Adolescent Medicine*, 162 (12),1150-6.

Patterson, S., Elder, L., Gulsrud, A., & Kasari, C. (2014). The association between parental interaction style and children's joint engagement in families with toddlers with autism. *Autism*, 18 (5), 511-518.

Piaget, J. (1952). *The origins of intelligence*. New York: International University Press.

Pickard, K., & Ingersoll, I. (2015). Brief report: high and low level initiations of joint attention and response to joint attention: differential relationships with language and imitation. *Journal of Autism and Developmental Disorders*, 45, 262-268.

- Poon, K., Watson, L., Baranek, G., & Poe, M. (2012). To what extent do joint attention, imitation and object play behaviours in infancy predict later communication and intellectual functioning in ASD? *Journal of Autism and Developmental Disorders*, 42, 1064-1074.
- Pring, T. (2004). Ask a silly question: two decades of troublesome trials. *International Journal of Language & Communication Disorders*, 39 (3), 285-302.
- Pring, T. (2005). *Research methods in communication disorders*. London: Whurr.
- Prior, M., Roberts, J., Rodger, S., Williams, K., & Sutherland, R. (2011). *A review of the research to identify the most effective models of practice in early intervention of children with autism spectrum disorders*. Australian Government Department of Families, Housing, Community Services and Indigenous Affairs, Australia.
- Prizant, B., & Wetherby, A. (1998). Understanding the continuum of discrete-trial traditional behavioral to social-pragmatic developmental approaches to communication enhancement for young children with autism/PDD. *Seminars in Speech and Language*, 19, 329–353.
- Prizant, B.M., Wetherby, A.M., & Rydell, P. (2000). Communication intervention issues for children with autism spectrum disorders. In A.Wetherby, & B. Prizant (Eds.) *Autism spectrum disorders: a transactional developmental perspective*. (Vol 9). Communication and Language Intervention Series. Baltimore: Paul Brookes.
- Prizant, B. M., Wetherby, A. M., Rubin, E., & Laurent, A. C. (2003). The SCERTS model: A transactional, family-centered approach to enhancing communication and socioemotional abilities of children with autism spectrum disorder. *Infants and Young Children*, 16, 296-316.

- Prizant, B.M., Wetherby, A.M., Rubin, E., Laurent, A.C., & Rydell, P. (2006). *The SCERTS Model: A comprehensive approach for children with autism spectrum disorders*. Baltimore: Brookes.
- Reichow, B., & Volkmar, F. (2010). Social skills interventions for individuals with autism: evaluation for evidence-based practices within a best evidence synthesis framework. *Journal of Autism and Developmental Disorders*, 40, 149-166.
- Reichow, B., Barton, E., Boyd, E., & Hume, K. (2012). Early intensive behavioral intervention (EIBI) for young children with autism spectrum disorders. *Cochrane Database Systematic Review*, Oct 17, 10:CD009260.
- Remington, A., Swettenham, J., Campbell, R., & Coleman, M. (2009). Selective attention and perceptual load in autism spectrum disorder. *Psychological Science*, 20, 1388-1393.
- Research Autism (2014). *Intellectual ability and autism* (online). www.researchautism.net/intellectual-ability (accessed July 5, 2015).
- Rickards, A., Walstab, J., Wright-Rossi, R., Simpson, J., Reddiough, D. (2007). A randomized, controlled trial of a home-based intervention program for children with autism and developmental delay. *Journal of Developmental Behavioral Pediatrics*, 28, 308-316.
- Robey, R. R. (2004). A five-phase model for clinical-outcome research. *Journal of Communication Disorders*, 37, 401-411.
- Robey, R. R., & Schultz, M. C. (1998). A model for conducting clinical outcome research: an adaptation of the standard protocol for use in aphasiology. *Aphasiology*, 12, 787-810.

- Rogers, E.M. (2003). *Diffusions of innovations (5th edition)*. New York: Free Press.
- Rogers, S. J. (2000). Interventions that facilitate socialization in children with autism. *Journal of Autism and Developmental Disorders*, 30 (5), 399-409.
- Rogers, S.J. (2006). Evidence-based Interventions for language development in young children with autism. In T. Charman & W.Stone, (Eds.). *Social and communication development in autism spectrum disorders*. New York/London: Guilford Press.
- Rogers, S.J. (2009). What are infant siblings teaching us about autism in infancy? *Autism Research*, 2 (3), 125-137.
- Rogers, S., Vismara, L., Wagner, A., McCormick, C., Young, G., & Ozonoff, S. (2014). Autism treatment in the first year of life: a pilot study of infant start, a parent-implemented intervention for symptomatic infants. *Journal of Autism and Developmental Disorders*, 44, 2981-2995.
- Rozga, A., Hutman, T., Young, G.S., Rogers, S.J., Ozonoff, S., Dapretto, M., & Sigman, M. (2011). Behavioral profiles of affected and unaffected siblings of children with autism: contribution of measures of mother–infant interaction and nonverbal communication. *Journal of Autism and Developmental Disorders*, 41, 287–301.
- Rutter, M., Kreppner, J., O’Connor, T., and the English and Romanian Adoptees (ERA) study team. (2001). Specificity and heterogeneity on children’s responses to profound institutional deprivation. *British Journal of Psychiatry*, 179, 97-103.
- Rutter, M. (2011). Progress in understanding autism: 2007-2010. *Journal of Autism and Developmental Disorders*, 41, 395-404.

Rutter, M. (2013). Changing concepts and findings on autism. *Journal of Autism and Developmental Disorders*, 43, 1749-1757.

Schertz, H., & Odom, S. (2007). Promoting joint attention in toddlers with autism: a parent-mediated developmental model. *Journal of Autism and Developmental Disorders*. 37, 1562-1575.

Schertz, H., Odom, S., Baggett, K., & Sideris, J. (2013). Effects of joint attention mediated learning for toddlers with autism spectrum disorders: an initial randomized controlled study. *Early Childhood Research Quarterly*, 28, 249-258.

Schopler, E. (2005). Comments on 'Challenges in evaluating psychosocial interventions for autistic spectrum disorders'. *Journal of Autism and Developmental Disorders*, 35 (6), 709-711.

Schopler, E., Reichler, R., & Renner, B. (2002). *The Childhood Autism Rating Scale (CARS)*. Los Angeles, USA: Western Psychological Services.

Scruggs, T., Mastropieri, M., & Casto, G. (1987). The quantitative synthesis of single subject research: methodology and validation. *Remedial and Special Education*, 8 (2), 24-33.

Shic, F., Macari, S., & Chawarska, K. (2014). Speech disturbs face scanning in 6-month-old infants who develop autism spectrum disorder. Archival Report. *Biological Psychiatry*, 75, 231-237.

Shields, J. (2001). The NAS EarlyBird Programme: partnership with parents in early intervention. The National Autistic Society. *Autism*, 5 (1), 49-56.

Siebert, J., Hogan, A., & Mundy, P. (1982). Assessing interactional competencies: The early social-communication scales. *Infant Mental Health Journal*, 3 (4), 244-258.

- Siegel, B. (2008). *Getting the best for your child with autism*. New York: The Guilford Press.
- Sigman, M., & Ruskin, E. (1999). Continuity and change in the social competence of children with autism, Down syndrome, and developmental delays. *Monograph of the Society for Research in Child Development*, 64 (1), serial no. 256.
- Silberman, S. (2015). *Neurotribes: the legacy of autism and how to think smarter about people who think differently*. London: Allen & Unwin.
- Siller, M., & Sigman, M. (2002). The behaviours of parents of children with autism predict the subsequent development of their child's communication. *Journal of Autism and Developmental Disorders*, 32 (2), 77-89.
- Siller, M., Hutman, T., & Sigman, M. (2013). A parent-mediated intervention to increase responsive parental behaviours and child communication in children with ASD: a randomized clinical trial. *Journal of Autism and Developmental Disorders*, 43, 540-555.
- Smith T. (1999). Outcome of early intervention for children with autism. *Clinical Psychology: Science and Practice*, 6, 33-49.
- Smith, T. (2012). Evolution of research on interventions for individuals with autism spectrum disorder: implications for behavior analysis. *Behavior Analysis*, 35, 101-113.
- Smith, T., Scahill, L., Dawson, G., Guthrie, D., Lord, C., Odom, S., Rogers, S., & Wagner. (2007). Designing research studies on psychosocial interventions in autism. *Journal of Autism and Developmental Disorders*, 37, 354-366.

Solomon, R., Van Egeren, L., Mahoney, G., Quon Huber, M., & Zimmerman, P. (2014). PLAY project home consultation intervention program for young children with autism spectrum disorders: a randomized controlled trial. *Journal of Developmental Behavioral Pediatrics, 35*, 475-485.

Snow, C., & Ferguson, C. (Eds.) (1978). *Talking to children: language input and acquisition*. Cambridge: Cambridge University Press.

Stickles Good, K., Ishijima, E., Chang, Y-C., & Kasari, C. (2013). Preschool based JASPER intervention in minimally verbal children with autism: pilot RCT. *Journal of Autism and Developmental Disorders, 43*, 1050-1056.

Steiner, A., Gengoux, G., Klin, A., & Chawarska, K. (2013). Pivotal Response Treatment for infants at-risk for autism spectrum disorders: a pilot study. *Journal of Autism and Developmental Disorders, 43*, 91-102.

Stone, W., & Yoder, P. (2001). Predicting spoken language level in children with autism spectrum disorders. *Autism, 5*, 341-361.

Swettenham, J., Baron-Cohen, S., Charman, T., Cox, A., Baird, G., Drew, A., Rees, L., & Wheelwright, S. (1998). The frequency and distribution of spontaneous attention shifts between social and non-social stimuli in autistic, typically-developing and non-autistic developmentally delayed infants. *Journal of Child Psychology and Psychiatry, 39*, 747-754.

Sullivan, M., Finelli, J., Marvin, A., Garret-Mayer, E., Bauman, M., & Landa R. (2007). Response to joint attention in toddlers at risk for autism spectrum disorders: a prospective study. *Journal of Autism and Developmental Disorders, 37*, 37-48.

Sussman, F. *More than words*. (1999). Ontario: Hanen Publication.

- Thompson, C. (2006). Single subject controlled experiments in aphasia: the science and the state of the science. *Journal of Communication Disorders*, 39, 266-291.
- Thompson, C. (2014). Establishing the effects of treatment for aphasia using single-subject-controlled experimental designs, *Aphasiology*, DOI:10.1080/02687038.2014.987043.
- Tomasello, M., & Farrar, J.M. (1986). Joint attention and early language. *Child Development*, 57, 1454-1463.
- Tomasello, M. (2003). *Constructing a language: a usage-based theory of language acquisition*. Cambridge, Mass.: Harvard University Press.
- Toth, K., Munson, J., Meltzoff, A., & Dawson, G. (2006). Early predictors of communication development in young children with autism spectrum disorders: joint attention, imitation and toy play. *Journal of Autism and Developmental Disorders*, 36, 993-1005.
- Trevarthen, C. & Hubley, P. (1978). Secondary intersubjectivity: Confidence, confiding and acts of meaning in the first year. In A. Lock (Ed.) *Action, gesture and symbol: the emergence of language* (pp.183–229). London: Academic Press.
- Turk, J. (2011). *Neurodevelopmental disorders – complexities and dilemmas*. Paper presented at Research Autism Conference. The ‘autisms’: important perspectives on autism. May 19th. London. Paper available from www.researchautism.org.uk.
- Veness, C., Prior, M., Bavin, E., Eadie, P., Cini, E., & Reilly, S. (2012). Early indicators of autism spectrum disorders at 12 and 24 months: a prospective longitudinal comparative study. *Autism*, 16 (2), 163-277.

Vivanti, G., Paynter, J., Duncan, E., Fothergill, H., Dissanayake, C., Rogers, S., & the Victorian ASELCC Team. (2014). Effectiveness and feasibility of the Early Start Denver Model implemented in a group-based community childcare setting. *Journal of Autism and Developmental Disorders*, 44, 3140-3153.

Vygotsky, L. (1978). *Mind in Society*. Cambridge, Mass.: Harvard University Press.

Wallace, K., & Rogers, S. (2010). Intervening in infancy: implications for autism spectrum disorders. *Journal of Child Psychology and Psychiatry*, 51 (12), 1300-1320.

Wachtel, K., & Carte, A. (2008). Reaction to diagnosis and parenting styles among mothers of young children with ASDs. *Autism*, 12 (5), 575-594.

Warren, Z., McPheeters, M., Sathe, N., Foss-Feig, J., Glasser, A., & Veenstra-Vanderweele, J. (2011). A systematic review of early intensive intervention for autism spectrum disorders. *Pediatrics*, 127, 1303-1311.

Warreyn, P., & Roeyers, H. (2014). See what I see, do as I do: Promoting joint attention and imitation in preschoolers with autism spectrum disorder. *Autism*, 18 (6), 658-671.

Weider, S. & Greenspan, S. (2003). Climbing the symbolic ladder in the DIR model through floor time/interactive play. *Autism*, 7 (4), 425-35.

Werner, H., & Kaplan, B. (1963). *Symbol formation*. Wiley: New York.

Werner, E., Dawson, G., Osterling, J., & Dinno, N. (2000). Brief report: recognition of autism spectrum disorder before one year of age: a retrospective study based on home videotapes. *Journal of Autism and Developmental Disorders*, 30, 157-162.

Wetherby, A., & Prizant, B. (Eds.) (2000). *Autism spectrum disorders: a transactional developmental perspective* (Vol 9). Communication and Language Intervention Series. Baltimore: Paul Brookes.

Wetherby, A., & Prizant, B. (2003). *Communication and Symbolic Behaviour Scales (CSBS)*. Baltimore: Paul Brookes.

Wetherby, A.M., & Woods, J.J. (2006). Early social interaction project for children with autism spectrum disorders beginning in the second year of life: a preliminary study. *Topics in Early Childhood Special Education, 26* (67), 67-82.

Whalen, C., & Schreibman, L. (2003). Joint attention training for children with ASD using behaviour modification procedures. *Journal of Child Psychology and Psychiatry, 44*, 456-468.

Whalen, C., Schreibman, L., & Ingersoll, B. (2006). The collateral effects of joint training on social initiations, positive affect, imitation and spontaneous speech for young children with ASD. *Journal of Autism and Developmental Disorders, 36*, 655-664.

White, P., O'Reilly, M., Streusand, W., Levine, A., Sigafos, J., Lancioni, G., Fragate, C., Pierce, N., & Aguilar, J. (2011). Best practices for teaching joint attention: a systematic review of the intervention literature. *Research in Autism Spectrum Disorders, 5*, 1283-1295.

Wilcox-Herzog, A., & Kontos, S. (1998). The nature of teacher talk in early childhood classrooms and its relationship to children's play with objects and peers. *The Journal of Genetic Psychology: Research and Theory on Human Development, 159* (1), 30-44.

Wing, L., & Gould, J. (1979). Severe impairments of social interaction and associated abnormalities in children: epidemiology and classification. *Journal of Autism and Developmental Disorders*, 9 (1), 11-29.

Winner, M. (2007). *Thinking about you, thinking about me*. San Jose, CA: Think Social Publishing (2nd edn.).

Wolery, M., & Garfinkle, A. (2002). Measures in intervention research with young children with autism. *Journal of Autism and Developmental Disorders*, 32 (5), 463-478.

Wolery, M., & Dunlap, G. (2001). Reporting on studies using single-subject experimental methods. *Journal of Early Intervention*, 24, 85-89.

Wolfberg, P. (2003). *Peer play and the autism spectrum: the art of guiding children's socialisation and imagination*. Shawnee, KS: Autism Asperger Publications.

Wolfberg, P., & Schuler, A. (2006). Promoting social reciprocity and symbolic representation in children with autism spectrum disorders. In T. Charman and Stone, W. (Eds.) *Social and communication development in autism spectrum disorders*. New York/London: Guilford Press.

Wolfberg, P., DeWitt, M., Young, G., & Nguyen, T. (2015). Integrated Play Groups: promoting symbolic play and social engagement with typical peers in children with ASD across settings. *Journal of Autism and Developmental Disorders*, 45, 830-845.

Wong, C. (2013). A play and joint attention intervention for teachers of young children with autism: a randomised controlled pilot study. *Autism*, 17 (3), 340-357.

Wong, C., & Kasari, C. (2012). Play and joint attention of children with autism in the preschool special education classroom. *Journal of Autism and Developmental Disorders*, 42, 2152-2161.

Wong, C., Odom, S., Hume, K., Cox, A., Fettig, A., Kucharczyk, S., Brock, M., Plavnik, J., Fleury, P., & Schultz, T. (2014). *Evidence-based practices for children, youth, and young adults with autism spectrum disorder*. Chapel Hill: The University of North Carolina, Frank Porter Graham Child Development Institute, Autism Evidence-Based Practice Review Group.

Yoder, P. (2005). Challenges in evaluating psychosocial interventions for autistic spectrum disorders. *Journal of Autism and Developmental Disorders*, 35 (6), 695-708.

Yoder, P., & Stone, W. (2006). Randomized comparison of two communication interventions for preschoolers with autism spectrum disorders. *Journal of Consulting and Clinical Psychology*, 74 (3), 426-435.

Yoder, P., & Warren, S. (2001). Relative treatment effects of two prelinguistic communication interventions on language development in toddlers with developmental delays vary by maternal characteristics. *Journal of Speech and Language Hearing Research*, 44, 224-237.

Yuen, R., Thiruvahindrapuram, B., Merico, D., Walker, S., Tammimies, K., Hoang, N., Chrysler, C., et al. (2015). Whole-genome sequencing of quartet families with autism spectrum disorder. *Nature Medicine*, 21, 185-191.

Zwaigenbaum, L., Bryson, S., Rogers, S., Roberts, W., & Szatmari, P. (2007). Behavioral manifestations of autism in the first year of life. *International Journal of Developmental Neuroscience*, 23, 143-152.

Zwaigenbaum, L., Bryson, S., Lord, C., Rogers, S., Carter, A., Carver, L., Chawarska, K., Constantino, J., Dawson, G., Dobkins, K., Fein, D., Iverson, J., Klin, A., Landa, R., Messinger, D., Ozonoff, S., Sigman, M., Stone, W., Tager-Flusberg, H., & Yirmiya, N. (2009). Clinical assessment and management of toddlers with suspected autism spectrum disorder: insights from studies of high-risk infants. *Pediatrics*, 123, 1383-1391.

APPENDICES

Appendix 1: Diagnostic Criteria for Autism Spectrum Disorder (APA, 2015)

Appendix 2: Information and Consent Forms

Appendix 3: SCIP Staff Power Point Training

Appendix 4: Coding Forms

Appendix 5: Coding Protocols

Appendix 1: Diagnostic Criteria for Autism Spectrum Disorder (APA, 2013)

The following criterion is from the 2013 Diagnostic and Statistical Manual of Mental Disorders Fifth Edition, DSM-5™. See the DSM-5™ for details and examples.

DSM 5™ 299.0 (F84.0)

A. Persistent deficits in social communication and social interaction across multiple contexts, as manifested by the following, currently or by history (examples are illustrative, not exhaustive; see text):

1. Deficits in social-emotional reciprocity, ranging, for example, from abnormal social approach and failure of normal back-and-forth conversation; to reduced sharing of interests, emotions or affect, to failure to initiate or respond to social interactions.
2. Deficits in nonverbal communicative behaviors used for social interaction; ranging for example, from poorly integrated verbal and nonverbal communication; to abnormalities in eye contact and body language or deficits in understanding and use of gestures; to lack of facial expressions and nonverbal communication.
3. Deficits in developing, maintaining, and understanding relationships, ranging, for example, from difficulties adjusting behavior to suit various social contexts, to difficulties in sharing imaginative play or in making friends, to absence of interest in peers.

Specify current severity:

Severity is based on social communication impairments and restricted, repetitive patterns of behavior [Level 3 – “Requiring very substantial support,” Level 2 – “Requiring substantial support,” Level 1 – “Requiring support.”]

B. Restricted, repetitive patterns of behavior, interests, or activities, as manifested by at least two of the following, currently or by history (examples are illustrative, not exhaustive; see text):

1. Stereotyped or repetitive motor movements, use of objects, or speech (e.g.; simple motor stereotypes, lining up toys or flipping objects, echolalia, idiosyncratic phrases).
2. Insistence on sameness, inflexible adherence to routines, or ritualized patterns of verbal or nonverbal behavior (e.g., extreme distress at small changes, difficulties with transitions, rigid thinking pattern, greeting rituals, need to take same route or eat same food every day).
3. Highly restricted, fixated interests that are abnormal in intensity or focus (e.g., strong attachment to or preoccupation with unusual objects, excessively circumscribed or perseverative interests).
4. Hyper- or hyporeactivity to sensory input or unusual interest in sensory aspects of the environment (e.g., apparent indifference to pain/temperature, adverse response to specific sounds or textures, excessive smelling or touching of objects, visual fascination with lights or movement).

Specify current severity:

Severity is based on social communication impairments and restricted, repetitive patterns of behavior [Level 3 – “Requiring very substantial support,” Level 2 – “Requiring substantial support,” Level 1 – “Requiring support.”]

C. Symptoms must be present in the early developmental period (but may not become fully manifest until social demands exceed limited capacities, or may be masked by learned strategies in later life).

D. Symptoms cause clinically significant impairment in social, occupational, or other important areas of current functioning.

E. These disturbances are not better explained by intellectual disability (intellectual developmental disorder) or global developmental delay. Intellectual disability and autism spectrum disorder frequently co-occur; to make comorbid diagnoses of autism spectrum disorder and intellectual disability, social communication should be below that expected for general developmental level.

Note: Individuals with a well-established DSM-IV diagnosis of autistic disorder, Asperger’s disorder, or pervasive developmental disorder not otherwise specified should be given diagnosis of autism spectrum disorder. Individuals who have marked deficits in social communication, but whose symptoms do not otherwise meet criteria for autism spectrum disorder, should be evaluated for social (pragmatic) communication disorder.

Specify if:

With or without accompanying intellectual impairment

With or without accompanying language impairment

Associated with a known medical or genetic condition or environmental factor

(**Coding note:** Use additional code(s) to identify the associated medical or genetic condition.)

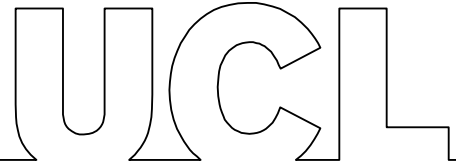
Associated with another neurodevelopmental, mental, or behavioral disorder

(**Coding note:** Use additional code(s) to identify the associated neurodevelopmental, mental, or behavioral disorder[s].)

With catatonia (refer to the criteria for catatonia associated with another mental disorder, pp.119.120, for definition) (**Coding note:** Use additional code 293.89 [F06.1] catatonia associated with autism spectrum disorders to indicate the presence of the co-morbid catatonia.)

American Psychiatric Association: Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition. Arlington, VA, American Psychiatric Association, 2013.

Appendix 2: Information and Consent Forms



Name of NHS Trust

Informed Consent Form

Preschool Consent for their setting to be part of the student research project:

Effectiveness of Social Communication Groups for Preschool Children

Thank you for your interest in this study. Please make sure that you understand everything on the Information Sheet. Pam Czerniewska will be happy to go over anything that does not make sense or is not properly explained. Once you feel fully informed, please read and sign the following

- I agree for _____ to be involved in this research study initials
- I agree for staff to be filmed during the research study
- I agree to ensure that all parents are aware of the study and have given consent for their child to be filmed
- I agree for staff to attend a training session
- I agree for a staff member to run (with support) a small group
- I understand that there will be complete confidentiality and anonymity for all information collected. The information may be used in publications and in talks but the children and nursery will never be identified.
- I agree to be contacted in the future by UCL researchers who may want to invite the nursery to take part in follow-up studies.

Participant's statement

I have read the Information sheet and Consent Form and I understand what the research study involves.

I.....(print name) agree that the *Early Social Communication in Preschools* research study has been explained to me and I agree for Preschool to take part.

Signed.....Date.....

Researcher's Statement

I, Pam Czerniewska, confirm that I have carefully explained the purpose of the study to the participating preschool and discussed any foreseeable risks and benefits.

Signed.....Date.....



Name of NHS Trust

Informed Consent Form

Staff members Consent for their setting to participate in the student research project:

Effectiveness of Social Communication Groups for Preschool Children

Thank you for your interest in this study. Please make sure that you understand everything on the Information Sheet. Pam Czerniewska will be happy to go over anything that does not make sense or is not properly explained. Once you feel fully informed, please read and sign the following:

- I agree to be involved in this research study as a staff member initials
- I agree to be filmed during the research study
- I agree to attend a training session as agreed by my Manager
- I agree to run (with support) a small group if required
- I understand that there will be complete confidentiality and anonymity for all information collected. The information may be used in publications and in talks but the children, staff and nursery will never be identified by name.
- I agree to be contacted in the future by UCL researchers who may want to invite nursery staff to take part in follow-up studies.

Participant's statement

I have read the Information sheet and Consent Form and I understand what the research study involves.

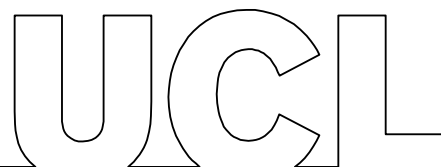
I.....(print name) agree that the *Early Social Communication in Preschools* research study has been explained to me and I agree to take part.

Signed.....Date.....

Researcher's Statement

I, Pam Czerniewska, confirm that I have carefully explained the purpose of the study to the participating preschool and discussed any foreseeable risks and benefits.

Signed.....Date.....



Name of NHS Trust

Informed Consent Form

Parents' Consent for their child to participate in the
Early Social Communication in Pre-schools Research Study

Effectiveness of Social Communication Groups for Preschool Children

Thank you for your interest in this study. Please make sure that you understand everything on the Information Sheet. Pam Czerniewska will be happy to go over anything that does not make sense or is not properly explained. Once you feel fully informed, please read and sign the following

- | | initials |
|---|----------------------|
| ▪ I agree for my child to take part in this research study | <input type="text"/> |
| ▪ I understand that if I do not want to take part at any point and for any reason, I can contact Pam Czerniewska and my child will be withdrawn. My child will continue have all the normal support. | <input type="text"/> |
| ▪ I consent to my child's personal information being looked at for the purposes of the research study. All information will be treated as strictly confidential and handled in accordance with the Data Protection Act 1998. | <input type="text"/> |
| ▪ I agree for my child to be filmed during the research study. | <input type="text"/> |
| ▪ I agree for my child's GP to be informed that he/she is taking part in this study | <input type="text"/> |
| ▪ I understand that there will be complete confidentiality and anonymity for all information collected. The information may be used in publications and in talks but my child will never be identified. | <input type="text"/> |
| ▪ I agree to be contacted in the future by UCL researchers who may want to invite my child to take part in follow-up studies. | <input type="text"/> |
| ▪ I understand that relevant data collected during the study may be looked at by individuals from regulatory authorities or from the NHS trust, where it is relevant to my taking part in this research. I give permission for these individuals to have access to this data. | <input type="text"/> |

Participant's statement

I have read the Information sheet and Consent Form and I understand what the research study involves.

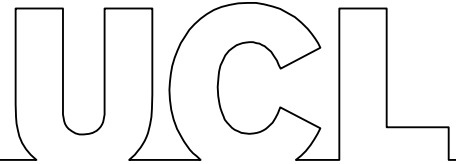
I.....(print name)
agree that the *Early Social Communication in Pre-schools* research study has been explained to me and I agree for my child to take part.

Signed.....Date.....

Researcher's Statement

I, Pam Czerniewska, confirm that I have carefully explained the purpose of the study to the participant and discussed any foreseeable risks and benefits.

Signed.....Date.....



Name of NHS Trust

**Effectiveness of Social Communication
Groups for Preschool Children**

Your child's pre-school is taking part in a research study to find out what helps children to play and interact with other children and adults in pre-school settings. We want to see if children with delayed social skills will join in more if they have been part of specially designed *Early Social Communication Groups*. We also want to know which type of group works best. We hope that the small groups will benefit all children and help them to take turns and share with each other.

Your child has NOT been identified as having delayed social skills. However, he or she may be present when we are filming the children playing together. Your child may also choose to join in one of our small groups. We therefore need your permission for your child to be filmed. All filmed materials will be kept strictly confidential and will not be shared without your full knowledge and permission.

Informed Consent

- | | initials |
|---|----------------------|
| ▪ I agree for my child to be filmed playing and taking part in group activities during the research study | <input type="text"/> |
| ▪ I understand that if I do not want my child to be filmed, I can request that he/she is not in the room during filming. | <input type="text"/> |
| ▪ I understand that all information will be treated as strictly confidential and handled in accordance with the Data Protection Act 1998. | <input type="text"/> |
| ▪ I understand that there will be complete confidentiality and anonymity for all information collected. | <input type="text"/> |

Parent's statement

The purpose of the research study has been explained to me.

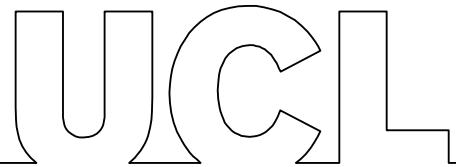
I.....(print name)
agree that my child may be filmed as part of the *Effectiveness of Social Communication Groups* research study.

Signed.....Date.....

Researcher's Statement

I, Pam Czerniewska, confirm that I have explained the purpose of the study and discussed any foreseeable risks and benefits.

Signed.....Date.....



Name of NHS Trust

***Effectiveness of Social Communication
Groups for Preschool Children***

INFORMATION SHEET FOR PRESCHOOL MANAGERS

We would like to invite your preschool to take part in a research study that looks at ways of helping children to communicate in preschools. We want you to understand what happens if you join the research and to be quite sure that it is possible in your setting.

Pam Czerniewska is running the Study and will try to answer all your questions. She will go through the information with you and you can contact her anytime you have any concern.

What's it all about?

Some children have difficulty interacting with other people; they find it hard to see how people talk and play together. If they are not playing and talking together, then they will have difficulty learning how we use language; how we share, and how we take turns.

Often, children avoid playing with other children because they don't understand the 'rules' of doing things together.

Some children are also extra-sensitive to noise, lights, colours, textures, smells, and other sensations and may become distressed at times. When they start at nursery, they may become confused by all the new experiences and new people, and they may find it difficult to join in with their peers in group activities.

In this research study, we want to find out what helps to prepare children for playing and interacting with other children and adults in preschool settings. We want to see if children will join in more if they have been part of specially designed *Early Social Communication Groups*. We also want to know which type of group works best.

We would like to introduce small group sessions in your nursery. To do this we will provide a training session and support for a staff member to run the groups.

How will we find out what helps?

We want to film how children communicate at home and in their nurseries; how they play with their peers; how they share, and how they sit in groups together. This will help us see if small *Early Social Communication Groups* make a difference. For example, we will see if they play with their peers more after they have had experience in small groups of taking turns?

We hope that our findings will be useful to parents, preschool practitioners, Speech & Language Therapists and other professionals. Most importantly, we hope it will help the children's social communication.

What will it involve?

Initial assessments

We will select a child in your nursery who has social communication difficulties. We will get full consent from his/her parents to join the research study. We will film the child at nursery. This will tell us what the child is like *before* the study begins and we will learn from you what helps the child to join in with others.

We will visit the child at nursery at intervals and film him/her playing for about 10-15 minutes. Children usually get used to being filmed but if they seem upset at all, we will change how we are doing this.

Early Social Communication Groups

We will provide a training session for nursery staff and then support a chosen staff member to run a small group for the selected child and 3 peers. We would like to run 6 group sessions with you.

We will arrange the dates with you so that they fit in with the nursery routine. This is likely to be in November.

Final assessments

After the groups, we will film the child again and see if the groups have made any difference to the way he or she plays with friends and staff at nursery. We will need to make sure that this wouldn't have happened just because the child was a few months older or because of other support happening.

Telling you what is happening

We will be visiting the nursery regularly and will discuss what we are doing. At the end of the study, we will let you know what we found out and also find out how you felt about the study.

Why have you been asked?

We have selected 4 children who are under 4 years at the beginning of the study. The children have been late to learn language and appear to have difficulty playing with other children. One of these children attends your preschool for at least 3 sessions a week.

Will it take extra time?

It will take a bit of extra time at the beginning. We will want your staff to attend a training session and for one of them to run (with support) 6 group sessions. These take 20 minutes and involve playing games and singing rhymes. Other nurseries have found these small groups useful for all children.

We will be observing the focus child during the research but this will not take you any extra time and we hope it will not affect your nursery.

We will be available to talk with you at any point in the study.

Will it cost anything?

There are no additional costs. We hope your nursery will benefit from the training and ideas for the group.

What happens to the results?

We will provide a written summary for all families and for the nurseries involved. We will also hope to publish our findings and talk to others about what we found helped (and did not help) develop children's social communication.

What about confidentiality?

We will need the consent of your nursery for us to film the focus child and to run groups within the setting. We will also need to tell other parents of children in the nursery that we will be filming there. We will explain to other parents that we are looking at the ways children communicate with each other in nurseries.

We will NOT identify the focus child to any other parent.

We will need the consent of all staff to be filmed in case they are incidentally in the video shot.

We will ask all nursery staff to respect the confidentiality and anonymity of the child who is the focus of the study

We will make sure that all information about the child is kept secure. All video recordings and assessments will be kept safe in a locked filing cabinet. Only the researchers involved in this study will have access to the information. All communication and results will be kept on a password protected electronic database. The children will be given false names and their real names will never be used in research results. The false name will be used on all labels and files.

Who is responsible for the study?

This research is the responsibility of University College London.

The main researcher is Pam Czerniewska, Highly Specialist Speech & Language Therapist. It is supervised by UCL Senior Lecturer, Dr John Swettenham and Barnet Consultant Paediatrician, Dr Elaine Clark.

Who has approved this research study?

This study has been ethically reviewed by the National Research Ethics Service (NRES). Research Ethic Committee Number: 12/LO/1072

Who to contact?

If you have any questions or concerns, you can contact Pam Czerniewska at any time. Mobile: E-mail:

What happens next?

If you are happy for your nursery to be involved in the research study, we will ask you to sign a consent form. This shows that you understand what is involved and are happy for the focus child to be filmed in your nursery, and that you are willing for your staff to attend a training session and help run the Early Social Communication Groups.

We are very grateful for your support.



Effectiveness of Social Communication Groups for Preschool Children

INFORMATION SHEET FOR PARENTS

We would like to invite you and your child to take part in a research study that looks at ways of helping children to communicate with others in preschools.

We would like to collect filmed examples of typical child communication in nurseries. As your child does NOT have any identified difficulties with communication we would like permission to film him.

Pam Czerniewska is running the study and will try to answer all your questions. She will go through the information with you and you can contact her anytime you have any concerns

What's it all about?

Some children have difficulty interacting with other people; they find it hard to see how people talk and play together. If they are not playing and talking together, then they will have difficulty learning how we use language; how we share, and how we take turns.

Often, children avoid playing with other children because they don't understand the 'rules' of doing things together.

In this research study, we want to find out what helps to prepare children for playing and interacting with other children and adults in preschool settings. We want to see if children will join in more if they have been part of specially designed *Early Social Communication Groups*.

How will we find out what helps?

We want to film how children communicate in their nurseries; how they play with their peers; how they share, and how they sit in groups together. This will help us see if small *Early Social Communication Groups* make a difference. For example, we will see if they play with their peers more after they have had experience in small groups of taking turns?

We hope that our findings will be useful to parents, preschool practitioners, Speech & Language Therapists and other professionals. Most importantly, we hope it will help the children's social communication.

What will it involve?

Preschool filming

During the next 2-3 weeks, I will be visiting the nursery and filming children as they play and talk together. The children usually quickly get used to me and my camera. I collect filmed examples for 15 minutes each session.

Early Social Communication Groups

Your child will be invited to join in a small group with 3 other children. This will be held in the nursery during your child's normal nursery time. There will be 6 sessions and will last for 3 weeks (2 sessions a week). The sessions will be run by one of the nursery staff who will be trained and supported by Pam Czerniewska. These will happen towards the end of this term.

Will I be told what is happening

We will let you know what we found out at the end of the study.

Why have you been asked?

We would like your child to take part because she/he is attending a local preschool and is under 4 years at the beginning of the study. Your child does not have any identified difficulties with communication and will therefore provide an example of 'typical' development.

Will it take extra time?

We will be observing your child in nursery during the research but this will not take you any extra time and we hope it will not affect your child. We will be available to talk with you at any point in the study.

Will it cost anything?

There are no additional costs. All the groups are free.

What happens if you want to stop taking part?

We hope that you will stay in the research study. If for some reason you no longer want your child to be part of it, then you can leave at any point. We will ask if we can keep any observations that we have already made.

What happens to the results?

We will provide a written summary for all families and for the nurseries involved. We will also hope to publish our findings and talk to others about what we found helped (and did not help) to develop children's social communication.

Will information about my child be confidential?

We will make sure that all information about your child is kept secure. All video recordings and assessments will be kept safe in a locked filing cabinet. Only the researchers involved in this study will have access to the

information. All communication and results about your child will be kept on a password protected electronic database. Your child will be given a false name and their real name will never be used in research results. The false name will be used on all labels and files.

Your child's real name and address will NOT be used.

We have consent of your child's nursery to film your child and to run groups within the setting.

Who is responsible for the study?

This research is the responsibility of University College London. The main researcher is Pam Czerniewska, Highly Specialist Speech & Language Therapist. It is supervised by UCL Senior Lecturer, Dr John Swettenham and Consultant Paediatrician, Dr Elaine Clark.

Who has approved this research study?

This study has been ethically reviewed by the National Research Ethics Service (NRES). Research Ethic Committee Number: 12/LO/1072

Who to contact?

If you have any questions, please contact Pam Czerniewska.
Mobile: E-mail

What happens next?

If you would like your child to take part in the research study, we will ask you to sign a consent form. This shows that you understand what is involved and are happy for your child to be filmed.

We are very grateful for your support.

Appendix 3: SCIP Staff Training

1. **Introduction** – the role of the researcher and her role in the local Speech & Language Therapy service
2. **What we mean by social communication needs** – an introduction to social communication differences with film examples of children with neurotypical development; language delay and with a diagnosis of ASD.

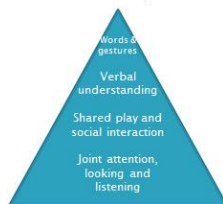
What do we mean by social communication needs?

- ▶ Some children seem a bit different in
 - How they use language
 - How they interact with other children and with adults
 - How they behave; how they react to other's behaviour
- ▶ The differences don't seem to be due to
 - Language delay or language disorder
 - Developmental delay
 - Home language experiences
 - Other reasons such as hearing or motor difficulties

3. **Features of ASD** – an interactive discussion about the difficulties a child with ASD may have with social communication and his/her availability to learn, supported with film clips of the target child
4. **How social understanding develops** – a short talk with examples about early social engagement; joint attention in play, and the precursors to language development.

How does social understanding develop?

- ▶ Social Communication Pyramid



5. **What we can do** – interactive discussion about ways to help children make sense of communication; see patterns of interaction, and be available for learning through changes to the environment

What can we do

- ▶ Help them make sense of communication
- ▶ Help them see patterns of interaction
- ▶ Help them be available for learning

6. **Summary of main ways to support children** by responding to their preferences in play; adapting and supporting the language used; modelling play and language; fostering initiations; adapting the environment and providing support and feedback through e.g. gestures, props, pictures and praise.

Learning and Environmental Support – 1

- › **Follow their interest** – respond to them; imitate what they say and do
- › **Adjust your language** to their level – repeat the same words; make it tuneful and interesting
- › **Support with gestures, props and pictures**
- › **Set the stage for engagement** – get their attention; reduce distractions; signal sequence

Learning and Environmental Support – 2

- › **Model how we do things together** – model language; be a partner; take turns
- › **Provide feedback** – praise; model appropriate behaviour
- › **Foster Initiations** – offer choices; wait; tempt them to communicate
- › **Make links** between home and school

7. **An overview of the SCIP group** and arrangements for 6 group sessions: setting; participants; key worker availability.

8. General discussion about what we hope to achieve.

What we hope the child will achieve

To attend, to respond and ultimately to become a partner in the complex dance of reciprocal social communication

To use a variety of strategies to communicate symbolically for a range of purposes and functions

9. Questions

Appendix 5: CODING PROTOCOLS

STUDY ONE: Social Communication Observations

JOINT ATTENTION

Initiates Bid for Interaction:

Needs to be spontaneous i.e. no prompt, or at least 3 seconds following verbal or physical prompt

Needs to be directed towards an intended or potential communication partner.

Include any form of communicating that attempts to get a partner to respond/share attention. For example, this may include standing next to the adult; vocalising and waiting for a response, as well as more conventional bids such as taking an adult hand, using words or gestures.

Interaction bids include showing and giving.

Responds to Bid for Interaction:

Bids for interaction to include: verbal or physical prompts e.g. calling name or touching arm.

Can also include bids using pictures and songs e.g. 'Hello' song may be viewed by child as bid for interaction in group activity.

Do not include if the bid is to regulate behaviour

COMMUNICATIVE FORMS

These will usually have been coded in terms of their function. For example, a child that shows an animal to an adult and says 'moo' will have his communication coded under 'Initiates Interaction' as well as 'Uses communicative words'

Uses communicative gestures

Include gestures e.g. nodding head, pointing, waving (conventional and non-conventional) that serve a communicative function. Do not include gestures that occur as part of a social routine such as a rhyme unless has clear communicative function e.g. making *Twinkle Twinkle* gesture to show the rhyme child wants adult to sing. Do not include gestures used for self-regulation such as flapping.

Uses communicative words

Include word-like forms (conventional and non-conventional, in English or home language) that serve a communicative function. Do not include words that occur as part of a social routine such as a rhyme unless has clear communicative function e.g. saying *Twinkle* to show the rhyme that the child wants adult to sing.

Do not include language used for self or self-directed forms such as humming.

Looks at others

Include any eye contact that has a social communicative function/ interest in other person. Do not include looking at the camera or at activities that do not have a clear interactive purpose.

Smiles at others

Needs to be directed towards a person acknowledging their part in the interactive environment i.e. not merely a smile to self when engaged in activity or a smile at the camera.

STUDY TWO: Practitioner Support Strategy Observations

General Notes:

Note 1:

Most preschool settings are naturally arranged for children to engage with motivating toys/activities and most early years' practitioners (EYPs) will adapt their language and style for younger children. The transactional support coding for EYPs in this study is designed to code instances where the adult is responding to the needs of the child with ASD by specifically promoting joint attention, and developing opportunities for the child to engage with the adult. The adult language and play need to acknowledge the developmental level of the child.

Note 2:

Some actions or words used by adults may fit into more than one category. Try to code according to the primary function of the adult support. For example, if an adult offers a choice of 'car' or 'ball', this should be coded as Fosters Initiations even though it could also be coded as Models Language or Simplifies Language. Where it is unclear what the primary function is, then code in more than one category.

Responds to child

Follows child's lead

The adult makes a clear response to what the child is saying, doing or looking at. Do not code if the adult simply sits near the child

Do not code if the adult introduces a topic that is not obviously part of the child's focus. E.g. do not code responses such as '*what colour is this?*' or '*this is yellow*' when the child has not indicated an interest in colour.

Imitate child's language and actions

The adult imitates the child's language or behaviour and then pauses, waiting for a response

Adjusts communication

(a) Simplifies language

The adult adjusts the complexity of the language so that it is appropriate for the child's language developmental level. For the children in this study, the language level is preverbal or early verbal. The adult should use mainly single words or short repeated phrases.

Do not count when the adult talks in ways they would talk to other 2-3 year olds, but does not adjust to the research child's level.

(b) Supports with gestures and pictures

The adult uses pictures or nonverbal gestures – e.g. waving; pointing; Makaton signs – to support the words used.

Provides feedback and reinforcement

Praises success

The adult gives specific and contingent praise e.g. '*that's it*' or '*high five*' or '*good listening*'

Do not count if feedback is not promoting/maintaining joint engagement

Models social communication

Models play

The adult models play appropriate to the child's developmental level. E.g. if the child is playing with bricks, the adult might start building a tower and then model excitement as they wait for it to fall down.

Models appropriate language (verbal and non-verbal)

The adult models language from the child's perspective and in line with his developmental level and interest. E.g. if the child builds a tower then the adult might say '*up – up –up it goes*'. The language may also model the child's feelings e.g. '*Alex wants to stop*'

Fosters Initiation

Offers choices

The adult shows or names choices of objects e.g. '*car*' or '*ball*'

Waits for child to initiate

The adult waits and looks expectantly at the child when, for example, a choice is offered, or an object is out of reach.

Uses time delay

The adult deliberately adds a delay into an activity such as pausing before blowing bubbles or pausing before saying the key word in an action song, e.g. *the horn on the bus goes[pause]....beep beep beep*