A STUDY INTO THE EFFECT OF ADULT INTERACTIVE STYLE ON THE SPONTANEOUS COMMUNICATION OF YOUNG CHILDREN WITH AUTISM AT SCHOOL

By

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ABSTRACT

This research explored the effect of adult interactive style on the spontaneous communication of children with autism. It focused on the frequency of children's communication, the functions of their communication, the methods they used and the impact of four different school activities (i.e. sensory room, snack time, soft play and 1:1 work) on their communication. Theoretically, the study drew upon the transactional model of child development and the social model of disability. It was an action research study having a mix of quantitative and qualitative data which took place over an eighteen month period. The study was conducted within an Early Years Foundation Stage (EYFS) class in a specialist school for pupils with autism. Six children and three members of staff took part. The researcher developed a set of principles in conjunction with the staff which formed the basis for the Adult Interactive Style Intervention (AISI). The findings showed that staff increased their use of the AISI principles over time and all children considerably increased the frequency of their spontaneous communication, their communicative functions and methods. In the follow-up phase, twelve months later, it was found that these changes had been maintained in both children and staff.

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ITHACA

When you set out to on the journey to Ithaca,
pray that the road be long, full of adventures, full of knowledge.
Do not be afraid of the Laestrygonians and the Cyclopes, the ranging Poseidon.
You will never meet these on your way,

[…]

unless you carry them along within your soul.

[…]

Always keep Ithaca in your mind. To arrive there is your final destination.
But do not rush the voyage, it's better if it lasts for many years;
And once you' re old, cast anchor on the isle, rich with all what you've gained along the way.
Do not expect Ithaca to give you any wealth. It gave you the great voyage:
Without Ithaca you'd never set out.

[…]

And if you find Ithaca poor, you haven't been deceived.
As wise as you've become, with such experience by now,
you have come to know what Ithacas really mean.

(C.P. Cavafy)

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LIST OF ABBREVIATIONS

AAC	Augmentative and Alternative Communication
ABA	Applied Behavior Analysis
AISCC	Adult Interactive Style Coding Checklist
AISI	Adult Interactive Style Intervention
APA	American Psychiatric Association
AS	Asperger Syndrome
BEd	Bachelor of Education
BSc	Bachelor of Science
BERA	British Educational Research Association
BTEC	British Technology Education Certificate
CARS	Childhood Autism Rating Scale
CB	Challenging Behaviour
CC	Central Coherence
CICCA	Checklist for the Initiation of Communication in Children with Autism
CSC	Children's Spontaneous Communication
DARL	Development in Areas Related to Learning
DCSF	The Department for Children, Schools and Families
DD	Developmental Delay
DIR	Developmental, Individual difference, Relationship-based model
DSM	Diagnostic and Statistical Manual of mental disorders
DTT	Discrete Trial Teaching
EEG	ElectroEncephaloGraph
EF	Executive Functioning
EIBI	Early Intensive Behavior Intervention
ESDM	Early Start Denver Model
EYFS	Early Years Foundation Stage
ICD	International Classification of Diseases and Related Health Problems
IT	Incidental Teaching
M-COSMIC	Modified–Classroom Observation Schedule to Measure Intentional Communication
MI	Musical Interaction
MRI	Magnetic Resonance Imagery
MT	Music Therapy
NICE	National Institute for Health and Clinical Excellence
NT	Neuro-Typical
PACT	Pre-school Autism Communication Trial
PE	Physical Education
PECS	Picture Exchange Communication System
PRT	Pivotal Response Training
QDSCC	Questionnaire for Determining Spontaneous Communication in Children

RCT	Randomised Control Trial
RIT	Responsive Imitation Training
RPMT	Responsive Education and Prelinguistic Milieu Teaching
RT	Responsive Teaching
SAACA	Single Attention and Associated Cognition in Autism
SB	Staff Behaviour
SCERTS	Social Communication Emotional Regulation Transactional Support
SD	Standard Deviation
SEN	Special Educational Needs
SLD	Severe Learning Difficulties
SLT	Speech and Language Therapist
SPT	Symbolic Play Test
TA	Teaching Assistant
TD	Typically Developing
TEACCH	Treatment and Education of Autistic and related Communication handicapped Children
ToM	Theory of Mind
VIG	Video Interaction Guidance
WHO	World Health Organisation
WWC	What Works Clearinghouse, part of the US department for Education

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CHAPTER 1

INTRODUCTION

1.1 Origins of the study

This thesis was inspired by my professional passion to understand how the minds of children with autism work in order to create a school environment which would make more sense and encourage them to communicate. When I started working as a teacher of children with autism in Greece, eight years ago, I found engaging these children in meaningful communicative exchanges a difficult task. They were often self-absorbed by everyday objects which they were using in unconventional ways (e.g. spinning, flapping, licking), apparently uninterested in the adults trying to gain their attention. This was one of the main reasons I came to the UK to do a Masters in autism and then continued to undertake PhD study.

My reading prior to starting my studies in the UK was related to Applied Behavior Analysis (ABA) and Early Intensive Behavior Intervention (EIBI) approaches (Lovaas, 1981; Cooper et al., 2007), which claim to be effective in teaching children with autism to communicate as neurotypical (NT) children do (e.g. to greet when entering a room, to look other people in the eyes while talking to them, to use 'appropriate' topics to start a conversation). Evidence indicates that some of these approaches result in higher scores in IQ, adaptive behaviour and language tests (Eikeseth et al., 2007; Remington et al., 2007) and their proponents advertise them as the only 'scientifically proven' methods to 'treat' autism (James and Fletcher, 2011). However, more and more able adults with

autism are raising concerns about the intensity, the content, the values and the ethics of such approaches (Dawson, 2004; Milton and Lyte, 2012). Their concerns are that they just teach technical skills or scripts, without sufficient emphasis on understanding or in developing natural interactions. I personally witnessed cases and heard stories of children being very frustrated and aggressive, as a result of ABA and EIBI work. These approaches might work to an extent with some able children with autism as argued by Sherer and Schreibman (2005, cited in Brunner and Seung, 2009) but there needs to be something different for less able children who may find these very intimidating and need to do things at their own pace and on their own terms.

I was influenced by ABA, EIBI (Lovaas, 1981; Cooper et al., 2007) and Treatment and Education of Autistic and related Communication handicapped Children (TEACCH) (Lord and Schopler, 1994), which were the most widely used approaches in Greece at that time. I knew little about the impact of adults' interactive style on children with autism. However, I could see that some adults (e.g. parents, teachers, therapists) could engage children in social interactions and communicative exchanges more than others no matter which approach they followed. So, I decided to explore the components of a communication-enabling adult style. As soon as I started my PhD, I attended a number of courses and read widely about developmental/relationship-based approaches such as Intensive Interaction (Nind and Hewett, 1994, 2001), Social Communication Emotional Regulation Transactional Support (SCERTS) (Prizant et al., 2006), the Option approach (Kaufman, 1994), Musical Interaction (Methley and Wimpory, 2010) and Developmental, Individual difference, Relationship-based (DIR) model - Floortime

(Greenspan and Wieder, 1998, 1999). All these approaches give advice on how adults should interact with the children to increase their engagement following the children's interests and pace. Based on these, I developed the Adult Interactive Style Intervention (AISI) and measured its impact on the spontaneous communication of children with autism.

1.2 Significance of the study

There are several reasons why this study is relevant and timely. It aims to fill a gap in the literature with regard to the impact of adult style on the spontaneous communication of children with autism whilst acknowledging the importance of helping children to develop communicative competence. It also addresses the need for more studies in real world classroom settings and the growing demand for staff development. The increasing prevalence of autism worldwide makes these issues more urgent and of universal interest.

Difficulties in spontaneous communication are a core feature of autism (Jordan, 1999) and needs further research, as acknowledged by Chiang and Lin (2008) and Chiang (2009). So far, as the National Research Council (NRC, 2001) notes, most studies describe the difficulties individuals with autism have in social communication but very few of them measure the effect of different interventions on these difficulties. Studies describe the frequency with which individuals with autism initiate communication, the reasons they communicate and the methods they use (Stone et al., 1997; Chiang and Lin, 2008, Chiang et al., 2008; Agius, 2009). Research has highlighted the difficulties

school staff face when teaching children with autism how to initiate communication (Kroeger and Nelson, 2006). Many of the interventions used have limited success perhaps because they focus on changing the children rather than considering the adults' behaviour (Bradshaw, 1998). However, as Prizant et al. (2006) argue, the way adults interact with children can be responsible for the children's limited communication skills. Therefore, interventions should also make recommendations on the adults' interactive style.

Teaching children with autism communication skills is of great importance for both the individuals themselves and their families. The Director General Report (UNESCO, 1985, cited in Thurman, 2009) highlights the importance of communication for the individual,

> *'…the fundamental importance of the right to communicate stems from the fact that all the major established human rights can be fully exercised and enjoyed only on the basis of genuine, comprehensive communication understood as an inalienable right of each human being'*. (p. 5)

When children with autism do initiate communication they can have greater control over the environment and, as a result, depend less on other people to anticipate their needs and desires (Carter and Hotchkis, 2002). Noens and Van Berckelaer-Onnes (2004) maintain that being able to initiate communication may give children access to a better quality of life. Challenging Behaviour (CB) is often related to limited communication skills (Reichel and Wacker, 1993, cited in Prizant and Wetherby, 2005)

and this can be reduced when communicative competence improves. Limited social communication also appears to be one of the main stress factors for parents of children with autism (Bristol, 1984) and one of their top teaching priorities (Pituch et al., 2011).

The extent of staff involvement in this study is of great significance. In most previous studies, the researchers trained the participants in existing interventions and took pre and post intervention data (Hwang and Hughes, 2000; Ingersoll et al., 2005; McAteer and Wilkinson, 2009). This was not the case for the current study. The researcher worked in close collaboration with the staff to develop and implement AISI. After the end of the pre intervention video recordings, the researcher went through these clips to find segments where staff used facilitative practices. These were then edited and presented to the staff to discuss further implementation and potential difficulties. The contribution of the staff was substantial in all research phases. There was a democratic partnership between the researcher and the staff, which empowered and developed both (McNiff and Whitehead, 2006; Denscombe, 2010).

Another parameter which contributes to the significance of this study is the increasing prevalence of children with autism. Estimates range from 60/10,000 (Medical Research Council - MRC, 2001) to 116/10,000 (Baird et al., 2006). This makes it very likely for every teacher to have at some point in their career to teach a child with autism. Thus, more research is needed on how teachers can accommodate the social communication difficulties children with autism have in specialist, special or mainstream settings.

1.3 Research design

An action research methodology was used following the need for more evidence-based practice in the field of special needs (Couper and Sampson, 2003; Odom et al., 2005; Parsons et al., 2011). The main advantage of evidence-based studies is that they have high ecological validity and provide findings which can be directly transferred into similar settings. Additionally, conducting evidence-based real world research is recommended to investigate communication in autism. Researchers (Ogletree et al., 2002; Chiang, 2009) believe that the communicative styles of children with autism are better explored in natural environments and with the people known to the children; school is such an environment. Natural environments and typical activities also seem to be the ideal context to develop communication interventions (Iacono, 1999). However, to date, many studies exploring communication in children with autism have been conducted in laboratory settings and their findings are therefore restricted (Roos et al., 2008).

In the current study, a school which specialised in teaching children with autism with outstanding Ofsted reports (2007, 2010) was chosen as the setting. The sample consisted of six children within an Early Years Foundation Stage (EYFS) class based on the rationale that early intervention in children with autism may have better results (Siegel, 1996; Powell and Jordan, 1997; Rogers and Dawson, 2010). A class following the extended curriculum was considered the most appropriate for this study as these children had limited communication and verbal skills, a population which needs to be further researched according to the literature (Chiang, 2008a; Chiang and Lin, 2008).

1.4 Theoretical frameworks

This study draws upon two theoretical frameworks, the transactional model of child development and the social model of disability. According to the former, adults' behaviour may influence and shape children's development (Wetherby and Prizant, 2000). Communication is '*a continuous dynamic interplay*' (p. 2). So, adults bear the same responsibility with children, if not more, when communication breaks down (Aldred et al., 2001; Willis and Robinson, 2011). Developmental/relationship-based approaches which were used as a basis to develop AISI embrace the transactional developmental perspective. If, for example, the adult speaks too much or does not wait long enough, the child is very unlikely to initiate communication, not because they cannot do so but because the adult does not give them the chance to do so. Similarly, if the adult does not respond to the child's 'inappropriate' initiations, this might discourage the child from initiating again.

The transactional model of child development is in line with the other theoretical framework of this study, the social model of disability. This, as opposed to the medical or deficit model, purports that disability results when the environment fails to accommodate the person's difficulties. Currently, the medical model is still predominant assuming that the society is set and pre-determined and the person should be adapted or 'treated' (Rieser and Mason, 1990). Llaneza's et al. (2010) article is an example of using the medical model to interpret autism. This article compares autism prevalence to that of paediatric cancer, diabetes and AIDS and concludes that funding for autism research should continue hoping that cure will be yielded. Many individuals

with autism are vehemently against this model. Luke Jackson (2002), a person with Asperger Syndrome (AS), highlighted that '*looking for a cure for autism can be linked to Hitler trying to create an Aryan race*' (p. 77).

There has been much criticism of the medical model. Its opponents claim that once a label or diagnosis is attached to a child, people are likely to have stereotyped expectations and to lose sight of the child's individuality. Indicative is the example of a mother who lost her ability to teach her son when he got the diagnosis of autism and professionals started behaving according to the deficit model (e.g. emphasising what he could not do rather than what he could do) (Hodge, 2006 cited in Hodge and Chantler, 2010). She said that, '*I felt that someone had taken my son away*' (p. 12).

In contrast, the social model of disability purports that the problems are often socially constructed and reside outside the individuals themselves (Rieser and Mason, 1990; Tregaskis, 2002). Society should provide the support that people need to access their physical, sensory and educational environments. This study explores the extent to which staff provide children with autism with the reasons and the methods they need to initiate communication at school. The social model of disability also promotes self-advocacy by people with autism. This was greatly respected in this study. For the development of AISI, personal accounts written by individuals with autism (e.g. Grandin, 1984; Sinclair, 1992; Lawson, 1998; Gerland, 2000; Jackson, 2002; Sainsbury, 2009) were considered. AISI also has the approval of several postgraduate students with AS to whom the findings of the study were presented at a student conference at the University

of Birmingham (Kossyvaki, 2010). It should be noted here that although the social model of disability has influenced the starting point of this study, there are aspects of this study which stem from different models of disability.

1.5 Organisation of the study

This thesis is divided into ten chapters including this introduction (i.e. Chapter One). Chapters Two and Three review the literature. Chapter Two explores the issue of social communication, including sections on the development of communication in Typically Developing (TD) children, the main difficulties children with autism may have with spontaneous communication and potential explanations deriving from cognitive and psychological theories. The chapter closes with findings of previous studies on the frequency with which children with autism initiate communication, the methods they use, the reasons they communicate, their communicative partners and the type of activities which are likely to elicit spontaneous communication. Chapter Three focuses on the role and style of adults in developing communication. It presents advice on the interactive style recommended by different interventions used with children with autism, discusses the findings of studies which explored parent and staff interactive style and their impact on children's communication. The chapter concludes by describing the AISI principles.

Chapters Four and Five give details on the design of the research. Chapter Four presents the research questions, the philosophical underpinnings, the research methodology, several key research terms, the sample and setting characteristics and closes by

outlining the research phases. Chapter Five discusses how the research methods were developed and used, explains how AISI was developed, and reports on the main ethical issues arising.

The findings are presented in four chapters following the order of the research questions. Chapter Six discusses the findings on the frequency of children's spontaneous communication and the influence of four different school activities on communication. Data on the communicative functions and methods are presented in Chapter Seven while the extent to which AISI was implemented by the staff is discussed in Chapter Eight. Chapter Nine gives the follow-up findings, twelve months after the end of the main study and Chapter Ten summarises the most significant findings, discussing their limitations and proposes ideas and implications for practice and future research.

1.6 A note on terminology and the impact of the funding body

There is no consensus on how individuals with autism feel about being autistic. Some people state that they 'suffer' from their autism. Blackburn (2007) considers herself *socially disabled* and would like to get rid of her autism if she had the chance to do so. On the other hand, there are other people who want their autism to be seen as a condition and not as a disorder. Jackson (2002), a young man with AS, views autism as '*a name for a lifelong set of behaviours*' (p. 29) and Grandin (cited in Sacks, 1995), a University Professor with AS, argues that autism is another way of being as a person. Arnold (2012), a PhD student with AS, views autistics as a '*cultural minority*' (p. 4).

Considering these people's feelings and being aware of the power of language when referring to people with special needs (Runswick-Cole and Hodge, 2009), the term autism is selected for use throughout this thesis. Terms such as disorder or disability were rejected as promoting the medical model of disability, while the term condition did not seem adequate to describe the extent to which some people's lives are affected by autism. The term autism, in this thesis, denotes the whole autism spectrum such as AS, Kanner's autism, atypical autism, Pervasive Developmental Disorders-Not Otherwise Specified (PDD-NOS), which is in line with how the term is used by Jordan (1999) and the National Institute for Health and Clinical Excellence (NICE) guidelines (clinical guideline 128, 2012).

Person first language (i.e. people with autism) and condition first language (i.e. autistic people) are used interchangeably as there is no unanimously preferred way. For example, Sinclair (1992) and Sainsbury (2009) dislike person first language because they do not feel just like people who happen to have autism as the condition permeates their whole lives. Condition first language seems to be more and more commonly used recently. A Google search conducted on March 14, 2007, revealed that 99% of the first 100 Google hits for the term *autistics* lead to organisations run by autistic people, whereas all the first 100 Google hits for the terms *person/s with autism* or *child/ren with autism* lead to organisations run by non-autistic individuals (Gernsbacher et al., 2008). However, this is not the way everybody wants to be called and trying to '*respect people's preferences [and] call people what they prefer to be called*' (American Psychiatric Association - APA, 1994, p. 480) this thesis uses both the terms children

with autism and autistic children. Additionally, the thesis avoids using the distinction between low and high functioning autism as it is considered inaccurate by many autistic people. Milton and Lyte (2012) think that such a distinction is misleading due to uneven cognitive profiles autistics tend to show and Arnold (2012) comments that '*autism is not a two dimensional thing with a high and a low functioning end it is like the palette of colours*' (p. 3).

I refer to myself interchangeably by either using the third person (i.e. the researcher) or the personal pronoun *I*. I use the third person more when describing how different research processes were followed to achieve validity, reliability and objectivity (as a way of being reflective) and the pronoun I when I want to highlight my involvement in designing and conducting this action research study.

Before moving on to the main body of this thesis, the role of its funding source should be clarified. This study was funded by the Greek Public Welfare Foundation, *Propondis*, which had no role in the study design, the data collection, analysis, interpretation or writing of the thesis. The only liability the researcher had was to acknowledge the Foundation when publishing or presenting at conferences.

CHAPTER TWO

REVIEW OF THE LITERATURE: CHILDREN'S SOCIAL COMMUNICATION

2.1 Introduction

This thesis explores the effect of adult interactive style on the spontaneous communication of children with autism. This chapter is the first of two chapters which review the relevant literature. The chapter starts by defining social communication, a term which features a lot in the literature on child development. After this, the chapter explores the differences between the social communication development of TD children and children with autism, with a particular focus on intentional spontaneous communication and issues in initiating communication in autism. The next section provides a number of cognitive/psychological and sensory processing theories which attempt to explain communication difficulties in autism as these theories should be taken into consideration when trying to enhance adult interactive style. The chapter closes with a review of naturalistic studies, mostly school-based, which focus on communicative functions, methods and partners, as well as activities which are likely to elicit spontaneous communication in children with autism. Children's issues in initiating intentional communication in combination with the findings of other similar studies formed the basis for developing the instruments of data collection for this study.

2.2 Social communication

This section examines different definitions of social communication, intentionality and spontaneity of communication and presents the definitions used in this study and the rationale for doing so. Social communication skills are very important as they enable children to have control over their social and emotional environment and to relate to other people (Jarvis and Lamb, 2001; Buckley, 2003). Webster's Collegiate Dictionary (1988) defines communication as:

> *'A process by which information is exchanged between individuals through a common system of symbols, signs or behavior'.*

The Chambers Dictionary (1998) defines communication as:

> *'The conveyance of one's meaning to others'.*

Schlosser et al. (2003) describe communication as an interaction which involves at least two people. In essence, the definitions of communication involve the transfer of information between at least two persons by verbal or non-verbal means. There are two types of communication depending on whether information is transmitted or received: expressive or receptive communication respectively. Bogdashina (2005) argues that for an act to be communicative, there needs to be:

- something to communicate about (the message)
- a sender
- a receiver

- a medium of transmission, and
- communicative intent. (pp. 21-22)

Individuals might communicate for many reasons using several media for transmitting their information. There are three major categories with regard to the functions that communicative acts may serve (Prizant et al., 2000):

- behaviour regulation (e.g. request and protest),
- joint attention (e.g. comment and provide information), and
- social interaction (e.g. request social games or routines, greet and call others). (p. 209)

Means of communication are split into two broad categories. Firstly, linguistic means (e.g. spoken/written/sign language) and, secondly, non-linguistic means (e.g. body language, facial expressions, gestures, pictures/symbols) (Bogdashina, 2005). Messages can be conveyed using a combination of means. It is important to note here that communication does not always involve intention (Messer, 1994). Intentionality and how this is defined in this study will be discussed later in this chapter.

Social communication is one of the terms which needs to be clarified. In this study, it is used as a joint term for communication and social interaction. This is in accordance with the proposed revised criteria for the Diagnostic and Statistical Manual of mental disorders, 5th Edition (DSM V) (Lord, 2010). According to this, difficulties in emotional reciprocity, verbal and nonverbal communication, social interaction, and developing and

maintaining relationships, will all fall now under the umbrella term, social communication. Many other recent studies in the field also use the term social communication (Drew et al., 2007; Murdock et al., 2007; Wetherby et al., 2007; Clifford et al., 2010).

Social communication is defined by Prizant and colleagues (2006) as:

> *'A child's ability to understand social events, and to participate and communicate as a competent, confident, and active participant in social activities using both verbal and/or nonverbal skills'*. (p. 315)

After defining the term social communication and presenting its main components, it is worth exploring social communication in children with TD and in children with autism. This will show how social communication develops through different pathways in each group.

2.3 Social communication in Typical Development (TD)

This section examines the social communication development in TD children to provide a context within which to analyse the social communication skills of children with autism. This is limited to a discussion of development from birth to 5 years old as it matches to the chronological age of the sample.

Child development is a dynamic process based on both biological and environmental factors; the rate of achieving each developmental milestone is attributed to both inherent characteristics and personal experiences (Sheridan, 2008). As a result, there is a great

variability in the patterns TD children develop. In this section, an overview of the average child's social communication development is presented. This overview is based on Sheridan's (2008) work, the Early Support Developmental Journal (DCSF, 2008a) and the Early Years Foundation Stage (EYFS) Pack (DCSF, 2008b).

Even from the first days following their birth, infants try to establish emotional ties with their carers and interact with them through eye contact and facial expressions. By the first month, they may turn towards a soothing human voice, smile socially, respond to a carer's vocalisations and regard a nearby speaker's face. At the age of six months, infants may vocalise to others, respond differently to different tones of other voices and maintain eye contact during interaction with a familiar person. They can also show emotions in response to other people's emotions and react enthusiastically to often repeated games and rough and tumble play. At nine months, infants may babble deliberately to communicate and shout to gain attention. They can respond when their name is called, imitate hand clapping and wave in context, and respond differently to facial expressions of happiness and sadness in others. At twelve months, infants understand simple instructions if accompanied by gestures, follow an adult's eye gaze and point to an object and look back to the adult for the purpose of requesting or commenting. They also demonstrate affection to familiars, begin to imitate sounds produced by others, show awareness of other children and display more sophisticated emotions (e.g. joy fear, anger, surprise). Their babbling gets increasingly speech-like (combination of consonants and vowels).

At the age of 2 years, toddlers can use fifty or more recognisable words appropriately and understand many more and can put two or more words together to form simple sentences. They refer to self by name, use echolalia, use names of objects and people, demand carers' attention, wait for their turn or go signal at *ready, steady, go* games, join in nursery rhymes and may have a tantrum when frustrated or misunderstood. By the third year of age, toddlers usually have a large vocabulary, which is understandable even to strangers, use personal pronouns correctly, ask many questions beginning with '*what'*, '*where'* and '*who'* and can defer satisfaction of wishes to the future. At the age of 4, children's speech is grammatically correct and completely intelligible and their talk is mainly related to '*here and now'*. They have some awareness of immediate past and future (e.g. before, later), use others as a source of information, are aware that some reactions can hurt others, show sympathy for peers in distress and demonstrate pride in own achievements. By the time they turn 5, children use fluent speech, which is grammatically conventional and phonetically correct and understand time and sequence concepts such as *first-then.* They play imaginatively and cooperatively with peers, show care and concern for others, respond to simple instructions and talk about things they see, past and future events.

There is a broad consensus in the literature that the development of communication requires a partnership between the child and the environment and that the most significant part of that environment is the adult carer. Many studies indicate that parents positively influence their child's communication (Scherer and Olswang, 1984; Olson et al., 1986). More specifically, studies on parent-child interactions have shown that

parents' prompt responsiveness to their children's initiations can foster the development of the latter's social communication (Salter-Ainsworth and Bell, 1974; Jarvis and Lamb, 2001). On the other hand, it has been reported that children being raised by depressed parents or in their absence may experience social communication difficulties. Mothers who suffer from depression and show flat affection to their children may affect their children's social communication skills (Wetherby and Prizant, 2002). In a study of social deprivation in orphanages in Romania, Rutter et al. (1999) found that 6% of 111 children who were adopted by English families showed autistic-like features. Children were exposed to poor or appalling conditions while being at the orphanages; they remained in cots all day, were self-fed through bottles with large teats, without personalised care-giving and had very limited interaction with caregivers. Although the quasi-autistic patterns cannot be attributed only to the children's adverse experiences early in their lives, some inferences can be drawn. The extent to which the lack of early interactions may affect development is also shown in early studies conducted with primates. Monkeys having been raised in deprived environments of total isolation rocked and engaged in stereotyped behaviours (Floeter and Greenough, 1979). This literature review attempts to explore the impact of adults on children's communication and does not embrace past theories suggesting that poor interactions with parents or carers can cause autism (Bettelheim, 1967). To explore the differences of social communication between TD and autistic children, the next section presents the development of social communication in children with autism.

2.4 Social communication in autism

After a brief overview of how social communication develops in TD children, this section investigates how social communication develops in children with autism. Particular emphasis is placed on how spontaneous communication is affected.

Kanner (1943) in his first article on autism refers to problems of communication and useful language. Most of the eleven children with autism he first observed had little or no communicative ability. Qualitative impairments in communication are still one of the main diagnostic criteria for autism in the International Classification of Diseases and Related Health Problems (ICD-10) (World Health Organisation - WHO, 1993), DSM-IV (APA, 1994) and the upcoming DSM-V (Lord, 2010). Difficulties in social communication are very common in people with autism (Baron-Cohen, 1995; Kasari, 2002) regardless of their language abilities (Jordan, 1999). Both verbal and non-verbal communication might be affected (Koegel, 2000; APA, 2000). Up to 50 % may never develop functional verbal communication (NRC, 2001). But even pupils with competent speech and language skills, often initiate very little communication (Koegel, 2000; Jones, 2002) or have problems with the prosody, semantics, syntax and pragmatics (Bogdashina, 2005). It is important to note that many young children with autism may not see the need to communicate in a verbal manner (Wall, 2004). Sinclair (1992), an able man diagnosed with autism, remembers:

> *'[…] I didn't communicate by talking, not because I was incapable of learning to use language, but because I simply didn't know that that was what talking was for. Learning how to talk follows why to talk-and until I learned that words have meanings, there was no*

> *reason to go to the trouble of learning to pronounce them as sounds'*. (p. 296)

Similarly, Temple Grandin (1984), a Professor at Colorado State University diagnosed with AS, recalls:

> *'I remember being able to understand everything that people said to me, but I could not speak back […] I did not learn to speak until I was 3 1/2'*. (pp. 144-145)

She also mentions that even as a grown up when she is frustrated she reverts to one word speech. Difficulties in social communication can be evident as early as 12 months of age and children with autism have a distinguishable profile of social communication before they even reach the second year of life (Wetherby et al., 2007).

Many studies comparing children with autism and children with TD or Developmental Delay (DD) show differences in their social communication skills. McGee et al. (1997) compared 3 and 4 year-old children with autism with TD peers and found that the former focus less on other children and adults, vocalise less and are less likely to be close to other children. Wetherby et al. (2007) compared age matched children with DD to 2 year old children with autism and found that the latter perform significantly lower on five social communication measures: i) gaze shifts, ii) gaze/point follow, iii) rate of communicating, iv) acts of joint attention, and v) inventory for conventional gestures. Murdock et al. (2007) compared the social communication skills of sixteen children with autism (from 6 to 11 years old) with sixteen age-matched TD peers and found that

the former exhibit from 40% to 57% less verbal initiations, verbal responses, joint attention and nonverbal communicative attempts than their peers.

In children with autism, expressive communication is often found to be more difficult to acquire than receptive communication (Pelios and Lund, 2001). Even children with average verbal comprehension skills might have difficulties in expressive communication (Chan et al., 2005). This means that staff at school might overestimate a child's ability to initiate communication and when the child does not initiate, this can be attributed to laziness or a lack of interest instead of lack of understanding.

2.5 Intentional spontaneous social communication in autism

There are several issues in the way in which autistic children initiate social communication. Given that the thesis focuses on intentional, spontaneous, social communication, this section starts with discussing intentionality and spontaneity. Both of these terms seem to be problematic for many children with autism. The section then continues with presenting a number of issues autistic children have in initiating communication. These are echolalia, echopraxia, pronoun reversal, difficulties with deictic words, extreme literalness, repetitive questioning, endless talking and poor intonation control.

2.5.1 Intentionality of communication

Communication can be unintentional, pre-intentional and intentional (Ogletree et al., 2002). Intentionality can be difficult to attribute to people's actions (Messer, 1994). For

example, when a baby cries, this does not necessarily mean that they are trying to get the adults' attention. Bruner (1981) claims that intentionality should be attributed only when there is persistence to reach a goal. Intentional communication can be hard for children with autism. It entails attributing thoughts, emotions and beliefs to the speaker and the listener, and thus it might be seriously affected in autism because of Theory of Mind (ToM) difficulties (Baron-Cohen, 1995) and inter-subjectivity difficulties (Hobson, 2002) which these children often experience. ToM difficulties are concerned with assigning thoughts and emotions to themselves and others whereas inter-subjectivity difficulties are related to their awareness of themselves in the minds of others and the difficulty to discriminate between *me-ness* and *you-ness* (Hobson, 1993).

There is no consensus on the definition of intentional communication. For Harding (1982) being an intentional communicator, means learning about oneself and others and realising that one's behaviour can have an effect upon others. Wetherby et al. (2000) define communicative intent as:

> *'The systematic use of conventional behaviors to deliberately affect another person'*. (p. 124)

Wetherby and Prizant (1989, cited in Potter and Whittaker, 2001) consider communication intentional when one of the following is observed:

- alternation of eye gaze between the goal and the listener,
- persistent signalling until the goal is achieved, and
- awaiting of a listener's response. (p. 25)

Although Wetherby and Prizant's definition is more detailed and easier to notice, its first two components appear to be very demanding for young autistic children. Young children with autism are likely to have eye gaze processing deficits (Pelphrey et al., 2005) and are unlikely to repeat a communication signal when there is a communication breakdown (Meadan et al., 2008) as they often show no awareness of communicative failures (Jordan, 1993). Therefore, Wetherby's et al. (2000) definition is more useful when researching young children with limited communication skills.

2.5.2 Spontaneity of communication

Numerous definitions of spontaneous communication, ranging from strict and conservative definitions to more liberal ones, have been used in previous studies. Halle (1987) considers spontaneous to be every uncued communication. For Watson et al. (1989) spontaneous communication is every communication cued by the environment but not by prompts. Stone and Caro-Martinez (1990) define spontaneous communication as unelicited, child-initiated communication with the exclusion of responses to questions. Zanolli et al. (1996) see spontaneity as initiations that occur in the absence of any physical or verbal prompt from others. Potter and Whittaker (2001) define spontaneous communication as a child's attempt to transmit a message without being verbally prompted. This last definition puts the least demands on children. Therefore, it was chosen as the most appropriate to use when it comes to very young autistic children who are at an early stage of communicative development.

2.5.3 Issues for children with autism in initiating communication

Children with autism may initiate communication in different ways to that of their TD peers. This section highlights several issues children with autism may have in initiating social communication. The list presented here is by no means exhaustive but it reflects potential communicative methods young autistic children with limited language may use.

Among other methods, echolalia may be used to initiate communication. Echolalia means the repetition of words or phrases previously heard. It can take different forms. When words and phrases are repeated just after being said, this is immediate echolalia, whereas when words and phrases heard in the past are repeated, this is delayed echolalia (Bogdashina, 2005). Roberts (1989) identifies one more type, that of mitigated echolalia; in this case, phrases are repeated, slightly modified. All types of echolalia can be used to initiate communication. The main reasons individuals with autism might initiate echolalia are to request, protest, label, provide information, give directions and call (Prizant and Duchan, 1981; Prizant and Rydell, 1984). Echolalia is common among children with TD in the course of developing language but in autism this might last much longer and even continue into adulthood (Bogdashina, 2005). Echolalia often appears as a precursor of language development and it should be encouraged (Prizant et al., 2006). Therefore when a child uses echolalia to request an object, the adult should provide the object.

Echopraxia is the equivalent of echolalia in sign language (Carr, 1982) and it can be used to initiate communication by children with autism whose preferred mode of communication is signing. Jordan (1993) defined echopraxia as:

> *'The slavish imitation of sequence of actions without taking account of the new role or situation of the person imitating'.* (p. 244)

To my knowledge, the relationship between echopraxia and spontaneous communication has not been widely researched. This is possibly because fewer and fewer children with autism use sign language or other signing programmes (e.g. Makaton, Paget-Gorman) due to their difficulties with gesture and the limited number of people who can understand the signs. Another problem with signs is that some people with autism cannot go beyond the literal understanding of the signing gesture. For them, signing can be as abstract as language. For example, Donna Williams, a woman with autism, questions the connection between signing the squeezing of cows teats and asking for milk (Williams, 1996). The extent to which individuals with autism use echopraxia should be examined alongside the imitation difficulties this population is reported to have. It is found that imitation problems are affected by children's learning and motor difficulties (Vanvuchelen et al., 2011). Therefore, signing might not be preferred by children on the lower end of the spectrum. Imitation difficulties are more apparent at younger age groups (Williams et al., 2004) and this might explain why older children with autism tend to use signing more. However, Rogers et al. (2003) found that children with autism have impairments in facial and procedural imitation but not in

gestural imitation when compared to chronological and mental age matched non-autistic controls which shows that sign programmes might work for some of them.

Children with autism might use personal pronouns, deictic words and verb tenses incorrectly when initiating communication. The complexities in the use of pronouns sometimes last into adulthood (Bogdashina, 2005). Since Kanner's first studies (1946), it was noted that the speech of autistic children showed pronominal reversal referring to themselves as *you* and to the person they were speaking to as *I*. They often use their proper names to refer to themselves or others (Bogdashina, 2005). There are many cases of children with autism asking '*Do you want to go out*?' when they want to go for a walk or say '*Hello [their own name]*' when they want to be greeted by a passer-by. The main reason for the errors in using the pronouns *I/me*, *you* and *she/he* lies in their deictic nature; they change according to the situation, instead of being permanent labels for people (Bogdashina, 2005). On a similar note, verbal children with autism might also have difficulty with deictic words such as *yesterday*, *today*, *tomorrow*, *here*, *there*, *this*, *that* and verb tenses as their meaning depends on one's position in space or time (Noens and Van Berckelaer-Onnes, 2004). Hence, adults have to accept a child using people's names instead of pronouns (Jordan, 2001) and expect mistakes in deictic words and verb tenses.

The language of autistic people can be extremely literal (Kanner, 1946). Humour, sarcasm, irony, idioms and polite modes of expression are difficult for young children with autism and limited communication to understand. These may confuse them and

result in ‘inappropriate’ behaviours. For example, people with autism often say exactly what they see and feel without realising that they may be considered rude. Similarly, they misinterpret others’ instructions (e.g. ‘*paint the child next to you’*). A reason which might account for their extreme literalness is their difficulty in understanding the pragmatics of the language. Children with autism focus on what the words mean, without paying attention to the social situation (Bogdashina, 2005). Many children with autism use neologisms giving new names to objects, people and activities which can only be understood by them and sometimes their parents (Bogdashina, 2005). It may be that these idiosyncratic words are based on unique associations (Frith, 2003).

Repetitive questioning, talking endlessly about special interests and poor intonation can also affect the way children with autism initiate communication. Sometimes, they may repeat the same question again and again not necessarily because they do not know the answer but for the sake of the predictable reaction they are going to get (Bogdashina, 2005). As a response to that, adults can provide reassurance by giving them the message that they were heard. Repetitive questioning can also occur non-verbally when children try to exchange the same picture/symbol again and again. The more verbally able children very often assume that their communicative partner shares their knowledge and passion about their special interests. Thus, they make long monologues with no joint reference to check whether others are following them (Lawson, 2001). Children with autism and learning difficulties might attempt to hold ‘conversations’ in the absence of a conversational partner (Jordan, 1999). In cases like these, it is recommended that adults should initially show interest in the child’s talk and then gradually try to make it

into a turn-taking process. When adults notice children talking in absence of a communicative partner, they can get involved as if the talk was addressed to them. Finally, autistic children often have a monotonous, robot-like, flat voice without variations in their intonation (Bogdashina, 2005). A very typical example of this is Temple Grandin. Her voice is still faster, louder and flatter than average NTs.

Given the particular ways children with autism may initiate social communication, there is a need to understand why these differences emerge. A variety of cognitive/psychological and sensory processing theories have been suggested to answer this question. Knowing the reasons behind children's behaviours may affect adults' behaviour.

2.6 Cognitive/psychological and sensory processing theories in autism

A variety of cognitive/psychological and sensory processing theories have been suggested in an effort to explain the way children with autism use social communication. These theories should also be kept in mind when developing a facilitative adult interactive style. The theories which are discussed in this section are: Theory of Mind (ToM) (Baron-Cohen, 1995), Executive Functioning (EF) (Ozonoff et al., 1991; Hill, 2004), Central Coherence (CC) (Frith, 2003), monotropic attention (Lawson, 2001) and sensory processing (Bogdashina, 2003).

2.6.1 Theory of Mind (ToM) (Baron-Cohen, 1995)

Children with autism often fail to attribute mental states such as thoughts, emotions, beliefs and desires to themselves and others. This appears in the literature as poor ToM or mind-blindness (Baron-Cohen, 1995) and can put autistic children at a great disadvantage when they have to predict the behaviour of others. A lack of awareness of one's own needs and the inability to read others' minds have an effect on understanding and using communication (Howlin et al., 1999). For a communicative act to be successful, the sender of the message has to recognise the listeners' needs and desires as well as to monitor what they need to know or what they already know. If the sender is not aware of their desires, emotions, and needs or cannot *read* the thoughts, emotions and intentions of the recipient, communication is unlikely to succeed. Clare Sainsbury (2009), a woman with autism, gives an example of how difficulties in ToM interfere with communication. She explained that one day her mother dropped her off at school. Clare turned to her in panic and asked, '*Where's the frying pan*?' Everyone in the class had been told to bring a frying pan and it did not occur to Clare that she had to give this information to her mother. However, this difficulty is not universal to all people with autism. Several studies (Dahlgren and Trillingsgaard, 1996; Roeyers et al., 2001) showed that autistic people can carry out ToM tasks when they are well explained to them.

2.6.2 Executive Functioning (EF) (Ozonoff et al, 1991; Hill, 2004)

The term EF is used to define a set of higher-order functions which are necessary for flexible, goal-orientated behaviours, especially in novel circumstances (Pellicano,

2011). EF is an umbrella term including functions such as planning, working memory, impulse control, and mental flexibility (Ozonoff et al., 1991; Hill, 2004). Effective communication demands that children with autism are flexible, can adapt to new situations and know what to say or to do in different contexts. So if a child has EF problems, their communication will be severely affected. The difficulty with EF is quite universal in people with autism (Pennington and Ozonoff, 1996). Poor EF can account for difficulties in initiating social interactions (Pellicano, 2011). For example, if a child with autism asks for the toilet when they are at home, this does not mean that they will do the same when at school. This may happen as autistic children may have difficulties in generalising learnt skills in new contexts. Only after reaching a point of self-awareness in which they are able to monitor their actions and act with volition can people with autism be regarded as competent communicators. Planning and sequencing difficulties are also common in children with autism. For example, a verbal child with autism may find it difficult to start, maintain and end a conversation. These result in processing delays which make the fast-paced communication more challenging.

2.6.3 Central Coherence (CC) (Frith, 2003)

Whereas NT people tend to process information globally and in context, people with autism are likely to process information locally and in a fragmentary way (Frith, 2003). This tendency is known as weak CC. There is inconclusive evidence regarding the frequency with which this difficulty appears in people with autism. Some studies have shown that all people with autism display a local processing bias (Happe, 1997) but others failed to do so (Jarrold and Russell, 1997). Such a difficulty might affect the

social interactions of people with autism who cannot make sense of a seemingly 'incoherent world' (Frith, 2003). Williams (1994) compared this difference in processing information between herself and NT people to '*a busy department store, which [in her case] can open only one department at a time*' (p. 3). Communication is transient with functions, methods, partners changing all the time and making each communicative interaction different to the previous ones (Noens and Van Berckelaer-Onnes, 2004). Therefore, autistic children have to simultaneously keep in mind various fragmented information in order to communicate, making the process very challenging.

2.6.4 Monotropic attention or Single Attention and Associated Cognition in Autism (SAACA) (Lawson, 2011)

Another theory to explain the behaviour of people with autism which is close to CC is that of having a monotropic focus of attention or Single Attention and Associated Cognition in Autism (SAACA) (Lawson, 2011). A monotropic individual is able to focus on one thing at a time or use only one channel (e.g. visual, auditory, tactile etc) to filter information (Lawson, 2001). Since his first description of early infantile autism, Kanner (1943) highlights the attention difficulties people with autism may experience. He notes for one of his patients that:

> *'To get his attention almost requires one to break down a mental barrier between his inner consciousness and the outside world'*. (p. 218)

Mesibov (2007) compares the attention of people with autism to a torch beam meaning their attention is very intense but narrow. Grandin (1984) remembers how she was

studying the sand at the beach as if she was '*a scientist looking at a specimen under the microscope*' (p. 156). Due to these attention issues, autistic people often fail to notice most of the features of the social environment (e.g. individuals' facial expressions, non-verbal signals and other information) unless they have an interest in them and, as a result, they are likely to behave inappropriately and to 'stand out'. To add to this, Courchesne et al. (1994) notes that people with autism might experience a severe attention-switching problem. This means that it may take them a long time to shift attention from one activity to another. Hence, their initiations to communicate requests or comments might be delayed and appear out of context.

2.6.5 Sensory processing differences (Myles et al., 2000; Bogdashina, 2003)

Most children with autism have different ways of processing sensory stimuli (Bogdashina, 2003). These differences are so universal among children with autism that hyper or hypo sensitivity to sensory input is one of the new proposals for autism criteria in DSM V (Lord, 2010). There are seven sensory systems within the nervous system which may be hyper or hypo sensitive in autism (Myles et al., 2000). These are the auditory system (hearing), the tactile system (touch), the visual system (sight), the gustatory system (taste), the olfactory system (smell), the vestibular system (balance) and the proprioception system (body awareness). Sensory processing differences in any of these systems may influence to a great extent the way children with autism initiate communication. For example, a child who has hypersensitivity in the auditory system may avoid communicating with a loud adult and a child who has hyposensitivity in the visual system might get very close to the adults before initiating communication.

Children's sensory processing patterns should be identified before starting any intervention programme with them (Dunn et al., 2002).

After exploring the literature on different ways in which children with autism might initiate social communication and the theories that can explain why this might be happening, it seems useful to present the findings of several studies in the field. The next section discusses studies on spontaneous communication and autism with a particular emphasis on communicative functions, methods and partners as well as the effect of school activities on spontaneous social communication. The reason for selecting these studies is that they are closely related to the research questions of this thesis.

2.7 Previous research on children's spontaneous communication

Several studies have been carried out to investigate spontaneous communication in children with autism. Some of them focusing on the functions of communication, the methods children use, the partners they address and school activities which elicit most initiations are presented here. The findings are illustrated by quotes from individuals with autism.

2.7.1 Communicative functions

In one of the first studies in the field, Stone and Caro-Martinez (1990) explored the patterns of spontaneous communication during activities at school. They observed thirty children with autism and found that the most common communicative actions were:

getting attention, engaging in social interactions and requesting. Stone et al. (1997) compared fourteen children with autism to fourteen children with DD and/or language difficulties and found that the former requested more often and commented less often than controls. In a study of eighteen young children with autism and minimal or no speech, Potter and Whittaker (2001) suggested that the purpose of the majority of children's communication acts were requests and rejects or protests. Exploring spontaneous communication in children and young adults with autism, Chiang and Lin (2008) and Chiang (2009) found that request was the most commonly used function. In another study, Chiang (2008a) looked at the communicative spontaneity of thirty-two autistic children and pre-adolescents using Carter and Hotchkis's (2002) continuum model to explain the nature of spontaneous communication in naturalistic settings. Communicative acts were judged along a continuum from low to high spontaneity and results revealed that the majority of spontaneous communicative acts were at the highest level of the continuum. The level of spontaneity in requesting and rejecting was higher than the other communicative functions. Agius (2009) investigated the patterns of spontaneous and intentional non-verbal communication in eleven children with autism and found that requests and protests were the most common.

The main reason people with autism may not request or reject objects and activities is that they are unaware of their needs. Ros Blackburn, an adult with autism said in a lecture in 2011 that:

> *'Autistics are prompt dependent'; they find it extremely difficult to initiate communication, being at the mercy of other people around them'.*

She also gave an example of continuing to go horse riding even when she had stopped liking it. Only when her mother realised that she did not like it anymore and asked her whether she wanted to stop, did she answer yes.

2.7.2 Communicative methods

Most of the studies researching the functions of children's spontaneous communication looked also at the methods these tended to use. In Stone and Caro-Martinez's (1990) study, motoric acts were the most common method of initiating communication. Direct manipulation of the examiner's hand was the primary method children with autism used to communicate in Stone's et al. study (1997). The use of physical manipulation and re-enactments were the most frequent means of communication in Potter and Whittaker's (2001) study. Chiang et al. (2008) studied 104 children and infants with autism, DD and TD and found that young children with autism displayed deficits in initiating high level skills of joint attention such as pointing, showing, and extending objects towards the tester's face when compared to all control groups. In Chiang and Lin's (2008) and Chiang's (2009) studies children tended to use unaided Augmentative and Alternative Communication (AAC) such as gestures and motoric actions during spontaneous communication. In Agius's (2009) study children mainly used vocalisations, eye contact and hand manipulation.

There is a growing body of literature on the communicative methods children with autism use. However, this chapter cannot cover the whole literature on it and focuses on

CB, eye contact and pointing. CB is an ambiguous term which has often received vigorous criticism with regard to who is being challenged; the child or the adult. Emerson (2001) defines CB as a:

> *'Culturally abnormal behaviour of such an intensity, frequency or duration that the physical safety of the person or others is likely to be placed in serious jeopardy, or behaviour which is likely to seriously limit use of, or result in the person being denied access to, ordinary community facilities'.* (p. 3)

CB is found to be common among children with autism and closely associated with the degree of the child's communication difficulties (Sigafoos, 2000). Improvements in communication skills tend to decrease occurrences of CB. However, verbally skilled adults with autism recall using such methods to communicate when they were younger. Ros Blackburn (2011) used to hit children who were trying to be her friends, as hitting them made the children go away.

Eye contact as a method of initiating communication can be very difficult for many people with autism. John Elder Robison (2007), a man with AS who was diagnosed in his 40s, says:

> *'When I speak, I find visual input to be distracting . . . I usually look somewhere neutral—at the ground or off into the distance—when I'm talking to someone. Because speaking while watching things has always been difficult for me'.* (p. 3)

Jackson (2002) describes vividly his difficulty in looking somebody in their eyes by saying:

> *'I feel as if their eyes are burning me and I really feel as if I am looking into the face of an alien'.* (p. 70)

The difficulty individuals with autism may have in finding the right method to get their message across is described by Gerland (2000, cited in Sainsbury, 2009), a woman with AS. She illustrated how people with autism can worry about something without approaching anybody to share their problem just because it is difficult to ask something *'which you don't have words for'*.

Children with autism may find difficulties in both imperative and declarative pointing (Camaioni et al., 2003; Naoi et al., 2008). Imperative pointing is pointing to an object for requesting purposes whilst declarative pointing is pointing to share an object or event of interest (Wall, 2004). While declarative pointing is quite uncommon in autism, imperative pointing might be present (Baron-Cohen et al., 1992). The reason why this is happening may be that imperative pointing involves 'non-social' ends, whereas declarative pointing is an end in itself, which lack meaningfulness for some people with autism.

2.7.3 Communicative partners

Most of the studies looking at communicative functions and methods, investigated the partners to whom children address their initiations. It is essential to note here that some children with autism lack completely the understanding that they need a partner to send their message to in order to communicate their needs (Jordan, 1999). As a result, there

are cases of children pointing to out of reach toys in an empty room or holding pictures in front of their eyes and expecting objects to ‘magically’ appear.

In Stone and Caro-Martinez’s (1990) research, the teacher was found to be the most common target of communication. Adults were the most common communicative partner in Chiang and Lin’s (2008) and Chiang’s (2009) study. Almost all of the communicative initiations were directed towards familiar adults in Potter and Whittaker’s (2001) study too. Children preferred to communicate with adults than other peers in Agius’s (2009) study. An interesting finding by Chiang (2008a) showed that there was a difference in the nature of spontaneous communication when this was addressed to adults or peers. She found that spontaneity was lower when children addressed teachers and higher when they addressed peers. This suggests that children with autism tend to depend on prompts to initiate communication to adults but not to peers. This might be happening as adults tend to pre-empt the needs of children with autism to avoid tantrums (Potter and Whittaker, 2001) while peers can be more unpredictable. It is also interesting to note here that autistic children tend to communicate more often with their TD peers than peers with autism or other special needs (Bauminger et al., 2003). A possible explanation for this might be that, among these groups, TD peers are the easiest group to train in scaffolding children with autism. A number of studies have used TD children to teach social skills in children with autism (Barry et al., 2003; Thiemann and Goldstein, 2004; Tsao and Odom, 2006).

2.7.4 Activities and their effect on spontaneous social communication

There are only a few studies which reported differences in children's spontaneous communication across activities. Stone et al. (1997) found that children with autism initiate communication more often during unstructured activities. Quite inconsistent with this study is Chiang's (2009) work, which showed that spontaneous communication occurred more often during academic activities rather than free time, morning circle or lunch. It is interesting to note here that CB was more likely to occur in academic activities (Chiang, 2008b), which might have raised children's spontaneous communication during these times. Similar were the findings of another study (O' Reilly et al., 2005). This showed that a child with severe autism was self-injuring mainly during academic demands to escape from the activity but not during play or no-interaction conditions. Potter and Whittaker (2001) found that most spontaneous communication occurred in 1:1 or small group (1 adult: 3-4 children) sessions.

2.8 Summary

This chapter has undertaken a review of the literature on social communication. This has included defining social communication, identifying its main components and presenting social communication development in children with TD and children with autism. By comparing the two groups, the differences become clear. Intentional spontaneous communication and issues in initiating communication in autism have also been discussed as they played a crucial role in developing the data collection methods of this study. A number of cognitive/psychological and sensory processing theories have been presented to try to explain the reasons why children with autism have a different

communication profile to that of their TD peers. The chapter closed with findings from studies related to the research questions of this thesis. These findings have shown that autistic children initiate communication infrequently. They also showed that the main reasons these children communicate are for requesting and protesting, whilst they use mainly pre-symbolic methods, and their communicative partners tend to be adults. Regarding the activities which elicit more spontaneous communication, the evidence is inconclusive.

The next chapter focuses on adults caring for or working with children with autism. Adults can either facilitate or inhibit children's attempts to communicate. Communication breakdown in autism is bidirectional and hence intervention should focus equally on changing adults' behaviours (Aldred et al., 2001). As Gray (2000) argues, adults '*hold more than half the solution*'. The next chapter presents the key principles of some of the interventions in the field of autism (from naturalistic/behavioural to developmental/relationship-based approaches) which have a focus on adult interactive style.

CHAPTER THREE

REVIEW OF THE LITERATURE: ADULT INTERACTIVE STYLE

3.1 Introduction

For communication to be successful both partners need to work effectively together. Increasing attention is being given to how adults should interact with autistic children to encourage and facilitate their communication (Potter and Whittaker, 2001; Prizant et al., 2006). This chapter considers some interventions in autism which focus on developing communication. It pays particular attention to the advice given on how adults should modify their behaviour and communicative style. A set of principles derived from these is suggested. The term child instead of its plural form children is used in this chapter when describing facilitative adult interactive style as in most of the interventions presented here adults tend to work on a 1:1 basis with the children. Regarding adults, the plural form is preferred as there is usually more than one adult using the intervention with a child for skill generalisation purposes.

The chapter starts by classifying the approaches to develop social communication in autism into three broad categories: behavioural/naturalistic, developmental/relationship-based and skill-based approaches. It then discusses different interventions which belong to these broad categories and focuses on the advice they give for a facilitative adult interactive style. The next section presents past studies reporting changes in children's

spontaneous communication as a result of implementing these interventions. The last section of this chapter illustrates studies having explored the impact of parents' and practitioners' interactive style on children's communication. The ultimate aim of presenting intervention guidelines for effective adult interactive style and findings is to conclude with the principles contained within AISI, the intervention used in this study, to show their rationale and evidence base. Table 1 and Table 2 at the end of this chapter show the contribution of each intervention to the development of AISI.

3.2 Approaches to developing social communication in autism

There are a variety of approaches to develop social communication in children with autism. Classifying them into broad categories is an ill-defined issue as there are many different taxonomies, which can be based on subjective judgements and do not always agree with each other (Jordan et al., 1998; Simpson, 2005; Yoder and McDuffie, 2006; Ospina et al., 2008; Kalyva, 2011). This thesis mainly followed Ingersoll and Dvortcsak's (2006) classification system which has two categories. These are firstly, behavioural/naturalistic and secondly, developmental/relationship-based. Although these interventions have some similarities in the way they are implemented, they also differ greatly in their theoretical underpinnings. This section gives an overview for the main components of behavioural/naturalistic and developmental/relationship-based approaches, explores their similarities and differences and the characteristics of children who benefit more from each one of them. It also underlines the need to incorporate a third category for interventions which do not fit in any of the two categories and

explains why developmental/relationship-based approaches were the main source of information when developing AISI.

Behavioural/naturalistic interventions are based on the assumption that new skills should be taught in an environment where the antecedent stimuli are clear and systematic reinforcement follows a correct response (Cooper et al., 2007). These approaches break the target communication skill into smaller steps such as greet in response to the arrival of an adult (Charlop and Trasowech, 1991) or say '*thank you*' when being given a desired object (Matson et al., 1993). Teaching usually takes place in highly structured environments. The main argument against these approaches is that the learnt skills are context limited. It has also been argued that they address only the child's ability to achieve environmental ends (e.g. get an object) and not social ends (e.g. request social games). Additionally, they are accused of using pragmatically irrelevant reinforcers which do not help the child to make the connection between communication and achieving social ends (Wetherby, 1986). However, behavioural interventions have been subjected to rigorous research and there is evidence of gains in children's cognitive, communication, adaptive and social skills (Couper and Sampson, 2003). In these approaches adults use reinforcement, prompts, modelling and predictability. They also set up the environment to promote children's initiations and use time delay procedures.

Developmental/relationship-based approaches are based on the assumption that children with autism follow the developmental trajectories of their TD peers and suggest going

back to practice the milestones they missed (Greenspan and Wieder, 1998). Learning is achieved through strong affect-laden relationships between the child and the adults (Ingersoll et al., 2005). Developmental/relationship-based approaches share the following common characteristics (Ingersoll et al., 2005; Ingersoll, 2010a):

- the adults follows the child's lead,
- the environment is set up to evoke initiations from the child
- all the child's communicative attempts, even the unconventional and pre-intentional ones, are interpreted as intentional,
- affective and emotional interactions are emphasised, and
- language and social demands are adjusted to the child's developmental level.

In these approaches, adults pay great attention to their interactive style. They build strong relationships with the child through sharing mutual enjoyment of their in between interaction. Adults are also responsive to the child, adjust language input, follow their pace, use multiple cues and foster initiations.

Originating from different theoretical backgrounds, behavioural/naturalistic and developmental/relationship-based approaches have several strategies in common but display crucial differences as well. Both teach to the child's focus of attention, create an environment which fosters opportunities for communication and provide natural consequences (Wilcox and Shannon, 1998). One main difference is that

developmental/relationship-based approaches focus on promoting social communication skills without making a distinction between different specific communicative functions or methods, whereas behavioural/naturalistic approaches target specific communication functions (e.g. ask for information) and methods (e.g. sign for 'more') and teach them. The second crucial difference is that in developmental/relationship-based approaches adults respond to all the child's attempts to communicate even the 'unconventional' and pre-intentional, while in behavioural/naturalistic interventions adults prompt the child for an elaborated response (Kaiser et al., 1992).

There is a debate with regards to which children benefit from each type of intervention. The evidence is inconclusive. For Sherer and Schreibman (2005) and Stoelb et al. (2004, both cited in Brunner and Seung, 2009) behavioural/naturalistic interventions appear to be more beneficial for more cognitively able children whereas developmental/relationship-based interventions work better for less able children. However, Yoder et al. (1995) argue the reverse. They found that children with lower language levels benefited more from the behavioural/naturalistic interventions whilst children with higher language skills responded better to developmental/relationship-based approaches. Further study is clearly needed and it is always important to consider the approach that is most suited for the individual child.

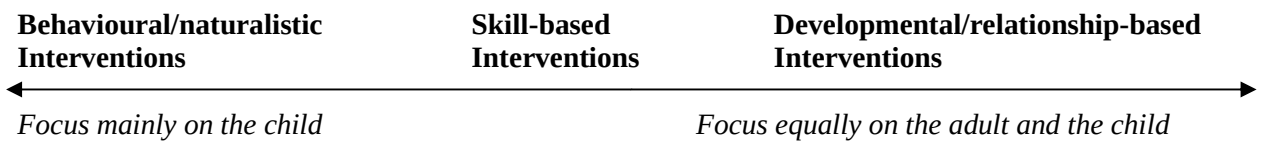
There are also approaches which do not fit in either of the two general intervention types described by Ingersoll and Dvortcsak (2006). These stand somewhere in between as they share elements from both the behavioural/naturalistic and

developmental/relationship-based approaches. This thesis classified them as skill-based interventions following the example of Simpson (2005). He defines skill-based interventions as the approaches targeting the particular needs of children with autism to improve functioning in these areas. However, Simpson includes in this category interventions such as EIBI or Picture Exchange Communication System (PECS), which this study classified as behavioural/naturalistic. This discrepancy further demonstrates the problems arising from the lack of a widely accepted taxonomy. One can argue that an approach can be both behavioural/naturalistic or developmental/relationship-based and skill-based at the same time. This is true and that is why the category skill-based is used here for two interventions which do not clearly belong to the behavioural/naturalistic or the developmental/relationship-based camp (i.e. TEACCH and unaided AAC).

AISI is mainly based on developmental/relationship-based approaches. This is in accordance with research stating that facilitative strategies are more appropriate for teaching initiation than prompting strategies which are more effective with responding skills (Rydell and Mirenda, 1994; Salmon et al., 1998). Moreover, all these approaches put particular emphasis on adults' behaviour which can affect to a great extent the child's communication (Nind, 1999; Potter and Whittaker, 2001; Prizant et al., 2006). However, there is an argument against these approaches which should be taken into consideration. Most of the developmental/relationship-based approaches evidence their effectiveness based on studies which are not experimental and as a result the effect of sample maturation cannot be ruled out (Ingersoll, 2010a). Figure 1 shows the

interventions on a continuum, based on the importance they place on the child alone or both the child and the adult to make communication work.

Figure 1: Continuum of the emphasis put on adult style in interventions to teach communication in autism



The next sections go into detail about specific interventions which belong to the three broad approaches to teaching social communication in autism. The main emphasis is on the advice these interventions give for adult style as this formed the basis for the development of AISI.

3.3 Specific Interventions within the behavioural/naturalistic category and the role of adult style

3.3.1 Early Intensive Behavior Intervention (EIBI) (Lovaas, 1981; Cooper et al., 2007)

EIBI is based on ABA and uses Discrete Trial Teaching (DTT). DTT is a very structured programme in which the therapists present a stimulus to the child and react straight away according to their response (Lovaas, 1981). If the response is correct, the therapists praise and reward the child whereas if the response is incorrect, the therapists immediately prompt the child to respond appropriately. DTT is unlikely to develop spontaneous communication as the child gets intensive instruction and direct feedback for responding to the adults. However, some of the advice given in EIBI with regards to

the adult interactive style might be used when facilitating spontaneous communication. For example, adults should be brief and specific, using a clear voice when giving the stimulus which should have a distinctive onset and offset (Richman, 2001). Adults are also advised to get the child's attention before presenting the stimulus (Richman, 2001).

They also use a variety of prompts. These prompts can be either verbal or physical. Physical prompts are recommended as although they might seem more intrusive, they are easier than verbal prompts to fade (Richman, 2001). They can range from full hand-over-hand prompt to show the child how to perform an action or a slight tap on the shoulder to remind them to take action. The adults should gradually reduce the amount of physical prompt they provide. For example, they may start with hand-over-hand help and gradually relax their grip, guide the child by the wrist, tap them on the shoulder or point to the activity they are supposed to be doing.

Adults also use reinforcement. This can take two forms: positive and negative. Positive reinforcement is the addition of a desired stimulus (e.g. biscuits, '*Nice job*', toy car, tickles etc.) to the environment whist negative reinforcement is the removal of an unpleasant stimulus (e.g. an activity the child dislikes) from the environment (Cooper et al., 2007). Reinforcement should be used differentially as then it becomes more powerful (Cooper et al., 2007). This means that adults should save the most meaningful reinforcers for the most difficult tasks. For example, they should provide more reinforcement the less prompted the child's communicative attempt is. Special

importance is placed on the adults' tone of voice when reinforcing. This should be done with an upbeat voice (Richman, 2001). To sum up, EIBI trains adults to use a number of prompts and reinforcers. It also requires them to get the child's attention before addressing them and to use brief and specific language.

3.3.2 Naturalistic behavioural approaches

Apart from the EIBI, there are a number of more naturalistic behavioural interventions. These approaches although being structured, are more child-directed and use naturally occurring stimuli from the child's environment. This section discusses the facilitative adult interactive style several of these interventions propose.

3.3.2.1 Incidental Teaching (IT) (McGee et al., 1994)

IT involves providing instructions based on the child's interests and motivation (McGee et al., 1994). Its rationale is that every situation throughout the day can be used as a teaching opportunity. Adults arrange the environment in a way to promote the child's initiations (Richman, 2001). A commonly used technique is to put favourite toys or objects the child needs in sight but out of reach. Crayons are removed from the cupboard before it is time for the child to colour or the forks are not on the dinner table when it is time for dinner. Once the child initiates request, the adults encourage them to elaborate on the initiation. Additionally, adults should follow the child's lead, wait for initiations, indicate expectation through gestures and use prompts to complete the interaction (McGee et al., 1994).

3.3.2.2 Pivotal Response Training (PRT) (Koegel et al., 2006)

PRT is an approach using mainly ABA principles but also some developmental procedures targeting five pivotal areas which, when treated, have a collateral effect on other areas of functioning (Koegel et al., 2006). These are motivation, responsivity to multiple cues, self-management, self-initiations and empathy. PRT suggests that adults make environmental arrangements which promote frequent opportunities to communicate. Adults should identify motivating materials, put items in sight but out of reach and provide the child with opportunities which break a preferred activity down into smaller steps (e.g. one building block at a time instead of a box full of blocks, small amounts of juice). So, additional opportunities for communication are created. Adults are also advised to follow the child's lead, respond to their interest (e.g. '*Do you want the ball?*' when looking at the ball) and immediately provide the preferred item contingent upon the child's attempt to respond. Daily routines should be broken down too. For example, when entering a dark room the adults should wait for the child to request that the light be on or instead of opening jars and containers they should provide the child with the opportunity to ask for it. A short time delay may clearly show to the child that the routine is broken. Adults should gain the child's attention before giving instructions, use concise and task-related language, combine verbal instructions with modelling and ensure that instructions have a clear beginning and ending (Fisher, 2006). Reinforcers are recommended too (Fisher, 2006). Reinforcers start from immediate and obvious and they gradually get more abstract (e.g. from a sticker to the task completion

itself). Adults are advised to be predictable and prepare the child for changes ahead of time.

3.3.2.3 Early Start Denver Model (ESDM) (Rogers and Dawson, 2010)

The ESDM fosters development in a variety of areas known to be affected by autism (Rogers and Dawson, 2010). Each child's interest is taken into account while adults try to support their social communication using carefully behavioural teaching strategies. ESDM uses teaching practices from EIBI, PRT and the Denver model. Adults are advised to engage the child in positive emotional experiences in which the latter will have the chance to practise their knowledge. They also have to offer the child opportunities to request, protest, comment, ask for help and greet as frequently as every ten seconds. Reinforcement is widely used but the goal is to make social engagement the reward. For this reason, social experiences are paired with non-social rewards such as favourite objects, which enhance the reward value of social experiences. Adults should get and maintain the child's attention as well as systematically use fading prompts so that behaviours are triggered in response to environmental cues rather than adult prompts. They are also asked to respond to the child's communicative cues giving them the message that they have been heard. Language used should be developmentally appropriate. The *one-up rule* is proposed. This means that the length of adults' utterances is approximately one word longer than the length of the child's utterances.

3.3.2.4 Milieu Teaching (Fey, 1986)

MiIieu Teaching states that prompting and cueing can be done during highly natural activities in which the child's reinforcement is the communication outcome itself (Fey, 1986). Adults are asked to observe the child and when the latter shows interest in an object or an aspect of the environment, they should mand a verbal response (e.g. '*Tell me what you need*'). If the child responds correctly, they are verbally reinforced and given the object. If the response is incorrect, adults should use prompts. There are four types of milieu language prompts: model, mand, questions and time delay (Ingersoll, 2011). The following example explains how these prompts might work. A child playing with a toy car and a therapist interrupting the child's game to prompt them to say '*car*' or '*play car*' set the scene. When the child's play routine is interrupted, the therapist can model what the child should say (e.g. '*car*', 'more *car*'), mand (e.g. '*Tell me what you want*'), question (e.g. '*What do you want?*') or restrict access and get an expectant look.

3.3.2.5 Responsive Imitation Training (RIT) (Ingersoll and Schreibman, 2006; Ingersoll, 2010b)

Ingersoll is now developing a behavioural naturalistic intervention called RIT. The goal of this intervention is to teach young children with autism imitation through play (Ingersoll, 2010b). She argues that imitation plays a central role in developing other social communication skills and therefore it should be targeted in early interventions (Ingersoll, 2008b). Reciprocity is an integral part of RIT. The therapists are trained to imitate the child's verbal and non-verbal actions, describe them using simplified language and expand on their utterances (Ingersoll and Schreibman, 2006; Ingersoll,

2010b). Therapists are also asked to model actions with toys (Ingersoll and Schreibman, 2006). Before modelling they should get the child's attention by facing them or saying their name. They have to model the actions up to three times and if the child does not imitate after the third time, the therapists physically prompt the child to complete the action and then give praise. Therapists have to fulfil the child's requests and briefly acknowledge their comments (Ingersoll and Schreibman, 2006). In sum, in RIT therapists keep a balance between modelling actions and following the child's lead. Imitation of verbal and non-verbal behaviours, running commentaries on the child's play using simple language, getting the child's attention before modelling, prompting and praising them are the main components of RIT.

To conclude, naturalistic behavioural approaches share a number of common adult style principles. Adults should be responsive to the child following their interests, use simple language, create environments which promote spontaneous communication and pause showing an expectant look. Special attention is paid to the development of language and this is why adults are encouraged to elaborate on the child's communicative attempts.

3.3.3 Picture Exchange Communication System (PECS) (Bondy and Frost, 2002)

PECS is a picture-based programme to teach children with communication difficulties to initiate communication in a social exchange (Frost and Bondy, 2002). It prompts children to exchange a picture of a desired object for that object. A crucial point of PECS is that it aims at spontaneous communication as there is no verbal pre-empting

such as '*What do you want*?' or '*Give me the picture'*. The adults have to wait for the child to initiate communication by handing over the picture/symbol. Its significance lies in the fact that unlike other AAC systems (e.g. pointing or signing which can be seen in the absence of a communicative partner) the child has to physically interact with a partner by giving them something. In initial PECS sessions, two adults are needed. Adult 1 (the communicative partner) holds out an empty hand in front of the object while Adult 2 (the physical prompter) physically guides the child to hand in the picture to Adult 1. Once this is mastered, prompts are gradually eliminated and more distance between Adult 1 and the child is created (Bondy and Frost, 2002).

Bondy and Frost (2002) suggest a number of communication enhancement strategies to develop the child's spontaneity which bear great similarities to IT. Adults are encouraged to place favourite items within view but out of reach, offer small portions of food and drink, consume a favourite food or drink in front of the child and create the need for assistance (e.g. wind-up toys, firmly closed containers etc). They are also asked to interrupt a favourite cooperative activity, offer the child something they do not like, hold out two favourite items and say nothing and violate the child's expectations. When these strategies are put in place, adults are reminded to pause and wait to increase the likelihood of spontaneous communication. Communicative partners are advised to wait for at least five seconds with an expectant look, raised shoulders and eye-brows and if despite that the child does not respond they are advised to use subtle prompts. These could include pointing to the picture or object, saying the initial sound of the word or having a second person model the response.

Therefore, in PECS adults have to set up environments which promote the child's initiations and then wait for them to take action. Adults are also encouraged to show with their body language that they are available for communication and if this does not work to use prompts. The prompts should be physical or visual as verbal pre-empting is not recommended.

3.3.4 Portage, modified for children with autism (Smith, 1999)

Portage is a home based programme for pre-school children with additional support needs and their families (White and Cameron, 1987). It aims to support the development of play, communication, relationships and learning. Most of the strategies used come from the EIBI (e.g. chaining, shaping and task analysis). Central to Portage philosophy is that parents have an essential role. Adults in Portage should use clear language speaking only about things which can be seen or heard (Willis and Robinson, 2011). It has been adapted for children with autism (Smith, 1999). The advice given to adults working with autistic children is that they should be very responsive to them. They should watch the child intensively and respond as if they communicated by asking questions, commenting, reacting and repeating. Adults should also pause expectantly and wait, extend communicative attempts, imitate the child and use slower speech and simpler sentences. Reinforcement, exaggerated tone, gestures and facial expressions as well as fun are recommended too. So, responsivity to the child's initiations is very

significant in the Portage programme for children with autism. Adults should also wait, imitate, use simple language and have an animated tone of voice and body language.

3.4 Specific Interventions within the developmental, relationship-based category and the role of adult style

3.4.1 Intensive Interaction (Nind and Hewett, 1994, 2001; Caldwell, 2008)

Intensive Interaction is an approach for enabling social communication based on the model of caregiver-infant interaction and can be used with individuals of all ages (Nind and Powell, 2000). It builds upon the basics of communication (e.g. taking turns, sharing personal space, using and understanding eye contact, facial expressions and non-verbal communication) (Nind, 1999). Adults are expected to be observant, tuned in and responsive while allowing pauses and letting the child lead (Nind and Hewett, 2001). It is a '*process oriented approach*' (p. 101) with the interaction itself being the ultimate goal (Nind and Powell, 2000). When adults change their interpersonal behaviours (e.g. facial expressions, body language, vocal and gaze behaviour) to become more interesting and meaningful, children increase their social communication (Nind, 1999).

Nind and Hewett (2001) advise adults to position themselves below the child's eye level before communicating. Nind and Hewett (1994) place great emphasis on physical contact when interacting with people with limited understanding. They consider touch a fundamental form of communication especially for non-verbal people. So adults in the approach use a lot of physical contact while interacting with the child. Adult availability

is another important principle. Nind and Hewett (1994) advise that the adults' body should be slightly turned towards the child, with shoulders and legs relaxed, head slightly leant to one side or back and eyes wide but with a mild and questioning face. Pausing and waiting are of particular value in Intensive Interaction as children with communication difficulties may process information at a slower pace (Nind and Powell, 2000). Adults should celebrate and acknowledge all the child's attempts to communicate, including speech (Nind and Hewett, 2001). Imitation is also important (Caldwell, 2006). The need for adults to slow down and use some variation in the pitch of their speech is highlighted too (Nind and Hewett, 2001). To summarise, adults are expected to get close to the child, show them they are available for communication, follow the child's lead and imitate them. They are encouraged to respond to all the child's attempts to communicate and pause and wait to give the child a turn.

3.4.2 Social Communication Emotional Regulation Transactional Support (SCERTS) (Prizant et al., 2006)

The SCERTS framework is a multidisciplinary approach to support children with autism and adults who work or live with them (Prizant et al., 2006). It aims to support the child to become a competent, emotionally regulated communicator and has a focus on developing strategies for the adults as well as for the child. Interpersonal support is a crucial component of SCERTS. Adults should be responsive and foster initiations. Responsiveness can be achieved in a number of ways such as following the child's focus of attention, attuning to their emotion and pace, responding appropriately to their signals and recognising signs of dysregulation and offering support. Adults can also be responsive by imitating the child, pausing in anticipation of a response from them and

offering breaks when needed. Initiations can be encouraged by offering choices, waiting for initiations and the adult intervene, only when it becomes clear that the child is not going to initiate. Allowing children to initiate and terminate activities may further promote initiations. When activities cannot be terminated immediately, SCERTS advises adults to indicate steps for completion.

Setting the stage for engagement and providing appropriate developmental support are also very significant components of SCERTS. To engage children, adults are advised to get close and down to their level and secure their attention before communicating. This can happen either verbally by calling the child's name or non-verbally by touching them. Adults can provide developmental support by repairing communication breakdowns and expanding on the child's non-verbal communication. It is the adults' responsibility to clarify the meaning of an unclear signal coming either from themselves or the child. They should also model some verbal communication. If for example a child gives the adult a jar of crisps to request open, the adult can say '*more crisps*' or '*open jar*'.

Adults are advised to adjust language input and to model appropriate behaviours. If, for example, a child does not understand words, adults should mostly use single words. And if a child does understand some words, adults can use two- and three- word sentences. The use of non-verbal cues (e.g. gestures, facial expressions, intonation) to support understanding is highly recommended. Adults should also model appropriate non-verbal communication (e.g. gestures, pointing), a range of communicative functions

(e.g. holding out an open palm to request an object, pointing to interesting events in the environment and waving to greet) and 'child-perspective' language considering the child's intentions and developmental level (e.g. if a child reaches for a toy car, adults might say '*car*', or '*car down*').

SCERTS draws adults' attention to the sensory issues many children with autism may experience. In particular, adults should avoid being overly enthusiastic or speaking too loudly when communicating with children who are hypersensitive to sounds and they should avoid touching or hugging children with tactile hypersensitivity. Overall, SCERTS encourages adults to be responsive to the child, to promote initiations, to get close to them and show availability, to use 'child-perspective' language and a range of non-verbal cues to support understanding. Adults should also be alerted to the child's potential sensory sensitivities which must affect the way each individual child is approached.

3.4.3 Developmental, Individual Difference, Relationship-based (DIR) model - Floortime (Greenspan and Wieder, 1998, 1999; Wieder and Greenspan, 2003)

The DIR model - Floortime is a developmental intervention which takes young children with autism to the very first milestones they missed and starts the developmental process from the beginning (Greenspan and Wieder, 1998, 1999). Affective interactions with others are highly emphasised (Wieder and Greenspan, 2003). Its primary goal is to help children form a sense of themselves as intentional and interactive individuals through building a link between emotions, behaviour and eventually words (Greenspan

and Wieder, 1998, 1999). Establishing secure relationships is the cornerstone to promote development of the functional milestones. Adults should base their interactions on the child's interests, imitate them and respond to their initiations (Schertz and Odom, 2004). Adults are encouraged to hold the child's attention through their senses (e.g. vocal gestures, touch, motor experiences) (Greenspan and Wieder, 1998). Great attention is also given to children's individual sensory differences (Schertz and Odom, 2004).

Based on DIR model - Floortime, Sonders (2003) developed her own approach of developing communication skills, which she named *Giggle Time*. Here adults assign meaning to the child's ordinary actions by making it into a turn-taking process. She considers giggle games the basis for pre-conversational speech. Adults are advised to use one of the pragmatic pre-language skills to start the *Giggle Time*. These can be eye contact, gesture, movement, social smile, touch, proximity, vocalisations etc. The adults' turn should be a similar length of time as the child's to keep their interest. Given the children's affinity for predictability, adults are advised to repeat their turns exactly the same way each time. Once a routine is established, the adults' turns can be modified. Animated facial expressions, body movements and voice volume should be used. People who might feel embarrassed to be animated can use puppets pretending that it is the puppets' voice which is animated (Greenspan and Wieder, 1998). Exaggeration is necessary when interacting with children with autism as the adults should be more interesting than the child's object of desire. Adults are advised to create problems for the child to solve which may offer opportunities for communication (Greenspan and

Wieder, 1998). For example, they can read a book upside down or put the socks on the child's hands while getting dressed.

Giggle Time pays a lot of attention to the last and the last but one turn of each game. The last but one turn is called *cue turn*. It is noticeably different from the previous turns (e.g. louder, quieter or slower). The last turn is called *reinforcing turn* and it can be tickles, spin or a favourite object to increase the likelihood of the child starting again. Adults should follow the child's lead, imitate them and exaggerate. They are also advised to wait for initiations (for 10-15 seconds to show the child it is their turn to do something), use rhymes and combine them with movement to engage the child. Sonders (2003) highlights the importance of incorporating vestibular movement into the joint action routines stating that the lower the staying power of the child, the more vestibular movement is needed. The ideal distance between the adult and the child is within 60 cm apart. When adults want to show the child it is their turn, they should adopt a freezing expression and posture (e.g. mouth, eyes and limbs in an exaggerated open position). A song broken into phrases to establish a turn-taking routine can work really effectively for most children with autism. A child's favourite action song in which the adults drop the end word or phrase can work well too. Adults can do the action and wait for the word and if the child does not respond they can prompt by whispering the word.

To conclude, the DIR-floortime model suggests that adults follow the child's focus of attention, imitate them and respond to all their communicative attempts, even the

unconventional ones. Close distance between the child and the adult, stopping part way through a predictable routine and an exaggerated body language and tone of voice are essential components of this approach.

3.4.4 Musical Interaction (MI)/Music Therapy (MT) (Trevarthen et al., 1996; Methley and Wimpory, 2010)

MI focuses on the need to 'tune in' to the child and start working with what they are able to do. Parents or school staff are involved in the process and they are asked to implement the intervention in other contexts too. They follow the child's lead by imitating their sounds and movements, use running commentary songs, flexible action songs and short repetitive routines which build anticipation (Christie et al., 2009). Adults are asked to treat the child as if they are communicating long before they really are (Methley and Wimpory, 2010). For instance, if the child runs away, the adults treat this as if they meant to communicate, by starting a running game or song. In addition, the child learns that they can direct the action in the sessions. When adults imitate what the child does, this gives them the idea of exchange and turn-taking. Adults are also advised to copy the child's sounds as well as their physical actions. Spontaneous songs about what the child is doing are encouraged as it is argued that some children are more likely to take notice of the adult if the adult sings a response rather than just saying it.

MT has many similarities to MI and this is why they are discussed in the same section. However, MI and MT are different in some important respects. MT enables social

communication through the use of musical instruments. It is delivered by a trained therapist who has a three year musical training and a MT postgraduate qualification (British Association for Music Therapy - BAMT, 2012). The therapist sees the child on a 1:1 basis once or twice a week and there is usually no involvement of other adults who can extend the principles to the child's everyday life. MT is described as:

> *'Attentive listening on the part of the therapist* [which] *is combined with shared musical improvisation using instruments and voices so that people can communicate in their own musical language, whatever their level of ability'. (BAMT, 2012- Online)*

MT proponents argue that every individual, regardless of learning and communication difficulties has an inherent musicality and can respond in one way or another to music (Trevarthen et al., 1996). The therapist improvises songs of what the child is doing, they follow and support the child through their music (e.g. matching music with the child's hand beating on the floor), while providing them with time and space in which they can explore the instruments. Special attention is paid to the silent moments. Music is both sound and silence and silence should be actively experienced (Nordoff and Robbins, 1977). Other important characteristics of music are that it gives predictability in the adults' behaviour (e.g. crescendo for anticipation) and synchronises and supports the adult's and the child's turns. It reflects what is happening (e.g. if the interaction goes faster the music has to go faster too) and eventually the child picks up that they can influence the music. An example of how MT works in practice with an autistic child is given by Warwick (2001), a leading British music therapist, who says that she was *'trying to meet him where he was'* (p. 202). When the boy tapped on the strings of the

autoharp, she tapped on the guitar strings and when the boy responded by tapping on a drum, she replied on a different drum.

In summary, MI and MT use music to support what the child is doing. Adults are asked to either sing commentaries or to improvise on an instrument a melody to reflect what the child is doing. They are also advised to respond to every sign from the child, even if it is not clearly communicative, and to use imitation and pauses.

3.4.5 Son-Rise or Option approach (Kaufman, 1994; Kaufman 2002)

The Son-Rise or Option Program (Kaufman, 1994; Kaufman 2002) is a child-centred approach developed by the parents of a child with autism. The rationale behind it is that '*the children shows us the way in*' and then adults can show them the way to the NT world. Instead of trying to force a child to conform to a world that they do not understand or does not make sense to them, adults try to go with them. Once a mutual connection is established, the child learns with greater success, speed and ease. An effective way of developing a relationship with the child is via the three E's, which are *energy*, *excitement* and *enthusiasm* (Autism Treatment Center of America, 2008). Kaufman (1994) notes:

> *'We had to make ourselves into the most beguiling […] clowns of the universe so we would excite him and entice him to walk through seemingly impenetrable walls'*. (p. 63)

Adults should honour vigorously every child's attempt to communicate and acknowledge even the ineffective efforts by saying '*nice try'* or '*that was so close'*.

The adult should be the number one attraction and join in the child's repetitive behaviours (Kaufman, 1994). Adults should see the child's repetitive behaviour as a doorway to create a relationship with them. The Kaufmans started imitating their son 't*urning his 'isms' in an acceptable, joyful and communal event'* (p. 49). By 'isms' they define things children do repetitively and to the exclusion of everything else. For example, when Raun, Kaufmans' son, spun plates, rocked or flicked his fingers whoever was in the house would do the same besides him. It was their way of being with him. Imitating Raun was proven effective. He would watch his parents when they were involved in his rituals. Following his lead was another adult style principle they tried with him. When Raun rocked back and forth while humming, his parents rocked besides him and sang in harmony with his hum.

Kaufman (1994) gives some practical advice on how to increase the effectiveness of the proposed techniques. The first thing adults should do is to observe what the child is doing. Then they should place themselves one metre away and do what the child does for at least fifteen minutes. Some children will respond from the first moment, some others might need longer. It is important that adults position themselves so it is easy to get eye contact from the child. Being in front of them either at eye level or slightly below is the ideal position. Achievements should be celebrated in animated ways such

as big, whispered or sung cheers, arms thrown in the air, jumps up and down, a little dance. These celebrations should be sincere and from the heart as children with autism may detect the discomfort of people around and move away from them. A lot of physical contact such as hugging, stroking, tickling, tumbling and throwing into the air is recommended but adults should always allow children the freedom to back off when they need to. Finally, adults are advised to offer choices and encourage the child to initiate.

In sum, adults should get close to the child before communicating, respond to all their communicative attempts, even the unsuccessful ones, follow their interests and imitate their 'isms'. Throughout the sessions adults have to be as animated as possible to get the child's attention.

3.4.6 Hanen or 'More than words' approach (Manolson, 1992)

The Hanen or 'More than words' approach trains parents to develop a facilitative interactive style with their children (Pennington and Thomson, 2007). Its main goal is to teach the child communication skills and increase their vocabulary. Parents are encouraged to take time to Observe, Wait and Listen (the OWL technique) (Manolson, 1992). Additionally, the child is allowed to lead while parents '*share the moment*' and add language and experience (Manolson, 1992). Special attention is drawn upon teaching parents how to recognise their child's attempts to communicate, use simpler language and engineer situations for them to communicate (Pennington and Thomson, 2007). Imitation, interpretation of child's behaviour and child-perspective language are

very important in the Hanen approach (Manolson, 1992). Parents should acknowledge all the child's attempts to communicate. They should respond to the child's messages even if they are likely to get it wrong, as their response lets the child know that they have been heard. Parents are advised to use language which is appropriate for the child's level and to speak as the child would if they could. Manolson (1992) highlights the importance of waiting while acknowledging how difficult this can be as often a silent moment might be felt as an empty moment. Parents are also advised to let their child problem solve (Manolson, 1992). Use of fun words to attract attention such as 'wheeee', musicality of speech, fun physical contact, praise, smiles, laughter and expansions are some other core strategies taught to parents (Sussman, 1999).

Overall, the Hanen approach suggests that parents should take a step back and observe their child before communicating with them. They are encouraged to wait for initiations, imitate the child, acknowledge all their attempts to communicate, expand on them and use child-perspective language.

3.4.7 Pre-school Autism Communication Trial (PACT) (Green et al., 2010; Green and Aldred, 2012)

PACT is a parent-mediated video-aided intervention. It is based on the rationale that children with autism respond better to a parent style of communication adapted to their difficulties (Green et al., 2010). Therapists use video feedback to advise on parent-child interactions. There are six main stages described by Green and Aldred (2012). Parents are firstly encouraged to establish shared attention by observing the child's focus and

inferring intentions. Parents' sensitivity and synchrony is also highlighted. Parents are encouraged to reduce demands and increase comments and acknowledgements on what the child is following or doing. The language they use should be matched to the child's development and focused intentions. Predictable routines, anticipation and repetitive language are also recommended. It is suggested that parents should use a variety of communicative functions (e.g. request, comment, seek attention) and communication teasers (e.g. disruptions, sabotage, mistakes, breaks in the flow). The last stage of PACT is extending language and conversation. Parents try to build on topics to develop syntax, vocabulary and reciprocal conversations. Of great significance is the finding that parents reported improvements in the perceptions and sensitivity to their child's communication needs (Green et al., 2010).

To sum up, PACT teaches parents to be sensitive to their child by inferring their intentions, following what they are doing and commenting on it. Language should be tailored to the child's developmental level and extended by the adults. Communication teasers, which increase the opportunities for spontaneous communication, are recommended too.

3.4.8 Responsive Teaching (RT) (Mahoney and Perales, 2003; Mahoney and McDonald, 2007)

RT highlights the importance of a positive emotional relationship between the child and the therapist (Mahoney and Perales, 2003; Mahoney and McDonald, 2007). It has several adult goals to address children's social communication. Getting into the child's

world, observing their actions and imitating them are principles adults should follow. Communication should be accompanied with appropriate intonation, pointing and non-verbal gestures. Activities children enjoy should be repeated. Adults are also advised to interpret the child's behaviour as an indicator of interest, follow their attentional focus and be sensitive to their sensations. The rationale behind these strategies is threefold. Firstly, following the child's lead increases eye contact. Secondly, contingent responsiveness increases intentional communication and, thirdly, using multiple cues enables the child to follow adults' attentional focus. To sum up, adults are advised to follow the child's interests and interpret their behaviour as communicative. They should also imitate the child and use non-verbal supports.

3.5 Specific Interventions within the skill-based category and the role of adult style

Two visually mediated educational approaches belong to this category, which was added to Ingersoll's and Dvortcsak (2006) classification system, as they have elements of both behavioural/naturalistic and developmental/relationship-based approaches. These are TEACCH and unaided AAC.

3.5.1 Treatment and Education of Autistic and related Communication handicapped Children (TEACCH) (Lord and Schopler, 1994)

TEACCH is a structured teaching approach developed at the University of North Carolina in 1972 (Lord and Schopler, 1994). It works on many areas of skills including communication. Communication is seen as an exchange which NT people have a

responsibility to make work and Lord and Schopler give advice on facilitative adult style.

Visual structure and motivation (e.g. snacks, favourite activities etc) are crucial when teaching children with autism to communicate (Lord and Schopler, 1994). Adults need to be predictable and to give information top to bottom or left to right. Depending on the child's abilities, a number of visual cues can be used such as written words, photos or symbols with written words, photo or symbol cards and objects of reference. Adults should clarify beginnings and ends of activities. Social reinforcement such as a smile, a hug, a pat on the back, a '*I am proud of you'* or even a sticker should be used with caution as they might be meaningless for children with autism (Mesibov, 2007). It is the adults' job to find what a meaningful reinforcer is for every child. Moreover, adults need to give multiple communicative opportunities across settings (e.g. school, home, community etc) (Lord and Schopler, 1994). Mesibov (2007) suggests that adults should not give children objects they want unless they ask for them.

Adults are encouraged to get the child's attention before communicating and to use real choices. The child's attention should be gradually sustained for longer periods of time. Adults can use colours and highlighting in the visual cues to engage the child's attention. Mesibov (2007) draws attention to the fact that adults have to give the child the chance to choose from objects and activities they really like and these choices should be supported by visual cues. Language should be kept to a minimum. In

TEACCH, partnership work with parents and building on the child's strengths are also very important.

To conclude, TEACCH uses visual supports to make children independent communicators. Adults should use as many visual cues as possible supported by minimal speech. They also have to get the child's attention before communicating and provide them with many real choices.

3.5.2 Unaided Augmentative and Alternative Communication (AAC)

Unaided AAC is *'the use of manual signs such as gestures and pantomime'* (Mirenda, 2003, p. 204). It can be used by adults to support receptive language understanding when communicating with children with autism. Makaton is one form of unaided AAC which is widely used with people with learning difficulties (Walker, 1976). Adults are advised to use Makaton with children with autism to emphasise key words alongside language or other AAC systems (Wall, 2004). They should mainly sign nouns as these are reported to be the first word classes children with autism acquire (Salvin et al., 1977; Watters et al., 1981). Other forms of unaided AAC such as headshake for *'yes'* or *'no'*, waving to indicate *'hello'* or *'goodbye'* and pointing are also suggested. In summary, adults should use a number of non-verbal cues such as simple signs and gestures to support the child's understanding.

After presenting a number of interventions giving direct or indirect advice on adult interactive style, there is need to investigate their impact on children's spontaneous communication. The next section reports past studies having showed a link between adult style and children's communication skills.

3.6 Past studies on interventions and social communication

A number of studies have examined the changes in children's social communication after the implementation of different interventions. This section presents the findings of studies which showed changes in children's spontaneous communication as a result of an intervention with reference to the role of adult style. The studies are grouped into three categories according to the theoretical foundations of the interventions they used (behavioural/naturalistic, developmental/relationship-based and combined interventions) and are presented here in chronological order.

3.6.1 Behavioural/naturalistic interventions

Although behavioural/naturalistic interventions refer to facilitative adult interactive styles, few studies examined the impact of adult style on children's social communication. This can be explained to some extent by the fact that other variables such as IQ, adaptive behaviour and language are most commonly examined when behavioural/naturalistic interventions are used (Eikeseth et al., 2007; Remington et al., 2007). Additionally, one can argue that behavioural interventions are more often used

with more cognitively able children with autism as they seem to benefit more from them as opposed to less able children who seem to benefit more from developmental approaches (Sherer and Schreibman, 2005; Stoelb et al., 2004, both cited in Brunner and Seung, 2009). According to this argument, behavioural interventions are not appropriate and hence they are not widely used with children with very limited communication skills.

Few studies have reported on the effects of behavioural/naturalistic interventions on spontaneous social communication. Even fewer refer particularly to the impact of adult interactive style on children's communication. Charlop-Christy et al. (2002) taught three children with autism to use PECS. They found that the structured and concrete nature of physical exchange and the time delay procedures adults used increased children's social communicative behaviours such as requests and joint attention. Jones et al. (2006) used DTT and PRT to facilitate initiating and responding of joint attention skills in five children with autism aged 2-3 years. The training took place in the preschool classroom and lunch areas. Adults were asked to develop rapport with the children, follow their choices and preferences and pairing themselves with a variety of reinforcers. The findings reported that the strategy was effective in developing both types of joint attention skills which were maintained beyond the intervention period. Ingersoll and Schreibman (2006) used a multiple baseline design across five autistic children to assess the benefits of RIT. They found that participants increased not only their imitation skills but also the use of language, pretend play and joint attention.

3.6.2 Developmental/relationship-based interventions

One of the main goals of developmental/relationship-based interventions is to improve children's social communication. They focus on adults' behaviour as well as on children. So changes in children's behaviour can be clearly attributed to the way adults interact with them. This section presents studies that have showed a link between adult style and children's communicative competence.

Sussman (1999) randomised fifty-one preschool children with suspected autism and their main caregiver to either a 'More Than Words' programme or a control group. The programme had a significant effect on both parents' and children's communication skills and the children's development of vocabulary. Chandler et al. (2002) carried out an 18-month intervention with ten children with autism (aged between 1:10 and 2:9 years at assessment) and their parents. The intervention consisted of MI therapy translated into home based activities. At the end of the intervention all children showed gains in social interaction and expressive communication (gestural and verbal). Mahoney and Perales (2003) trained the mothers of twenty autistic children in RT logic model. They found significant improvements in children's social communication competence and initiations. Aldred et al. (2004) randomly allocated twenty-eight children with autism (age 2:0 to 5:11) to treatment and control groups in a preliminary study for the development of PACT. All children in the treatment group increased their initiation of social interaction.

3.6.3 Combined interventions

Some researchers attempted to combine elements of different types of interventions to check the impact on children's communication. Most of these studies showed improvements in social communication skills regardless of the type of intervention used.

Kasari et al. (2006) conducted a RCT study with fifty-eight autistic children (aged 3 and 4 years old). Children were randomised to a joint attention intervention, a symbolic play intervention and a control group. The two interventions focused on adult interactive style combining elements of ABA (e.g. systematic prompting and reinforcement) and facilitative interactive methods (e.g. following the child's lead, talking about what they were doing, expanding on what they said, sitting close to them, making eye contact and imitating their actions on toys). Results showed that children following either of the interventions initiated more joint attention compared to the control group.

Yoder and Stone (2006) compared the effectiveness of two interventions (e.g. PECS and Responsive Education and Prelinguistic Milieu Teaching-RPMT) for facilitating children's intentional communication. Thirty-six preschool children with autism (mean age 3 years) participated in the study. Adults using PECS were taught to show availability, use prompts which gradually fade away and create communicative opportunities in the environment. Adults trained in RPMT were encouraged to be

responsive to the child and to use motivational activities and prompts when needed. Results showed that RPMT encouraged more initiations of joint attention for children who had some joint attention skills and high levels of intentional communication pre intervention. PECS, on the other hand, was more effective for children who had minimal joint attention skills and low levels of intentional communication pre intervention. Ingersoll (2011) compared the effects of Milieu Teaching, RT and a combined intervention on the expressive language of two pre-schoolers with autism. Adults using the Milieu Teaching had to playfully interrupt the child's play and prompt the use of language to initiate request. When the correct response was given the child was reinforced by getting access to the toy. Adults being trained in the RT had to use simplified language to narrate the child's play and expand on any language used by the child. The combined intervention consisted of strategies from both Milieu Teaching and RT. She found that Milieu Teaching led to more requests while RT spurred more comments. The combined intervention showed similar increase in both variables.

Apart from these studies having explored the impact of well-known interventions on children's communication, there is some smaller scale research focusing exclusively on adult interactive style. Researchers inspired by one or more well-known interventions developed their own adult style interventions and tried them in practice. These interventions do not claim clear association to a specific intervention and therefore they are discussed in a separate section.

3.7 Past studies on adult style and spontaneous communication

Since there is no conclusive evidence regarding which intervention is more effective when teaching social communication in children with autism, many studies employ eclectic approaches, which is an integration of principles of different approaches. The focus of this section is on changing the adults' style of interaction to increase children's spontaneous communication. The studies to be presented are classified into two groups based on the communicative partner they were developed for and are presented in chronological order. A section on parents' interactive style proceeds, followed by a section for school staff's style of interaction. Most of the principles used in these studies originate from developmental, relationship-based approaches as in these interventions altering adult interactive style is one of the main goals.

3.7.1 Studies on parents' interactive style

A number of studies investigated parents' interactive style while trying to teach communication to their children. It is suggested that parents of children with autism interact with them in different ways than parents of TD children. For example, some studies found that parents of children with autism tend to be more directive (Watson, 1998) or smile less in response to their children's smiles (Dawson et al., 1990). This triggers a chicken egg scenario as to what comes first. Is it the children's particular communicative profiles or the adults' behaviour which accounts for the former's limited spontaneous communication? This section gives an overview of how parents tend to

interact with their autistic children and the impact of changing their interactive style on children's communication.

Watson (1998) and Doussard-Roosevelt et al. (2003) observed mothers' interactive style when dealing with their autistic children. Watson (1998) examined the extent to which mothers of preschool children use language while following their child's lead. She observed fourteen children with autism and fourteen TD children for fifteen minutes of free play with their mothers. Mothers of children with autism were as likely to use language for something which was within their child's focus of attention as mothers of TD children. However, they were more likely to use language for something that was not within the child's focus of attention. Qualitative differences in mother-child interactions were also evidenced by Doussard-Roosevelt et al. (2003) who video recorded twenty-four preschool children with autism and twenty-four TD children in free play sessions with their mothers. Mothers of children with autism used more physical contact and intensive behaviours and less language.

Another group of studies looked at the extent to which children with autism were influenced when their parents were trained to change their interactive style. Escalona et al. (2001) found that their sample of twenty children with autism (aged from 3 to 6 years old) showed more social relatedness after being massaged by their parents for fifteen minutes before bed every night for a month. Drew et al. (2007) recruited twenty-four children with autism (mean age 23 months) and randomly allocated their parents to either the training group or the control group. Reinforcement, use of visual supports for

spoken language, imitation, watch and wait, simple gestures such as simple action songs and Makaton nursery rhymes were used. The study showed that some of the children in the parent training group made more progress in communication skills and language. Siller and Sigman (2002) compared twenty-five children with autism, eighteen children with DD and eighteen children with TD. They illustrated a clear link between parental sensitivity to the child's focus of attention and the child's development of joint attention and language for the autistic children. A possible explanation for this might be that the child enjoys such interactions and feels more motivated to repeat them. Doussard-Roosevelt et al. (2003) examined the interactions of nine mothers with their autistic and non-autistic children and noticed that the former were more engaged when non-verbal behaviours were employed. Kashinath et al. (2006) conducted an intervention with five children with autism (aged from 33 to 65 months) and their mothers in the family's home. Modifying the environment to promote interaction, using reinforcement and time delay, imitating contingently, modelling and gestural and visual cueing were the strategies the mothers were taught. The intervention had positive effects on the children's communication skills. Ruble et al. (2008) researched thirty-five children with autism and their caregivers while interacting in a free play activity and concluded that the caregiver's responsiveness was associated with the child's initiations of social interactions.

Overall, studies on parent or caregiver interactive style showed that an effective communication style involves more physical contact and less language. When language is used, it is usually for things within the child's focus of attention. Parents who are

responsive to their children and often expand on their language facilitate their communication. Simple gestures, imitation, waiting, use of fun and songs and musicality of speech are also effective principles that parents use to enhance their children's communication.

3.7.2 Studies on school staff's interactive style

Although there is a growing literature about training parents of children with autism in using a communication enabling interactive style, little is known about principles teaching staff might be trained in. This section presents studies, which were conducted in a school setting and, as a result, are of particular importance for the research design of this thesis.

Potter and Whittaker (2001) carried out a qualitative key study on the way teaching staff interact with children at school and their influence on children's spontaneous communication. They involved eighteen young children with autism (average age 4.5 years) who had minimal or no speech from autism specialist classes in five special schools in the UK. Children were video recorded during everyday school activities and some staff were interviewed about the optimum communication enabling environment. The findings confirmed that when staff adopted a minimal speech approach (e.g. one or two relevant concrete words), used long pauses and non-verbal methods of interaction (e.g. rough and tumble play, burst and pause, imitation) and offered frequent opportunities for communication, the children communicated more often.

Some researchers took this a step further and tried to train the teaching staff in principles thought to promote children's social communication. They then explored differences pre and post intervention. Hwang and Hughes (2000) studied the early communicative skills of three non-verbal preschool children with autism when the class staff went through a social interactive training. They found that contingent imitation, naturally occurring reinforcement, expectant look and environmental arrangement were associated with increased eye contact, joint attention and motor imitation. Ingersoll et al. (2005) implemented a Developmental, Social-Pragmatic (DSP) approach with three boys with autism. This approach was adapted from developmental/relationship-based approaches such as DIR-floortime, Hanen, SCERTS and RT. The main components of the intervention included following the child's lead, engineering opportunities for initiation, acknowledging all attempts as communicative, emphasising affect and using indirect language stimulation. Findings showed an increase in the children's use of spontaneous speech. McAteer and Wilkinson (2009) undertook a study in a school for pupils with autism (aged 4-19 years). They trained staff in a *facilitative style of interaction* and following the training, changes in both the adults' and the pupils' behaviour were noticed. Adults were waiting for the child to start the communication, showing that they were listening by responding or repeating and commenting on what the child was doing and the pupils initiated interaction more frequently.

There were similar findings from two other studies on practitioners' interactive style and its effect on the social communication of children with special learning needs other

than autism. Kozleski (1991) examined the use of an expectant time delay technique excluding verbal and physical prompts in combination with a quizzical facial expression. Two students with severe cognitive and physical difficulties took part. The results indicated that both students were more frequently requesting highly preferred items during training phases. Mahoney and Wheeden (1999) found that in forty-nine teacher-child dyads, teachers' affective involvement (e.g. being responsive, supportive and relatively non-directive) encouraged children to initiate more social behaviours.

To sum up, these studies showed that when teaching staff wait for longer, follow the child's lead, and give them more opportunities to communicate, the children are more likely to initiate interaction. The same happens when the teaching staff are responsive, show availability, imitate the child and acknowledge all their attempts as communicative.

3.8 Summary

This chapter showed that although most interventions in the field of autism place some emphasis on adult interactive style, little is known about its effect on children's spontaneous communication. Developmental/relationship-based approaches certainly focus more on adults and the way they interact with children. However, studies often fail to establish clear links between adult interactive style and children's spontaneous communication due to research design limitations. Even in research designs which do explore the impact of adults' style on children's communication, there is often no

participants' contribution to the development of the intervention. Researchers-experts usually train adults (parents or teachers) in a set of principles and measure the children's behaviour pre and post intervention.

The principles of an effective adult style emerging from this literature review which seem to be important in developing children's spontaneous communication are classified into two categories which are general principles and communicative opportunities:

General Principles:

Adults should:

1. Gain attention
2. Establish appropriate proximity or touch
3. Show availability
4. Wait for initiations
5. Respond to all communicative attempts
6. Assign meaning to random actions or sounds
7. Imitate the child
8. Follow the child's lead or focus of attention

9. Use exaggerated pitch, facial expression, gestures and body language

10. Use minimal speech

11. Provide time for the child to process the given information

12. Expand on communicative attempts

13. Use non-verbal cues

Communicative Opportunities:

Adults should:

1. Offer choices

2. Stop part-way

3. Give small portions

4. Make items inaccessible

5. Give material they will need help with

6. Contradict expectations

7. Give non preferred items

8. 'Forget' something vital

Table 1 and Table 2 below show which of the interventions led to the inclusion of the general principles and the communicative opportunities stated above. Not all studies

and documents on the interventions made this explicit so the content of the tables has been determined according to what is implicitly suggested by these studies.

In summary, this study sought to develop an intervention built on evidence from the research literature. The next chapter presents the research methodology which was followed and gives details of the children and staff who participated and the setting in which the study took place.

Table 1: General principles on adult interactive style suggested by interventions in the field of autism

Interventions	General principles												
	Attention	**Proximity**	**Availability**	**Wait**	**Respond to <u>all</u> attempts**	**Assign meaning**	**Imitate**	**Follow child's lead**	**Exaggera-tion**	**Minimal speech**	**Time**	**Expand**	**Non-verbal cues**
Behavioural/naturalistic Interventions													
EIBI	√	√							√	√			√
Incidental Teaching			√	√				√					
Pivotal Response Training	√							√		√			√
Early Start Denver Model	√									√			
Milieu Teaching								√					
Reciprocal Imitation Training	√	√	√			√	√	√		√		√	√
PECS			√	√									
Portage modified for autism				√		√	√		√	√		√	
Developmental/relationship-based Interventions													
Intensive Interaction		√	√	√	√		√	√					
SCERTS	√	√	√	√	√	√		√		√		√	√

DIR-Floortime	√	√		√	√	√	√	√	√				
Musical interaction/Music Therapy				√	√	√	√	√			√		
Son-Rise/Option	√	√			√	√	√	√	√				
Hanen	√	√		√	√	√	√	√	√	√		√	
PACT						√		√		√		√	
Responsive Teaching						√	√	√					√
Skill-based Interventions													
TEACCH	√									√			√
Unaided AAC													√

Table 2: Communicative principles suggested by interventions in the field of autism

Interventions/Communicative opportunities	Choices	Stop part way	Small portions	Inaccessible items	Material they will need help	Contradict	Non preferred items	'Forget' something vital
Behavioural/naturalistic Interventions								
EIBI								
Incidental Teaching				√				√
Pivotal Response Training			√	√				
Early Start Denver Model								
Milieu Teaching				√				
Reciprocal Imitation Training								
PECS	√	√	√	√	√	√	√	
Portage modified for autism								
Developmental/relationship-based Interventions								
Intensive Interaction								
SCERTS	√			√	√			

DIR-Floortime		√				√		
Musical interaction/Music Therapy								
Son-Rise/Option	√							
Hanen								
PACT		√		√	√	√	√	√
Responsive Teaching								
Skill-based Interventions								
TEACCH	√							
Unaided AAC								

CHAPTER FOUR

METHODOLOGY: THEORETICAL PERSPECTIVES, RESEARCH DESIGN AND SAMPLE

4.1 Introduction

The literature review has shown that initiating social communication is often problematic for young children with autism. Additionally, increasing attention has been paid to adult interactive style and its role in developing and encouraging children's spontaneous communication. The call is now for more evidence-based research in school settings to explore the effect of adults' interactive style on children's spontaneous communication. This study aimed to develop an intervention focusing on adult interactive style which would encourage children's spontaneous communication. Within the research process, I felt it was important to involve the staff as much as possible. In the past, researchers have often entered schools with their own agenda and merely described what happens in practice or trained staff in a predetermined intervention and collected pre and post intervention data. In contrast, this study sets out to involve teaching staff in the development and the implementation of the intervention. This chapter is the first of two chapters on methodology. It provides details on the research methodology, several key research terms, the sample and setting and closes by giving the sequence of the research phases. The second chapter on methodology discusses how the research methods were developed and used, explains how the adult intervention was developed and reports on the main ethical considerations of this study.

4.2 Research aims and research questions

The overarching research aim was to develop an intervention which focused on adult style (AISI) and then to measure its effects on children's spontaneous communication.

The five main research questions were:

1. Did the intervention (AISI) affect the frequency with which children initiated communication?
2. Did the type of activity affect the frequency of the children's spontaneous communication?
3. Was there a difference in the reasons for which children initiated communication when adults changed their interactive style?
4. Was there a difference in the methods children used to initiate communication when adults changed their interactive style?
5. Were adults able to change their interactive style?

4.3 Philosophical underpinnings of the study

This section briefly discusses the most common philosophical theories influencing social and educational research. It defines terms such as ontology, epistemology and methodology and concludes by presenting the philosophical foundation of this study.

The philosophical underpinnings of a study are often unrecognised or taken for granted in educational research (Scott and Usher, 1999). However, research is not just a technical exercise but is closely related to the way the researcher understands the world

(Cohen et al., 2007). This means that a researcher's beliefs and values play a critical role in the way they conduct research. This set of beliefs and values is what Kuhn (1962) coined as paradigm and Johnson et al. (2007) call research culture. There is a debate with regard to the number and the content of research paradigms (Mertens, 1998; Burrell and Morgan, 2005; Johnson et al., 2007). This study embraces the opinion that there are three main research paradigms in social science and educational research. These are the positivist, interpretivist and pragmatic or the mixed methods paradigm (Johnson et al., 2007). Each one of these encompasses different ontological, epistemological and methodological positions.

For a paradigm to be understood, its ontology, epistemology and methodology should be defined. Questions of an ontological nature investigate whether the reality is external to the individual or a product of one's cognition (Burrell and Morgan, 2005). For Guba and Lincoln (1994), ontology answers the question '*What is the nature of reality*?' Assumptions of an epistemological type are connected to the nature of knowledge and whether it is hard, real and objective or soft, subjective and dependent on context (Burrell and Morgan, 2005). For Scott and Usher (1999), epistemology is concerned with '*How do we know what we think we know*?' With regard to the methodology, Burrell and Morgan (2005) offer two potential approaches. These are nomothetic, which is strictly based on systematic protocols, and ideographic, which implies the researcher's involvement in the participants' flow of life. To sum up, ontology represents the way a researcher interprets the reality and epistemology the way they approach the knowledge. Based on their ontological and epistemological standpoints,

the researcher has to decide on the methodology which means the stance they will adopt with regard to sample selection, data collection methods, and analysis and interpretation of the findings.

Positivists advocate the existence of an objective reality (ontology), which the researcher should approach by being neutral to the subject of the research (epistemology) and using mainly quantitative data for this purpose (methodology) (Mertens, 1998; Cohen et al. 2007). Interpretivists, on the other hand, believe in the existence of multiple and socially constructed realities (ontology), which influence to a great extent what is being researched (epistemology) and ask for primarily qualitative data (methodology) (Mertens, 1998; Cohen et al., 2007). The researchers who believe in the idea of mutually exclusive paradigms (i.e. positivism or interpretivism) are often called purists (Onwuegbuzie and Leech, 2005). However, there is a tendency recently for researchers to question this strict paradigm discrimination and to challenge paradigm-bound research (Cohen et al., 2007). They call themselves pragmatists (Onwuegbuzie and Leech, 2005) and believe researchers should use the philosophical assumptions and methods which work best for each piece of research (Robson, 2002). These researchers belong to the pragmatic or mixed-methods paradigm.

This study operates within the pragmatic paradigm in that methods have been selected which best suit the purpose. However, its ontology and epistemology lie within the interpretivist paradigm. My position is that social reality is depicted as experienced by the participants (ontology) who are influenced by the presence of the researcher

(epistemology). This means that if I had conducted the study with different participants or if another researcher had taken my role, the results might have been different. In terms of methodology, equal emphasis is put on both quantitative and qualitative data to answer the specific research questions. Quantitative data were needed to compare differences in the frequency of initiations, the communicative functions and methods and AISI principles pre and post intervention. These data were supplemented by gaining qualitative data from staff on the intervention and its impact on the children.

4.4 Research Design

This section illustrates how the research has been designed to explore the five main research questions. Yin (2003a) defines research design as:

> *'The logical sequence that connects the empirical data to a study's initial research questions and, ultimately, to its conclusions'*. (p. 19)

It includes defining the research problem, formulating the research questions, collecting the data, analysing these and writing the final report. This section illustrates how the research has been designed to explore the five main research questions.

There are many different research designs. Tesch (1990, cited in Creswell, 2003) identified twenty-eight of them. A common classification of designs follows the typology of research paradigms. So, there are quantitative or fixed and qualitative or flexible designs. The distinctive hallmark is that in quantitative designs there is a great

deal of pre-specification before the fieldwork, whereas in flexible qualitative studies, the design evolves and develops during the research process (Robson, 2002). The most common quantitative designs are experiments, quasi-experiments, relational designs, comparative studies and longitudinal designs. The most widely used qualitative designs are case studies, ethnographies, grounded theory studies, evaluation studies and action research. There is a third, mixed methods design which shares features of both quantitative and qualitative research designs (Creswell, 2003; Teddlie and Tashakkori, 2003; Creswell and Plano Clark, 2007; Leech and Onwuegbuzie, 2009). To answer the research questions in this study a mixed methods research design was selected.

4.5 Research methodology

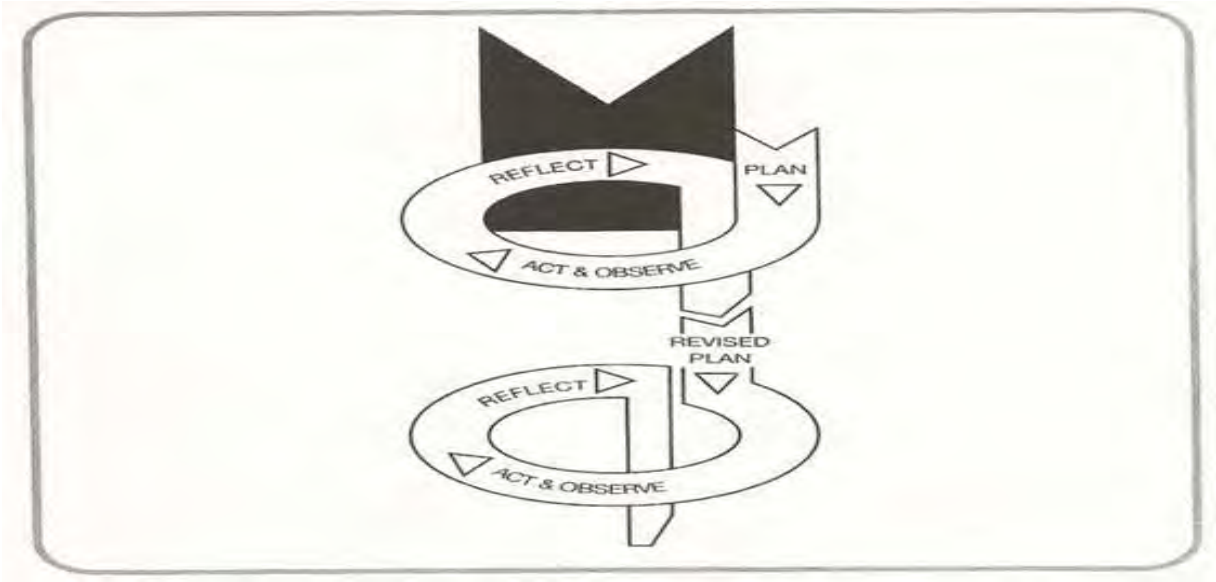
Action research was the main methodology followed to collect and analyse data for this study. Action research has been used for over seventy years. Kurt Lewin coined the term in the 1940s (Lewin, 1946). It was broadly used in education in the 1950s in the US and it was introduced to the UK in the 1970s. Currently, action research is a growing field in special education addressing the need for more evidence-based practice (Odom et al., 2005; Parsons et al., 2011). It is a practice-driven approach in which researchers and practitioners work in close partnership to produce viable improvements to real world problems. Reason and Bradbury (2001) give the following definition:

> *'Action research is about working towards practical outcomes, and also about creating new forms of understanding, since action without understanding is blind, just as theory without action is meaningless'*. (p. 2)

The aim of educational action research is to improve practice by making changes and learning from the consequences of these changes (Kemmis and McTaggart, 1992). However, serious concerns have been raised about the quality of many of these studies (Adelman, 1989). Zeichner (2001) maintains that the great variation in both the conceptualisation and interpretation of educational action research accounts for its poor quality.

Action research has four key features. It is practical, it involves change, there is a cyclical process, and it requires participants' contribution in the research process (Denscombe, 2010). Its main aim is '*to improve practice rather than to produce knowledge*' (Elliot, 1991, p. 49) and one of its principal contributions is that it helps practitioners to better understand their practice (Zuber-Skerritt, 1996). Change and reflexivity are also integral parts of action research and they determine its spiral format (see Figure 2). Reflection on the initial findings generates ideas for change which then shape the next stages of the study. In the beginning, the researcher plans a change, implements a solution agreed with the people involved and then observes what happens. The researcher and the participants reflect on the effects of the change and plan the next stage of the research process together. They then implement the amended plan and observe the consequences. This process is repeated several times until a final solution is established.

Figure 2: The action research spiral



SOURCE: Kemmis and McTaggart, 2000 (p. 4)

The researcher and the research participants work in close collaboration through all the stages of action research. Participants have to take an active role. For this reason, action research is often described as participatory research (Kemmis and McTaggart, 2000). Because of the participants' active role, the ownership of action research is a re-occurring debate (Reed, 2005). Action research can be conducted in two ways: either a researcher observes practitioners doing research and speaks on their behalf (i.e. interpretive approach) or the practitioners themselves are the researchers. Elliot (1991) is in favour of the interpretive approach. The concern with this approach is that although practitioners participate to a great extent in the data gathering, it is the researcher who generates the new theories and disseminates the findings (Whitehead and McNiff, 2006). On the other hand, Whitehead (1989) maintains that teachers should work in

'*democratic partnership*' with researchers, so that both can learn and grow together. Hall and Hall (1996) wrote about this partnership between the researcher and the researched participants:

> *'The research relationship is between equals and is not exploitative.[...]There is a genuine exchange. The research is negotiated'*. (p. 12)

4.5.1 Criticisms of action research

There are several criticisms of action research which are worth mentioning. The two most widely made are related to its rigour and generalisability (Koshy, 2005). Action research cannot claim the rigour and validity of laboratory-based studies. However, using a variety of data collection methods can enhance the standards of rigour and validity. Data generalisability is an issue that should be handled with caution. Action research does not set out to seek data which can be generalised to the wider population. Data can only be generalised within the situation in which the study took place. The aim of action research is to provide data which informs future practice in that setting and can form the basis of future research elsewhere.

4.5.2 Advantages of action research

There are a number of advantages in using action research. A very important one is that it bridges the gap between academic research and practice (Somekh, 1995). Schools and practitioners often feel excluded from what is happening in academia. Most findings are published in specialised journals to which schools do not subscribe or presented at

scientific conferences which only a few senior school staff might attend. Additionally, it is argued that teachers tend to have '*a consumer approach to read research*' (Zeuli, 1994, p. 53). This means that they are more interested in having information about the end product but are less interested in the process and the rationale behind it. This might be happening as although many teachers are very keen to get ideas on how to improve their skills in the classroom, they have difficulties in identifying those principles in academic publications (Zeuli, 1994). Action research can address this issue by making teaching staff part of the research process. Professional development is another very important strength of action research (Denscombe, 2010). Staff have the chance to be trained for free, in up-to-date interventions without having to leave the class. This can be much appreciated especially by TAs who rarely get extra training apart from the few whole-school training days (five inset training days per year).

The researcher benefits as well from working so closely with practitioners. The researcher learns how to better plan the research and understands the constraints of using interventions in real world environments. This is in contrast with confined laboratory-based studies in which the researcher is in more control of the variables under investigation but the findings cannot be directly transferable to real world settings. The notion of staff empowerment is of equal importance (McNiff and Whitehead, 2006), especially for the TAs who do not often have the chance to voice their opinion. Team work is another significant advantage of action research (Koshy, 2005) which is often neglected in schools due to the quick pace that staff have to follow. It is argued that teaching staff working with children with autism '*can sometimes find*

themselves feeling deskilled, over-responsible, isolated or overwhelmed' (Pittman, 2007, p. 31). Action research can remind staff of the importance of sharing knowledge and difficulties with colleagues.

4.5.3 Challenges of action research

Doing action research can be quite challenging for a number of reasons. There is less control in real world environments than in clinical or laboratory settings (Denscombe, 2010). The researcher cannot isolate the variables they are interested in, which means that changes due to other factors cannot be excluded. The issue of ethics is another challenge (Koshy, 2005; McNiff and Whitehead, 2006). The presence of the researcher and an audio or video recorder in the classroom can be very anxiety-provoking for staff and may be a challenge for the pupils. Finding time to discuss the research with very busy staff is an issue too. There are also challenges posed to the researcher's objectivity (Burns, 2000; Denscombe, 2010). Burns (2000) suggests that after a long stay in a setting, the researcher might feel so familiar with the participants and the environment that they lose their personal perspective of reality and objectivity and 'go native'.

There are a number of key research terms which play a crucial role in planning and conducting action research. Validity, reliability and reflexivity are some of them. The following sections discuss the background of each one of them.

4.6 Validity

Validity refers to the degree to which *'a method, a test or a research tool actually measures what it is supposed to measure'* (Wellington, 2000, p. 201). Cohen et al. (2007) and Robson (2002) suggest piloting the research tools to enhance their validity. Moreover, employing standardised measures or instruments which are known to have good validity can add to a study's validity. A strategy that Yin (2003a) proposes to improve validity particularly for qualitative data is triangulation. This can be achieved by using three or more different types of respondents (e.g. teacher, parent, pupil) or instruments of data collection (e.g. interview, questionnaire and observation of a teacher) with the same person.

External, internal and ecological validity are important to consider when designing a research study. Both external and internal validity are two validity types which can be problematic in naturalistic studies (Yin, 2003a). External validity relates to the extent to which the findings of a study can be generalised (Cohen et al., 2007), whilst internal validity refers to the potential of a causal relationship between two or more variables (Bryman, 2008). A solution to the threat of external validity is to follow Burns' (2000) advice and provide a full description of the unit of analysis leaving the readers to decide whether the findings apply to their case or no. Internal validity is extremely difficult to achieve in studies like this. Advocates of the interpretivist paradigm often use the terms credibility instead of internal validity (Riege, 2003) and transferability (Riege, 2003) or generalisability (Robson, 2002) instead of external validity. Ecological validity considers whether *'social scientific findings are applicable to people's every day, natural social settings'* (Bryman, 2008, p. 33). Therefore, if a study is conducted in a

school setting without changes to the curriculum and the daily timetable of the class, its ecological validity is high.

4.7 Reliability

Reliability is a concept closely linked to validity. It is often difficult to achieve this in real world research (Wellington, 2000). The term can have different meanings in quantitative and qualitative research (Cohen et al., 2007). In quantitative studies, reliability is used to ascertain whether if the same methods were used with a similar sample, the results would be the same. In the case of qualitative research, reliability refers to the accuracy between what the researcher records and what is actually happening. The term dependability instead of reliability is often used in qualitative studies (Mertens, 1998; Robson, 2002).

4.7.1 Inter-rater reliability

Inter-rater reliability is a test of the degree to which two or more raters agree that a phenomenon has occurred. Coolican (2006) highlights the great importance of conducting inter-rater reliability checks in naturalistic settings where the likelihood of rater bias is higher due to the unpredictability of the observed behaviours. A study is considered to have inter-rater reliability when two or more raters with the same theoretical background interpret the researched phenomena in the same way with agreement ratings over a certain percentage (Cohen et al., 2007). Reichow et al. (2008) suggest that this percentage should be of a minimum of 80%. One of the most common ways of calculating inter-rater reliability is the percentage agreement (Watkins and

Pacheco, 2000). Percentage agreement is defined as the number of agreements between two or more observers divided by the sum of both agreements and disagreements, and then multiplied by 100:

$$\frac{Agreements}{Agreements + Disagreements} \times 100$$

4.8 Reflexivity

Creswell (2003) interprets reflexivity as an acknowledgement by the researcher of their biases, values and interests. Denscombe (2010) asks:

> *'How far can my description of […] (an) event depict things from the point of view of those involved when I can only use my own way of seeing things, my own conceptual tools, to make sense of what is happening?'* (p. 86)

A researcher's background is likely to shape the findings of a study and their interpretation. Denscombe (2010) advises researchers make their personal beliefs, interests and experiences clear.

4.9 Research design of this study

This study used action research as defined by Whitehead (1989) and Hall and Hall (1996) (i.e. democratic partnership between researcher and participants) to explore the differences in children's spontaneous communication when classroom staff changed the way they interacted with them and to examine the extent to which staff managed to change their interactive style. The ultimate goal was to conduct research which could be

transferred into real world settings. An equal contribution by the researcher and the researched participants was more likely to produce data directly transferable to the school setting. The researcher may have better knowledge of the literature but the participants know the setting and the children and can predict practical difficulties before they occur. This study was conducted in one classroom within an autism specialist school. If this intervention was effective, then it could be introduced to other classes within the same school or in other schools too. Some important difficulties the researcher faced should be acknowledged here. I was an outsider to the school with two main other barriers which were that I am not a native English speaker and I had no experience of the British educational system.

This study used a mixed methods approach to answer the research questions as it is proposed by the literature for similar studies (Creswell, 2003; Creswell and Plano Clark, 2007; Ollerton, 2008). Quantitative and qualitative data were collected using video recordings, questionnaires, focus group interviews and self-evaluation checklists. Quantitative data (mainly obtained from the video recordings, questionnaires, and self-evaluation checklists) were necessary to show changes in children's spontaneous communication and adults' interactive style while qualitative data (mainly obtained from the focus group interviews) were needed to explore the impact of each principle of the intervention and to get a more in depth view of the reasons for the changes. The combination of quantitative and qualitative data coming from different sources enhanced the robustness and rigour of this small-scale study. Details on the sample

selected are now given whilst data collection methods are discussed in detail in the next chapter.

4.10 The sample: the school, the children and the teaching staff

There are two kinds of sampling techniques: probability sampling in which the participants are a representative cross-section of the whole population, and non-probability sampling in which the sample has not been chosen using random selection (Bryman, 2004; Denscombe, 2010). Denscombe (2010) maintains that small-scale research tends to have non-probability samples. Purposive sampling is a type of non-probability sample. In this, the researcher selects a small number of cases based on their known features. Denscombe (2010) maintains:

> *'Purposive sample can […] be used as a way of getting the best information by selecting items or people most likely to have the experience or expertise to provide quality information and valuable insights on the research topic'.* (p. 35)

He continues that such a sample can work as an exploratory sample. This was the case for this study in which a purposive sample was used. I selected a school and a class within it. The following sections give information first on the school and then on the children and the staff who comprised my sample.

4.10.1 The school

An all-age autism specialist school was selected to be the exemplary case (Yin, 2003b) for this study. Two outstanding Ofsted inspection reports (2007, 2010) described the school's high standards in educating autistic children and adolescents. The school accepts pupils with an autism diagnosis and communication and social difficulties. It has fifteen classes which on average have ten students. Some of them follow the National Curriculum, whilst others follow an Extended National Curriculum which is tailored to the children's specific needs. The staff:pupil ratio varies depending on the children's needs and ranges from 1:4 to 1:1. The school uses an eclectic approach taking elements from different interventions to meet each pupil's needs. These include ABA (Cooper et al., 2007), Daily Life Therapy (Kitahara, 1984), Intensive Interaction (Nind and Hewett, 1994, 2001; Caldwell, 2008), Son-Rise (Kaufman, 1994; Kaufman, 2002), TEACCH (Lord and Schopler, 1994) and Team Teach (Allen and Matthews, 2008). Over time the school has also developed their own programmes for assessing and teaching communication, early literacy and numeracy and toilet training. I first visited the school when I was doing my Masters degree in 2006. Soon after I started my PhD, I visited the school with both my supervisors. There we negotiated with the Head Teacher and the Manager of Language and Communication, potential ways of conducting the research. We decided to work with a class of young children following the Extended Curriculum. This population was of great interest for me as communication and language were at an early stage of development. My sample consisted of six children and three members of staff (one Teacher and two TAs).

4.10.2 The children

There were ten children aged between 4 and 5 years in the class selected. A letter of consent was sent to the parents of the ten children by the school (see Appendix 1 for this letter). Seven parents agreed for their child to participate. One boy had to withdraw as he moved to another class at the pre intervention stage. Therefore, six children formed the final sample (see Table 3 for details). Clear inclusion and exclusion criteria were established. The inclusion criteria for the children were to:

- have a diagnosis of autism and learning difficulties, already confirmed by a health care practitioner,
- regularly use up to twenty words (either spoken, signed, pictures, symbols, objects) both referentially and with communicative intent, and
- initiate communication infrequently.

Children with other syndromes or conditions which might have affected the study (e.g. Down syndrome, cerebral palsy, epilepsy) would not be included.

Data on the children

Although from staff descriptions and the first observations I made, children appeared to meet the inclusion criteria, a number of checklists, tests and assessment tools were administered by school staff. Additionally the researcher reviewed several reports (e.g. statements of Special Educational Needs-SEN and other school documents). The assessments included:

- the Childhood Autism Rating Scale (CARS) (Schopler et al., 1988),

- the DARL (Development in Areas Related to Learning) (unpublished),
- the Symbolic Play Test (SPT) (Lowe and Costello, 1988),
- the children's level of verbal communication (informal assessment by the school Speech and Language Therapist-SLT), and
- the Questionnaire for Determining Spontaneous Communication in Children-QDSCC (developed for this study).

This section gives a brief description of these assessments and the children's scores on these.

Statements of SEN present children's diagnoses, identify their educational difficulties and describe the provision (e.g. equipment, staff arrangements) which should be in place for them at school. The children's statements of SEN were examined and all had autism stated as a diagnostic category. The SEN statements were also used to get the children's date of birth. The teacher completed the CARS (Schopler et al., 1988). CARS is a diagnostic rating scale in which children are rated from 1 (typical behaviour) to 4 (atypical behaviour) against fifteen items-behaviours. It then gives an overall score ranging from non-autistic (from 15 to 30) to severely autistic (from 38 to 60). Children with scores between 30 and 38 are rated as mildly-moderately autistic. The children's CARS scores ranged from 40 to 54 classifying all six children as severely autistic (see Table 3 for CARS total scores and Appendix 2 for scores on each item). The children's level of learning ability was obtained using a school assessment tool called the DARL (Development in Areas Related to Learning) (unpublished). DARL rates learning ability

on a five point scale from 1 (profound impairment) to 5 (mild or no impairment). Ratings for the children of the sample ranged from 1 to 3 (see Table 3 for DARL scores). The Symbolic Play Test (SPT) (Lowe and Costello, 1988) was administered by the teacher and the SLT to triangulate children's learning abilities. SPT assesses the children's early concept formation and symbolisation, abilities which precede and develop alongside receptive and expressive language. The children were asked to play with miniature toys in a variety of situations and they were assessed on handling and relating the toys to each other. The test gives a score ranging from 0 to 24 and an age equivalent of score ranging from <12 to 36+ months. The SPT raw scores in this sample ranged from 0 to 12 and the age equivalent from <12 months to 22 months (see Table 3 for SPT total scores and Appendix 3 for scores on each play situation).

The children's level of verbal communication was assessed by the SLT and ranged from very limited vocalisations to occasional words (10-20 words) (see Table 3 for each child's verbal communication level). To assess the frequency with which children initiated communication, the methods they used and the reasons for their communication, the class teacher completed the QDSCC (see Appendix 4 for a blank copy) which the researcher developed based on *The Pragmatics Profile of Early Communication* (Dewart and Summers, 1988). All six children met the three inclusion criteria.

Table 3: Details of the children in the study (n=6)

Children (names changed)	**Molly**	**Alex**	**Robert**	**Nathan**	**David**	**Oliver**
Sex	Female	Male	Male	Male	Male	Male
Age at pre intervention assessment	53 months	61 months	49 months	48 months	62 months	45 months
Diagnosis	Autism	Autism	Autism	Autism	Autism	Autism
CARS score (January 2010)	51.5	51.5	54	46	40.5	51.5
Level of learning ability (DARL) (January 2010) **1= profound, 5=mild or no impairment**	2	3	1	2	3	2
Symbolic Play Test (January 2010) **Score** **Age equivalent in months**	 0 <12	 2 <12	 0 <12	 3 <12	 12 22	 1 <12
Level of verbal communication (January 2010)	Vocalisations	Vocalisations	Vocalisations	Vocalisations	Occasional words (10-20 words)	Very little vocalisation
English as first language	No	Yes	Yes	Yes	No	Yes
Comments on communication QDSCC (January 2010)	Rarely initiates communication with adults and peers. *Means:* looking at other people, touching, pushing, pulling and manipulating their hands. *Reasons:* requests and rejects objects and activities	Often initiates contact with adults and less often with peers. *Means:* approaching/ touching other people, pushing, pulling or manipulating their hands, using pictures/symbols. *Reasons:* requests objects and activities and sometimes rejects and starts social games.	Does not initiate communication often. Only to adults. *Means:* looking at other people, approaching/touching them, pushing, pulling and manipulating their hands. *Reason:* rejects objects and activities.	Does not often initiate contact with adults and peers. *Means:* looking at the other person, approaching/ touching them, crying, screaming. *Reasons:* requests and rejects and sometimes initiates social games.	Often initiates communication with both adults and peers but in an 'inappropriate' way. *Means:* crying, hitting, throwing objects, word-like sounds and one or two clear spoken words, looking at another person, approaching/ touching others and pointing to objects or people. *Reasons:* requests, draws another's attention to himself, performs simple social routines and initiates social games.	Rarely initiates communication and only with adults. *Means:* approaching/ touching other people, pushing, pulling and manipulating their hands. *Reasons:* requests and rejects objects and activities.

*More details on each child's scores on CARS, SPT and the QDSCC can be found in Appendices 2, 3 and 14 respectively.

4.10.3 The staff

The class had six members of staff (one Teacher and five TAs). The only inclusion criterion for the staff was to be employed by the school (full-time or part-time) to minimise potential changes of staff. The first day I visited the class, I had a debriefing session with the teacher. During this, the teacher learnt about the general aims of the study, the importance of staff participation and the methods to be employed. The teacher then presented the study to the other staff in my absence to give them the chance to raise concerns and ask questions. After that, I approached each member of staff to ensure that all potential participants understood the process. Initially the Teacher and three TAs agreed to participate. However, one TA was not comfortable being filmed and asked to withdraw at the pre intervention stage. Her decision was respected following the BERA (2011) ethics principle that research participants have the right to withdraw at any point of the study if they wish. Three staff formed the final sample (see Table 4 for details).

Table 4: Details of the staff in the study (n=3)

	Teacher	***TA1***	***TA2***
Level of education	BEd in teaching children with severe learning difficulties	Level 3 BTEC for TA	Level 3 BTEC for TA BSc in Human Psychology
Length of time at the school (years)	15	7	4
Type of employment	Part-time	Full-time	Part-time

4.11 The research methods and sequence of implementation

To obtain data, a range of research methods was developed and used as follows within an action research framework. Table 5 shows the sequence of actions taken from the start to the end of the research. Each stage of the research is discussed in detail in Chapter Five.

Table 5: Action research sequence

Research phase		Stage	Action taken
Research Pre-phases	Pre-phase 1 *Pilot* (4 weeks)	**1**	a) Observations in two pilot classes different to the sample. b) Trialling different methods for coding observations of: • Children's Spontaneous Communication (CSC) • Staff Behaviour (SB)
	Pre-phase 2 *Pilot* (4 weeks)	**2**	Development of research instruments: a) Checklist for the Initiation of Communication in Children with Autism (CICCA) for coding CSC. b) Adult Interactive Style Coding Checklist (AISCC) for coding SB. c) Questionnaire for Determining Spontaneous Communication in Children (QDSCC) for completion by staff.
	Pre-phase 4 *Pilot* (2 weeks)	**3**	Piloting of the research instruments: a) CICCA (video records taken of 4 activities for one child of the sample) b) AISCC (video records taken for 4 activities for an adult of the sample) c) QDSCC was piloted with 6 staff and 4 children not in the sample.
	Pre-phase 5 (1 week)	**4**	Modification of the three instruments on the basis of the pilot studies, in discussion with another researcher.

Main Research Phases	**Pre intervention** (8 weeks)	**5**	**Pre intervention data collection on the sample** a) Videos taken of the 6 children and 3 staff in four activities. b) Videos coded using CICCA and AISCC. c) QDSCC completed by the teacher on the 6 children.
	Development of the intervention (8 weeks)	**6**	**Development of Adult Interactive Style Intervention (AISI)** a) Researcher presented key intervention principles to staff from the videos taken at Stage 5 (pre intervention). b) Staff practised these principles with the 6 children in class over a 4 week period. c) Staff took part in focus groups to finalise AISI.
	Post intervention Use of final AISI principles (8 weeks)	**7**	**Data collection** a) Videos taken of the 6 children and 3 staff in four activities. b) Videos coded using CICCA and AISCC and reliability check conducted with two other researchers. c) QDSCC completed by the teacher on the six children. d) Self-evaluation checklist on adult style completed by the 3 staff. e) Three staff took part in a focus group to discuss AISI and the progress of the children.
	Follow-up 12 months later (4 weeks)	**8**	**Follow-up data collection** a) Videos taken of the 3 children and 2 staff in four activities. b) Videos coded using CICCA and AISCC. c) QDSCC completed by the teacher on the 3 children. d) Three staff took part in a focus group to discuss AISI and the progress of the children.

4.12 Summary

Chapter Four described the overarching aim which was to develop AISI and measure its effects on children's spontaneous communication. It also presented the five research questions this study aimed to answer which were related to the frequency of children's communication, their communicative functions and methods, the effect of school activities on children's spontaneous communication and the extent to which adults were able to change their interactive style. The chapter discussed the main philosophical research theories and explained the reasons why this study operated

within the pragmatic or mixed methods paradigm. It discussed the action research approach outlining advantages, challenges and criticisms. Chapter Four also described key research terms such as validity, reliability and reflexivity. Finally, it gave the research design of this study and presented the setting and sample characteristics. The chapter closed with an overview of the stages within the action research cycle and the research methods which are discussed in detail in Chapter Five. Chapter Five presents the checklists for coding CSC and SB, the Questionnaire for Determining Spontaneous Communication in Children (QDSCC) filled by the teacher and the three focus group interviews with the staff. It also discusses the development of AISI.

CHAPTER FIVE

METHODOLOGY: DEVELOPMENT AND IMPLEMENTATION OF THE RESEARCH METHODS

5.1 Introduction

This chapter discusses the three main research methods used to collect data. These were:

- video recordings of six children and three staff across four activities,
- a questionnaire on the six children's spontaneous communication, and
- focus group interviews with three staff on their interactive style and the progress of the children.

The development of the two video recording checklists, the questionnaire and the focus group questions are discussed. There is also reference to another method of data collection, the self-evaluation checklist, which was used to get the staff's views on implementing the intervention. In addition, the coding systems for analysing the video recordings are presented. The ethical issues arising in relation to each one of these methods of data collection are also considered. Finally, the development of the research intervention AISI and the twenty-one principles contained within it are explained.

5.2 Video recordings of staff and children across four activities
(used in Stages 5, 7 and 8)

It is often difficult to determine whether a child intends to communicate. Having a permanent video record allowing repeated viewings by the researcher and for other raters to check the reliability of the data makes the process easier. In this study, data were needed on different aspects of communication (e.g. functions, methods and intent) and it is very difficult for an observer to capture and record all of these by purely taking notes. In addition, data on the adult style was required and it is impossible to observe the actions of both staff and children simultaneously. Having the video allowed the researcher to analyse and code these separately.

Video recording has a number of strengths and limitations. The openness of the data to multiple scrutiny (Heath et al., 2010) is one of the most significant advantages of this method. Different researchers can code the same video several times increasing the reliability of the data. Additionally, video data have '*longer shelf life'* than other types of data (Stigler et al., 2000, p. 4). Researchers can re-code and re-analyse past videos in the light of new theories and then compare the findings to that of the initial analysis. Video data is likely to promote interdisciplinary research (Stigler et al., 2000), as it can be available to a wider range of researchers who might not have the chance or the knowledge to conduct studies with certain groups (e.g. ICT engineers can develop software for children with autism while the fieldwork is conducted exclusively by experienced psychologists and educators). However, the use of videos has some disadvantages as well. Like the observations, video data are limited to whatever the observer can record (Stigler et al., 2000). This might be

unrepresentative of what usually occurs and the researcher should bear this in mind when analysing the data. The camera effect is another important limitation which should be considered (Stigler et al., 2000). Teaching staff might show their best side when the camera is in the classroom and children might feel excited or embarrassed and behave in a different way than usual. Video also poses a number of practical and ethical problems. Practical concerns might be related to where the camera is placed and lighting and sounding issues. Gaining consent from parents and staff to video record can be an issue as video is likely to put off the participants (Heath et al., 2010). Parents might feel exposed to criticism for their child's behaviour and their parenting skills and classroom staff can be worried about the possibility of the senior staff watching the videos and assessing their skills.

In this study, videos were taken in the classroom as opposed to asking children and staff to come to a University setting, where video recording may have been easier. In such an environment the researcher could have more control over variables such as noise level, duration of the sessions, staff's full attention. As Heath et al. (2010) argue, videos are highly recommended for the analysis of non-verbal aspects of human behaviour such as communicative methods (e.g. gestures, body language and eye contact). Naturalistic observations are reported to be the most valid form of assessing social communication skills in children with autism (Clifford et al., 2010). Using video provided first-hand information on what was happening in practice, instead of getting this indirectly from staff (Robson, 2002; Cohen et al., 2007). This

is a significant point as there might be a discrepancy between what teaching staff think they do and what they actually do.

5.2.1 Effects of video on behaviour of staff and children

Since my presence was likely to have an effect on the children and I wanted to minimise this, I followed Denscombe's (2010) advice and tried to become part of the furniture. During video recordings interactions with the staff and the children were kept to a minimum. Children appeared to be oblivious to being videoed. Only one child, who was not part of the study, came close to the camera twice and tried to see what was being recorded by pulling down the researcher's hand. Staff might have tried to give their best practice but this could only be beneficial as building on their good practice was the aim of the study. For example, they might have used more strategies advised by the school such as visual supports and limited speech than they would if the researcher and the camera were not there.

5.2.2 The researcher's role

The researcher's role was that of the participant-as-observer. This type of observation differs from previous studies in the field (Stone and Caro-Martinez, 1990; Stone et al., 1997; Keen, et al., 2002; Chiang et al., 2008; Agius, 2009; Chiang, 2009), in which the researchers were not participating in the change but they were just describing what was happening (i.e. observer-as-participant). As I worked occasionally with the children to model the AISI principles, it is possible that I was a factor in the outcomes and I could have biased the findings. To minimise the

likelihood of this happening, some measures were put in place. The use of video recording to allow inter-observer reliability checks and other methods to triangulate the observation data minimised this possibility. To reduce observer effect, minimal interaction with the staff was also established.

5.2.3 Type of activities to video record

Children experience a variety of activities during the course of a school day. Some are more conducive to elicit spontaneous communication than others. Evidence on which activities are likely to elicit the most spontaneous communication is inconclusive. Some studies (e.g. O' Reilly et al., 2005; Chiang, 2008b; Chiang, 2009) argue that academic activities elicit more spontaneous communication while others (e.g. Stone et al., 1997; Potter and Whittaker, 2001) claim that unstructured activities are more likely to promote spontaneous communication. Four activities were chosen to video record partly based on SCERTS guidance (Prizant et al., 2006) which suggests that to get representative data on the social communication of autistic children with limited language and communication, observations should include a number of different activities. These activities should vary along at least four of these pair of variables (i.e. structured versus unstructured, must do versus fun, adult-directed versus child-directed, motor-based versus sedentary, familiar versus unfamiliar, preferred versus non-preferred, easy versus difficult, language-based versus non-language-based, social versus solitary and busy versus calm). According to the SCERTS manual (Prizant et al., 2006), these variables are likely to influence

children's behaviour in different activities and this is why they should be taken into consideration.

The four activities selected were:

a) sensory room,
b) soft play,
c) snack time, and
d) 1:1 work.

Sensory and soft play activities are often fairly unstructured, motor-based and child-led. The focus is on developing children's social communication and interaction skills (e.g. eye contact, turn-taking, anticipation and initiations). These activities take place in separate, calm rooms designed for these purposes. Snack time and 1:1 work are carried out in the classroom. These are highly structured, sedentary, adult-led activities conducted in a busy environment.

5.2.4 Adult:child ratio and size of group

In special and specialist schools, the class size is often between five and ten children with two to five adults. Some work occurs on a 1:1 basis, some as a small group and some with the whole class group. Decisions had to be made on what to video record. The SCERTS team (Prizant et al., 2006) suggest that autistic children with limited communication and language should be observed in at least two of the following group sizes: 1:1, small group and large group. Some research evidences that most spontaneous communication occurs in 1:1 or small group activities (Potter and

Whittaker, 2001). Therefore, it was decided to select activities performed in these two size groups. Work and snack time operated on a 1:1 basis whilst sensory room and soft play activities were set up on a small group basis. Although the adult:child ratio in the sensory room and the soft play activities was 1:2, staff were asked to focus on the target child while being filmed.

5.2.5 Length of video recordings

Studies, which have explored communication, have taken data on the children for various lengths of time. Sylva et al. (1980) observed each child for twenty minutes in their study. They experimented with longer and shorter periods but they thought that twenty minutes were long enough to capture the data they wanted but not so long to exhaust the observer. It is important to note here that their study was conducted with TD children. Studies including autistic children spent more time on observations. This might have happened because these children tend to have limited spontaneous communication and more observation time is needed. Stone and Caro-Martinez (1990) observed the children of their sample for a minimum of two hours each. Hauck et al. (1995) observed children for four fifteen-minute periods, most of them conducted on four different days. Potter and Whittaker (2001) video recorded the spontaneous communication of each child who participated in their study for one whole school day. Chiang and Lin (2008) videoed their participants for two hours. The SCERTS team (Prizant et al., 2006) suggest that to get representative data, it is important to observe each child for at least two hours. They also advise that these videos should be taken on at least two different days. In this study, each of the six

children was videoed for thirty minutes in each activity. The first piloting (Stage 1) showed that each activity lasted ten minutes on average so three sessions of each activity were videoed to provide thirty minutes of data. In the follow-up phase twelve months later (Stage 8), because of limited staffing, the children were observed for only fifteen minutes per activity giving a total of one hour, instead of the two hours, taken pre and post intervention. Table 6 shows the number and length of video records taken across the four activities for each child pre, post intervention and at follow-up.

Studies, which have explored child-adult interactions, have used the same video segments to code adults' and children's behaviour (Hwang and Hughes, 2000; Doussard-Roosevelt et al., 2003; Ruble et al., 2008). Following this example in this study, extracts from the children's videos were used to code staff's interactive style. Each member of staff was coded for eighty minutes pre and post intervention (forty for each research phase, see Table 23 for more details). The videos were selected randomly and they were ten minutes of each of the four activities in which the children were filmed (i.e. sensory room, snack time, soft play and 1:1 work). Table 7 shows the number and length of video records taken across the four activities for each member of staff pre, post intervention and at follow-up.

Table 6: Number and length of video records taken across the four activities <u>for each child</u> pre, post intervention and follow-up

Length of observations											
Pre intervention				***Post intervention***				***Follow-up***			
TIMELINE	***0-2 months***			***4-6 months later***				***18 months later***			
Activity	***Length of each session videoed (mins)***	***Number of sessions videoed over an 8 week period***	***TOTAL length of activity videoed (mins)***	***Activity***	***Length of each session videoed (mins) over an 8 week period***	***Number of sessions videoed***	***TOTAL length of activity videoed (mins)***	***Activity***	***Length of each session videoed (mins)***	***Number of sessions videoed***	***TOTAL length of activity videoed (mins)***
Sensory	10	3	30	***Sensory***	10	3	30	***Sensory***	15	1	15
Soft play	10	3	30	***Soft play***	10	3	30	***Soft play***	15	1	15
Snack	10	3	30	***Snack***	10	3	30	***Snack***	15	1	15
1:1 work	10	3	30	***1:1 work***	10	3	30	***1:1 work***	15	1	15
TOTAL	**40**	**12**	**120**		**40**	**12**	**120**		**60**	**4**	**60**

Table 7: Number and length of video records taken across the four activities <u>for each staff</u> pre, post intervention and follow-up

Length of observations											
Pre intervention				***Post intervention***				***Follow-up***			
TIMELINE	***0-2 months***			***5-6 months later***				***18 months later***			
Activity	***Length of each session videoed (mins)***	***Number of sessions videoed***	***TOTAL length of activity videoed (mins)***	***Activity***	***Length of each session videoed (mins)***	***Number of sessions videoed***	***TOTAL length of activity videoed (mins)***	***Activity***	***Length of each session videoed (mins)***	***Number of sessions videoed***	***TOTAL length of activity videoed (mins)***
Sensory	10	1	10	***Sensory***	10	1	10	***Sensory***	10	1	10
Soft play	10	1	10	***Soft play***	10	1	10	***Soft play***	10	1	10
Snack	10	1	10	***Snack***	10	1	10	***Snack***	10	1	10
1:1 work	10	1	10	***1:1 work***	10	1	10	***1:1 work***	10	1	10
TOTAL	**40**	**4**	**40**		**40**	**4**	**40**		**40**	**4**	**40**

5.2.6 The use of the camera

A DCR-DVD310E Sony camcorder was used for video recording. It was bought for this study on the basis that it was the best option (e.g. reliable brand, light and good quality picture) given the researcher's budget. Lonergan (1990) maintains that the quality of the sound, the level of lighting and the use of the zoom are key factors to consider. He highlights the drawback of using a built-in microphone and proposes the use of an extension microphone to get clearer sound. A decision needs to be taken as to whether to use a fixed position for the camera or not (Heath et al., 2010). I decided to hold the camera myself instead of using a tripod, which might have caused accidents. I may also have lost important data due to the continuous movement of the children and the staff. The use of an extension microphone was ruled out as it would add extra weight and sound zoom was used instead. This is an extra setting which works alongside the optical zoom. Microphones attached on children and staff were not used due to funding restrictions and ethical concerns (e.g. people being recorded outside video recording times). Filming was conducted at the highest possible resolution to ensure the best video quality. Optical zoom was adjusted before starting recording and it was kept steady to avoid degrading the quality.

The camera provides the option of two recording media: DVD and memory card. The use of the memory card was selected for the higher recording capacity (i.e. 8GB as opposed to 1.5GB for the DVD) and ease of data transferability. At the end of each school day, the data were transferred through cable from the camera to the researcher's laptop and then to an external hard drive which was kept at all times in

the researcher's home. Copies of the videos were also kept in DVDs locked in a cupboard in the researcher's office.

5.2.7 Piloting the video recording

During piloting the video recording the researcher took critical decisions regarding her role and the position of the camera, the activities to be recorded, the length of each session and some other practical issues with the camera. This lasted for a period of two weeks and the actual sample (i.e. one child and one member of staff) was involved (Stage 3).

Being an observer-as-a-participant as previous studies have suggested (Stone and Caro-Martinez, 1990; Stone et al., 1997; Keen, et al., 2002; Chiang et al., 2008; Agius, 2009; Chiang, 2009) alienated the researcher from the participants. So, I started taking part in the classroom activities when not filming and I tried out in practice the AISI principles. Different positions for the camera were also tried. Although sitting in front of the child was the best position for filming everything that was going on, it made some children upset. Sitting behind the child was the least obtrusive position but much information (e.g. eye contact, eye pointing and smiles) was lost. As a result, filming was best conducted from the side (Sylva et al., 1980; Robson, 2002) with the researcher being two to three metres away from the child and avoiding eye contact.

With regard to the activities to be filmed, the selected four were not the only ones meeting the criteria for this study (i.e. varying across the ten variable pairs SCERTS suggest, being performed in 1:1 and small groups). Other activities which also met

these criteria had to be ruled out for different reasons. For example corridor activities, in which staff worked with a small group of children on developing communication and interaction skills such as turn-taking, anticipation and initiations (like in sensory room and soft play area) could not be filmed. Many other children and staff were crossing this area throughout the day and this would have posed serious ethical restrictions. Another issue which needed to be addressed was how to split the time allocated for each activity (i.e. thirty minutes) in shorter sessions. The piloting showed that there were some activities which lasted on average ten minutes and this is why it was decided to split the total thirty minutes into three ten-minute sessions. For example, tabletop toy activities met the criteria for activity selection (i.e. activity variables and group size) but due to children's limited concentration (most of the times these hardly lasted five minutes) they were not included in the selected activities. A last issue which arose from the piloting was the adjustments needed to be made in the sensory room. Due to the dark lighting, videos there were of very poor quality. To solve this, the night shot mode was used and a dim light was kept on in the room throughout the session.

To sum up, the piloting made clearer the need to fit the study into the possibilities and constraints that the school setting provided. This reflects the researcher's beliefs that when conducting classroom research, it is vital to be flexible in the approach respecting participants' time and other commitments in the classroom. This is also included in the ethical guidelines by BERA (2011).

5.2.8 Video Data Coding

Broadly speaking there are different types of observational recording in which the degree of structure may considerably vary. Hopkins (2002) states that there are two types of observation coding: open observations in which the observer keeps notes on a blank sheet and focused observations in which the observer ticks every time a particular event or behaviour occurs (Hopkins, 2002). Cohen et al. (2007) add a third category in-between the highly structured (i.e. predetermined categorised recording sheets) and the unstructured (i.e. uncategorised note taking) observational recording. This is the semi-structured coding (i.e. there is a degree of predetermination).

This section considers how the data captured from the video camera was coded and analysed. At this point there were a number of different decisions to be made. These include the amount of video to be coded, how the spontaneous communication of the children is categorised in terms of frequency, functions and methods and how staff behaviour is classified in terms of their interactive style. Regarding the amount of video observations to be coded it was decided to use all children's data and forty minutes per research phase (i.e. pre, post intervention and follow-up) for the adults' data. The amount of children's data to be coded is in line with previous studies in the field. The amount of adults' video data was considered adequate by the researcher given the use of other methods to triangulate adults' style (e.g. self-evaluation checklists, focus groups) and the great extent of children's video data which needed to be analysed. To categorise and code children's spontaneous communication and adult's style, two focused/highly structured checklists were developed by the researcher. These are the Checklist for the Initiation of Communication in Children with Autism (CICCA) and the Adult Interactive Style Coding Checklist (AISCC).

5.2.8.1 Checklist for the Initiation of Communication in Children with Autism (CICCA)

CICCA was developed for this study and it was based on previous studies (Stone and Caro-Martinez, 1990; Keen et al., 2002; Roos et al., 2008) and mainly that of Agius (2009). Earlier versions of CICCA were tried out with children from two other classrooms over a period of four weeks (Stage 2). Different categories were added and words in the checklist were altered until the researcher was confident that CICCA would capture the main types of social communication that were likely to be seen. It includes sixteen methods (e.g. eye contact and vocalisations) and nine functions (e.g. request and reject) of communication. The communicative methods were further classified into two groups (i.e. pre-symbolic and symbolic) and the functions were grouped into three categories (i.e. behaviour regulation, joint attention and social interaction). The method(s) and function(s) of each behaviour, which meet the criteria of spontaneous communication (as defined by Potter and Whitaker, 2001 and Bogdashina, 2005), were coded using numbers to indicate the order in which the child used these. For example, if a child used eye contact and simple motor actions to request, a *1* was recorded in both boxes in the request column and if then the child used CB to protest, a *2* was recorded (see Table 8 for an example on how to code using CICCA). When the child initiated communication with another child, a symbol *c* was put in the appropriate box/es to distinguish it from initiations addressed to adults. Combinations of methods were recorded as c_1 c_1 or c_2 c_2 c_2. Unclear behaviours were coded in the unclear column.

Table 8: Checklist for the Initiation of Communication in Children with Autism (CICCA)

Functions/ Means of Communication	*Behaviour Regulation*		*Joint Attention*		*Social Interaction*					Unclear
	Request	Reject/ Protest	Comment/ Give information	Seek information	Express Feelings	Seek Attention	Seek Approval	Social Routines	Social Games	
Pre-symbolic means										
CB		2								
Eye Contact	1									
Eye Pointing										
Laugh										
Point										
Proximity/Touch	C_1				C_2					
Reenactments										
Simple Motor Actions	1 C_1									
Smile										
Vocalizations/ Babbling										
Other:										
Symbolic means										
Delayed Echolalia										
Immediate Echolalia										
Object of reference										
Single Words										
Signs/Gestures										
Symbols/ Pictures										
Word Combinations										
Other:										

SOURCE: Developed by the researcher based on other studies

CICCA bears many similarities to the Modified–Classroom Observation Schedule to Measure Intentional Communication (M-COSMIC) (Clifford et al., 2010). M-COSMIC is one of the very few, if not the only assessment tool, which measures spontaneous communication in naturalistic settings. The M-COSMIC codes social communication behaviours initiated by the children. It delineates forms, functions and partners of children's spontaneous communication. One of the main differences is that M-COSMIC does not only code children's initiation of communication, but it also codes their responses to others' communication. M-COSMIC was not considered for this study as it was published after the development of CICCA (Clifford et al., 2010).

Defining what is observed was a very significant issue which needed to be considered when developing the coding schedule and before piloting it. Chapter Two has shown that there is a great variation in the way spontaneous communication is defined. Given the young age and the communication difficulties of the children who participated in this study, a fairly liberal definition of spontaneous communication was used. I chose Potter and Whittaker's (2001) definition who coded as spontaneous, every child's intentional act which occurs *'without verbal prompting from adults'* (p. 25). Bogdashina's (2005) definition of what constituted a communicative act was also useful here. She thinks that the pre-conditions for an act to be communicative are something to communicate about, a sender, a receiver, a medium of transmission and communicative intent. A definition was given for each communicative function and method (see Appendix 5 for the definitions) based on previous studies and the definitions provided by the school's SLT.

- *Piloting CICCA*

CICCA was piloted for two weeks (Stage 3). Piloting is usually done with a similar sample of participants to check the feasibility of the selected research method (Blaxter et al., 1996). However, this did not happen as there was not an equivalent group of children in the same school. So CICCA was piloted with one child and one member of staff from the actual sample. The piloting brought a few changes. Ticking (√) the appropriate box/es, as Agius' (2009) did, had to be replaced by putting an ascending number for two reasons. Firstly, by using ascending numbers one could see the chronological order of the behaviours and, secondly, methods were paired with function. The issue of whether to code initiations towards the researcher had also to be resolved. I decided not to code initiations towards the researcher following Sylva's et al. (1980) example. However, in such cases I did respond briefly to the child. The last change the pilot brought was related to the communicative partners. Initially, I intended to compare the children's initiations towards the teacher to the initiations towards the TAs. However, it became clear from the piloting that there was no significant difference between the adult's role and children's initiations and this plan was abandoned.

- *Reliability check for CICCA*

Inter-rater reliability was checked by two postgraduate students who were qualified teachers of children with SEN and were also blind to the aims of the study and to the order the videos were taken. I trained the two observers in CICCA on separate samples of videos until an 80% agreement was achieved. Then each observer independently coded 22% of the total video samples (i.e. five of the total twenty-

three hours) which were randomly selected. This exceeds the 20% minimum of sessions across conditions recommended by Reichow et al. (2008). An 85% inter-observer reliability agreement (range from 81% to 89%) was reached for the total number of initiations. A 70% inter-observer reliability agreement (range from 63% to 82%) was reached for the communicative functions and an 82% (range from 78% to 86%) was reached for the communicative methods. These percentages approach or exceed the minimum 80% Reichow et al. (2008) recommend.

5.2.8.2 Adult Interactive Style Coding Checklist (AISCC)

To measure the extent to which staff implemented AISI principles post intervention, I developed a checklist to code adult behaviours seen in the videos. This was named the Adult Interactive Style Coding Checklist (AISCC). Earlier versions of the AISCC were piloted for four weeks with six members of staff from two different classrooms (Stage 2). The first version of AISCC consisted of a range of verbal and non-verbal behaviours thought to facilitate social communication and some communicative opportunities proposed by Potter and Whittaker (2001). The second version of the AISCC was based on transactional support, which is one of the three main components of SCERTS (Prizant et al., 2006). This offers a more structured framework as it involves categories accompanied by detailed definitions. After AISCC was finalised it was piloted with a member of staff from the actual sample for two weeks (Stage 3). It is based on event sampling. Every time an AISI principle was observed, a tally was put in the relevant box. When each video was coded, frequencies were calculated (see Table 9 for an example on how to code AISCC).

Table 9: Adult Interactive Style Coding Checklist (AISCC)

General principles	***Tallies***	***Frequencies***
1. Gain attention	IIII	4
2. Establish appropriate proximity		
3. Show availability		
4. Wait for initiations		
5. Responds to communicative attempts		
6. Assign meaning to random actions or sounds		
7. Imitate the children		
8. Follow children's lead/ focus of attention	II	2
9. Use exaggerated pitch, facial expression, gestures and body language		
10. Use minimal speech	~~IIII~~	5
11. Provide time		
12. Expand on communicative attempts		
13. Use non-verbal cues	~~IIII~~ IIII	9

Communicative opportunities	***Tallies***	***Frequency***
14. Offer choices		
15. Stop part way		
16. Give small portions	II	2
17. Make items inaccessible		
18. Give material they will need help with		
19. Contradict expectations		
20. Give non preferred items		
21. 'Forget' something vital		

- *Reliability check for AISCC*

A qualified teacher of children with SEN who was blind to the aims of the study was asked to code some of the sessions to check inter-observer reliability for AISCC. I trained her on separate samples of videos until an 80% agreement was achieved. Then she independently coded 21% from the total adult videos sample (i.e. one of the total four hours) which were randomly selected. This exceeds the 20% minimum of sessions across conditions recommended by Reichow et al. (2008). An 90% inter-observer reliability agreement (range from 81% to 95%) was reached which is above the minimum 80% Reichow et al. (2008) recommend.

To sum up, CICCA and AISCC gave quantitative data which needed to be triangulated with the qualitative data to keep the balance a mixed methods approach requires (Creswell, 2003; Teddlie and Tashakkori, 2003; Creswell and Plano Clark, 2007). The qualitative data came from the focus group interviews with the staff.

5.2.8.3 Models of spontaneity to develop CICCA and AISCC

Two highly structured checklists were employed to code data on children's spontaneous communication and adults' interactive style. Apart from their similarity in the degree of structure, they have a significant difference. CICCA was developed based on the binary model of spontaneity, whereas AISCC was based on the continuum conceptualisation of spontaneity (Chiang and Carter, 2008). The binary model considers spontaneity as an all-or-none act where the terms *initiated* and *spontaneous* communication are used interchangeably (Carter and Hotchkis, 2002). In the continuum model, instead of *spontaneous* and *non-spontaneous* communicative acts, there is a degree of spontaneity for each communicative attempt based on the intrusiveness of the antecedent stimuli (Kazmareck, 1990; Carter and Hotchkis, 2002). The less intrusive the stimulus, the more spontaneous the communicative attempt.

The binary model of spontaneity on which CICCA was based is the most commonly used in describing spontaneous communication in research (Potter and Whittaker, 2001; Chiang and Lin, 2008; Agius, 2009; Chiang, 2009), but it has several limitations. Within the binary perspective there is neither consensus regarding the antecedents which lead to communicative spontaneity nor convincing justification as

to why some antecedents are indicative of spontaneous acts (Carter and Hotchkis, 2002). For instance, it is not clear why a child's request in response to an adult's extended palm is more spontaneous than a response to an adult's verbal instruction. Acknowledging these limitations, AISI was developed having the continuum conceptualisation of spontaneity in mind (See Appendix 6 for two examples on the continuum conceptualisation of spontaneity). Therefore, AISCC, which was developed to measure the extent to which AISI principles were implemented, was based on the same model too.

5.3 The development of the Adult Interactive Style Intervention (AISI)

After having collected the pre intervention video data for the children (Stage 5), I analysed these to explore adult style and identify principles facilitating children's spontaneous communication (Stage 6). These videos were then presented to the staff and I talked with them about how we could build together on these ideas. An initial set of general principles was decided and staff were asked to practise them for four weeks and think of further potential implications (Stage 6). During this period, I had been visiting the school three times a week and had short sessions with the staff to discuss any difficulties experienced and to explain the principles again if necessary. When the practice period ended, a final set of principles was agreed (Focus group 1) and given the name AISI (Adult Interactive Style Intervention). AISI consists of thirteen general principles and eight communicative opportunities thought to be effective in fostering spontaneous communication (see Appendix 7 for AISI protocol with examples from the study). AISI was not field tested prior to use in this study and it is mainly based on developmental/relationship-based approaches to teach social communication in autism and my teaching experience. The main

developmental/relationship-based approaches AISI was based on are: Intensive Interaction (Nind and Hewett, 1994, 2001), the SCERTS framework (Prizant et al., 2006), the Hanen model (Manolson, 1992), the Son Rise Program (Kaufman, 1994; Kaufman, 2002) and Musical Interaction (Methley and Wimpory, 2010).

Video Interaction Guidance (VIG) (Kennedy, 2011) was adapted to train staff in using AISI principles. VIG is an intervention aiming to improve communication between parents and children, building on their existing skills. Parents are shown edited video clips of interactions with their children while highlighting the best aspects of the interaction and the key principles that work. The aim is to improve their interactions within a coaching relationship. Parents are encouraged to *'become as active as possible in experiencing and thinking about their own change*' (p. 31). So VIG seemed very appropriate to this study. I had to be clear not to deskill staff but to build on what they were doing already. By showing them positive video clips of what they were doing, while naming the principles as in AISI, I hoped they would be enabled to implement more of the principles.

5.3.1 Fidelity of implementation and self-evaluation checklist

Ensuring fidelity of implementation plays a very important role in producing good quality research (Jones and Jordan, 2008) and this is why it was taken into serious consideration in this study. Kasari (2002) suggests the use of fidelity checks to determine whether the intervention was conducted in the way it was supposed to. In research there are a number of ways of checking fidelity, both external and internal (O' Donnell, 2008). One could ask a trained person to observe and comment on the extent to which staff followed the principles of an intervention and rate this.

Alternatively, one can ask staff included in the intervention to self-check. It is interesting to note here that when self-reports are used in combination with field observation to check fidelity, the self-report data tend to show higher fidelity than the observation data (Emshoff et al., 1987).

In this study, I chose to use both methods of checking fidelity. I was able to check the videos to assess the extent to which staff used AISI principles. In addition, I asked staff to complete a form (see Appendix 8) to record how often they used each AISI principle. This was also helpful in that it reminded them of the twenty-one principles. Staff had to complete the self-evaluation checklist only on the days I visited the school (three to four days a week, depending on the research phase) to minimise their workload. Staff did not have to remember the exact number of times they used each principle, but they had to choose from three broad categories which were 'not at all', '1-5 times' and 'many times'. The exact number of times a principle was used was almost impossible to remember in a busy classroom setting.

5.4 Teacher questionnaire
(used in Stages 5, 7 and 8)

A questionnaire was developed to enable the teacher to provide the researcher with details on each of the six children's spontaneous communication. This was named the *Questionnaire for Determining Spontaneous Communication in Children* (QDSCC). QDSCC was based on the *Pragmatic Profile of Early Communication Skills* (Dewart and Summers, 1998). It consists of mainly close-ended questions which aim to get the teacher's views on the frequency the six children initiated communication, the reasons they communicated for and the methods they used.

There are only two open-ended questions regarding activities which elicit or discourage spontaneous communication and further comments by the respondent.

The use of questionnaires was selected for a number of reasons. The fact that questionnaires give a great amount of data in a short time (Munn and Drever, 1990; Hopkins, 2002) was an important reason for using this method. It did not take the teacher more than ten minutes to complete each questionnaire respecting her busy schedule. Furthermore, she had the chance to complete the questionnaire at a time which was convenient to her (Gillham, 2007). The teacher answered the same questions which were presented in the same order for all six children in all research phases, which is a strategy recommended by Munn and Drever (1990). The reason for selecting the same person to fill in the questionnaires was to ensure consistency. Another strength of using questionnaires and especially close-ended questions is that the data analysis can be relatively straight forward (Munn and Drever, 1990; Gillham, 2007). A drawback of this method is that it cannot provide in-depth data (Borg and Gall, 1989) but richer data in this study was captured by the video recordings. Misunderstandings (Bryman, 2008; Peterson, 2000) and questions being left blank (Rickinson, 2005) are common limitations in the use of questionnaires. To avoid these, I sat by the teacher while she was completing the questionnaires to prompt her to answer all questions and give her the chance to ask me about questions which were not clear.

5.4.1 Piloting the Questionnaire for Determining Spontaneous Communication in Children (QDSCC)

The QDSCC was piloted with two classes, different to the class which participated in the main study (Stage 3). Six members of staff (i.e. one teacher and two TAs from each class) and four children (i.e. two from each class) were involved. The teacher of each class completed a questionnaire for each of the two children and two TAs completed one questionnaire each. The teacher was asked to pick the TAs who knew the children best. I chose the children the staff had to fill in the questionnaire for; one child who was relatively good at communication and the other was at the very early stages. Changes indicated by the staff during the piloting were related to the layout, the wording and the question types.

With regard to the layout, one teacher was confused with a question being split between two pages. The literature highlights the importance of having a question and its answers on the same page (Cohen et al., 2007; Bryman, 2008), but this was initially compromised to keep the questionnaire compact. All the respondents used their index fingers to guide themselves between the lines, so the font size was changed from 11 to 12 and more space was left between the questions.

The alternatives ‘never’, ‘rarely’, ‘sometimes’ and ‘often’ given as possible answers to several questions appeared problematic. A teacher commented that she could not easily discern the boundaries between them. Therefore, the options ‘not at all’, ‘not often’, ‘often’, ‘very often’ were used instead. Additionally, two participants gave communicative intent to actions which were not communicative (e.g. self-stimulatory or self-regulatory behaviours) and, in my opinion, overestimated the children’s

communicative initiations perhaps because these children responded well to others' communication. This brought to mind Oppenheim's (1992) and Peterson's (2000) point about the danger of using terms which can be interpreted in several ways. For this reason, a detailed definition of the term initiation of communication was added right at the beginning of the questionnaire.

5.4.2 The final version of Questionnaire for Determining Spontaneous Communication in Children (QDSCC)

Although questionnaires are more often used in collecting survey data (Robson, 2002; Cohen et al., 2007) and are usually distributed in the absence of the researcher (Wilson and McLean, 1994, cited in Blaxter et al., 2006), in this study they were used in an action research design and while the researcher was present. The classroom teacher completed the questionnaire for the six children in the sample pre and post intervention. She also completed the questionnaire for the three children who participated at the follow-up phase.

With regard to the layout, wider margins and more space between questions and answers made the questionnaire more attractive and reduced the risk of some questions being left blank by mistake. Answering by ticking the appropriate box/es was selected as the easiest way to respond (Robson, 2002; Cohen et al., 2007) and was kept constant throughout the whole questionnaire to avoid confusion (Oppenheim, 1992; Blaxter et al., 2006). Guidance on how to complete each question was given in brackets next to the questions (Cohen et al., 2007). In terms of clarity of wording, questions which were double-barrelled (i.e. ask two questions at once), negatively framed (i.e. formulated in a negative form) and leading (i.e. encourage a

specific answer) were avoided (Robson, 2002). One practical piece of advice which was adopted was to keep questions short, meaning no more than twenty words per sentence (Oppenheim, 1992; Peterson, 2000).

With regard to the question type, the use of open-ended questions was limited as advised by Oppenheim (1992) and Cohen et al. (2007) since they need a lot of time to be coded and analysed (Robson, 2002). Only two open-ended questions were put in the questionnaire to give participants the opportunity to express their views, as Lewis (2009) advises. A space, instead of drawing lines, followed the open-ended questions as the lines might indicate to the respondents how much they have to write (Lewis, 2009). The choice of the response category 'other, please describe' (Cohen et al., 2007; Bryman, 2008) was kept in two of the main questions (communicative functions and methods). Initially the thought was to have the 'other, please describe' category only in the piloting phase but later it was decided that by leaving it out from the main study questionnaire, valuable information might have been lost. See Appendix 4 for a blank copy of the questionnaire.

The next section discusses the focus group interviews conducted to get the staff's views on their use of AISI and children's spontaneous communication.

5.5 Focus group interviews with staff
(used in Stages 6, 7 and 8)

Focus group interviews were conducted to get staff's views on developing and evaluating AISI, as well as on the children's progress. I conducted three focus groups with the three staff in the class. In all of these, I assumed the role of

facilitator/moderator. I was meeting with the staff in the classroom after the end of the school day for about an hour, following Bloor's et al. (2001) and Litoselliti's (2003) advice on the place and the duration of focus groups. Additionally, Bryman's (2008) advice on conducting focus groups with people who share professional relationships was also considered. Being aware of the potential effects the teacher's status would have on TAs, I encouraged more the latters' contributions. The three focus group interview schedules can be found in Appendix 9.

Having focus groups instead of separate interviews was very significant for this study. The interactions among the group were the basis for developing and evaluating AISI as each participant built on the ideas of the others. It also strengthened the team and made the process potentially less stressful for the staff. This was very important given that I was a researcher coming from outside, not having worked with them before. The main limitations of using focus group interviews are the lack of data generalisability and the possibility of *false consensus* (i.e. when some participants dominate the discussion at the expense of others' different views). None of these two greatly affected this study. There was no intent for generalisation as focus groups were primarily used to reflect on the AISI principles and to triangulate data from the videos and the questionnaires. The action research methodology of the study would not allow any generalisable conclusions to be drawn regardless of the use of focus groups. Being aware of the possibility of *false consensus* (Litoselliti, 2003), I encouraged the more hesitant people (i.e. the two TAs) to speak more, by asking them to elaborate on short answers, giving them eye contact and using supportive body language (e.g. smiles, nodding).

An external multi-directional microphone was used to ensure better sound quality and to capture the voice of people who spoke softly. This made the transcription easier and faster. However, despite constant reminders about the importance of not speaking one above the other, this was not completely avoided. During the focus groups, I used jargon-free language (Litoselliti, 2003). For example, the term 'informal discussion' was used instead of 'focus group interview' and staff were asked 'in which ways children changed their spontaneous communication' instead of being asked for 'changes in children's communicative methods and functions'.

5.5.1 Piloting the focus group interview schedules

The three focus group interview schedules were piloted with the same two postgraduate students a week before each focus group session. The conclusions from the piloting were related to changing the wording of some questions to make them simpler, adding clarification and visual supports to several questions (e.g. graphs and videos on which staff had to comment) and allocating more time for each question to be answered.

The next section discusses the ethical issues arising which are particularly important when working with vulnerable children and young people. Additionally, ethical restrictions are of great significance when the researcher is using a video camera in the classrooms (Heath et al., 2010).

5.6 Ethical considerations

Ethical issues are defined as '*rules of conduct*' (Robson, 2002, p. 65) which distinguish socially acceptable behaviours from socially unacceptable acts. In other

words, ethics are concerned with protecting the well-being and interests of people taking part in the research and preventing them from harm (Lankshear and Knobel, 2004). Prior to the study onset, ethical approval was given by the University of Birmingham's Ethical Review Committee (Application for Ethical Review ERN_09-353, see Appendix 10 for the ethical review application and the letter of the ethical approval). This study also complies with the ethical guidelines and requirements specified by BERA (2011).

Informed consent from the participants was sought. Two types of consent form were developed, one for the parents and one for the staff (a copy of each can be found in Appendix 1 and Appendix 11 respectively). These forms provided the participants with information about the researcher and the research focus and made it clear that they had the right to withdraw at any point if they wished (BERA, 2011). It would have been ideal to obtain the children's consent too. However, due to their young age and their communication difficulties, it was not possible for them to give or deny consent. So, a parent permitted or denied participation for them. If a child showed frustration as a result of taking part in the study, they would automatically withdraw.

Ensuring participants' confidentiality and anonymity is another very important ethical issue (Robson, 2002; Lankshear and Knobel, 2004; BERA, 2011). Special attention should be paid to confidentiality and anonymity in small scale studies like this one, in which the cases can be easily identified. For this reason, pseudonyms instead of participants' real names were used throughout the research (collecting and presenting data). An issue arose with how to protect participants' anonymity when presenting videos at conferences and workshops. So, an extra consent form was

given to ask permission for using the videos for data dissemination and training purposes (see Appendix 12 for a copy). Moreover, I use only segments in which participants' names are not mentioned and the school's logo on the children's uniforms is not clear. The three raters who did the reliability checks on the videos were also told to keep confidentiality.

Finally, it had to be demonstrated that children and staff would benefit from their participation. The research focus and methods were directly relevant to their work in the classroom. It was expected (although not a certainty) that developing a set of principles on adult style could have a use beyond the research in the school which would benefit both the staff and the pupils involved in the study. BERA (2011) requires researchers to act in the participants' best interests without adding extra work or stress on them. This was achieved by extending my presence at the school. I often had informal discussions with the staff to share their concerns. More often than not we discussed concerns related to children who were not part of the study or topics beyond the scope of the study (e.g. sensory issues, eating difficulties, toileting). I always listened to what staff had to say and I was advising them based on my personal experience and knowledge. When no recordings were being conducted, I took part in activities with the children to give them the chance to know me better and decrease staff's workload. Additional work for the staff was kept to a minimum. It involved three focus groups, the questionnaires which were completed by the teacher and the self-evaluation checklist that staff had to fill in at the end of each day I was at school.

According to the University's Code of Practice for Research all data collected will be preserved and accessible for ten years after the completion of the study. The data will be stored in the researcher's home and I will be the only person having access to these. After ten years, all videos will be deleted and all documents will be destroyed by a shredder.

In summary, what I have shown in this section are the main ethical challenges faced during fieldwork. I intend to disseminate the findings of this study to my sponsor, the Greek Welfare Foundation Propondis, and the school where the research was conducted.

5.7 Summary

This chapter discussed the main research methods used to collect data for this study. A detailed description of the rationale for using each one of these and the process of administration were provided. The chapter concluded by reporting the ethical considerations encountered. Chapter Six presents and discusses the findings on the children's frequency of communication and the effect of activities on communication. More specifically, it shows data obtained by CICCA, QDSCC and the focus group interviews. Findings are discussed in relation to similar studies in the field.

CHAPTER SIX

FINDINGS: FREQUENCY OF SPONTANEOUS COMMUNICATION AND THE EFFECT OF ACTIVITIES

6.1 Introduction

The overarching aim of this study was to explore the impact of adults' interactive style on children's spontaneous communication at school. An action research approach was employed with video recordings, questionnaires, focus group interviews and self-evaluation checklists being the methods of data collection. The specific research objectives were:

1. To examine whether the introduction of an Adult Interactive Style Intervention (AISI) affects the frequency with which children initiate communication,
2. To explore the effect of type of activity on the frequency of children's spontaneous communication before and after the intervention,
3. To examine whether the reasons children initiate communication change with the introduction of the intervention,
4. To investigate whether the methods children use to initiate communication change with the introduction of the intervention, and
5. To explore the extent to which staff were able to change their interactive style.

The findings of the study are presented according to themes. This chapter is the first of four chapters presenting and discussing the findings related to the frequency of

children's spontaneous communication and the effect of type of activity on this. Chapter Seven presents the findings on the functions and methods of communication, and Chapter Eight presents the findings on the implementation of AISI by the staff. Chapter Nine gives the follow-up data for both children and staff. The next section explains how the data were analysed before presenting the findings on frequency and activity type.

6.2 General notes on the analysis of the data

The six children were quite different in terms of their abilities, and the effect of AISI on every child differed. Even within the same session of an activity, there can be differences in what staff do with children which can potentially affect the degree to which they communicate. To address this, data are presented for both the whole group and each individual (children and staff). Effect size (Cohen, 1988; Dancey and Reidy, 2002) and Excel sheets were used to analyse group data. Effect size was used to calculate the clinical or practical significance of the video data and Excel sheets were used to find averages, ranges, Standard Deviations (SDs) and percentages. NVivo (QSR International Pty Ltd, 2012) was used to analyse the qualitative data (about both the group and each individual) from the focus group interviews. The questionnaires gave data about the individual children and the self-evaluation checklists gave data about the individual staff.

6.2.1 Effect size

No hypothesis test (e.g. t-tests, ANOVA) was used as the sample size was very small and this would not convey anything reliable about the population. Therefore, effect size calculations and, more precisely, Cohen's d was used instead. Effect Size (ES) was calculated to measure the size of the difference between pre and post intervention data.

Cohen's d is the index used to show the size of the difference between group means in terms of standard deviations (Cohen, 1988). The exact formula used was:

Table 10: Formula to determine effect size

$$d = \frac{m_A - m_B}{\sigma}$$

d = ES index for t tests of means in standard unit,
m_A, m_B = population means expressed in raw unit (original measurement) and
σ = the standard deviation of either population-since in this study they are assumed equal.

The variance was assumed to be equal as there was no reason to believe that the variance of the sample was different to the variance of the population. If the variance of the population was different to the variance of the sample, the effect size would be even higher.

Cohen's d gives the clinical or practical significance of the difference (Dancey and Reidy, 2002), rather than the statistical significance, which is used with larger samples. Sometimes researchers know the size of the effect they are looking for based on previous studies and carry out research to prove or challenge it. However, if there is no previous research in the area, the researcher can fall back on the values Cohen proposes (1988); Cohen's d ≥ 0.2 shows a small effect size, ≥ 0.5 shows a medium effect size and ≥ 0.8 shows a large effect size. The importance of effect size calculations is highlighted by the APA which recommends these for every published work (Field, 2005). More and more international journals have either added effect size to the statistical significance calculations or replaced them with effect size (Cohen et al., 2007). If the effect size is

0.8 or more, researchers can be confident that they have detected a real effect. If it is less than this, they may need to replicate the study, with more participants to increase the power (Field, 2005).

6.2.2 NVivo

For the analysis of the focus group interviews, a qualitative data analysis software, called NVivo (QSR International Pty Ltd, 2012) was used. The interviews were transcribed and then the researcher assigned codes to different thematic categories (see Appendix 13 for a full list of the NVivo categories). These categories had the experiences and views of staff as a starting point rather than the researcher attempted to fit staff's experiences and views in fixed pre-determined categories. This reflects the interpretivist epistemology that this study followed. For example, when staff discussed the activity which seemed to elicit the most initiations for all the children, the code 'activity effect' was assigned. These codes are called nodes in NVivo. NVivo also gives the chance to see where nodes are coded in a document by using the option coding stripes, so one can determine which focus group, and which part of the interview a quote comes from.

6.3 Frequency of spontaneous communication

Data obtained from three instruments are discussed here. These are the CICCA, the QDSCC and the focus group interviews. The first two provided quantitative data and the latter qualitative data.

6.3.1 Frequency of initiations from analysis of video data

6.3.1.1 Results

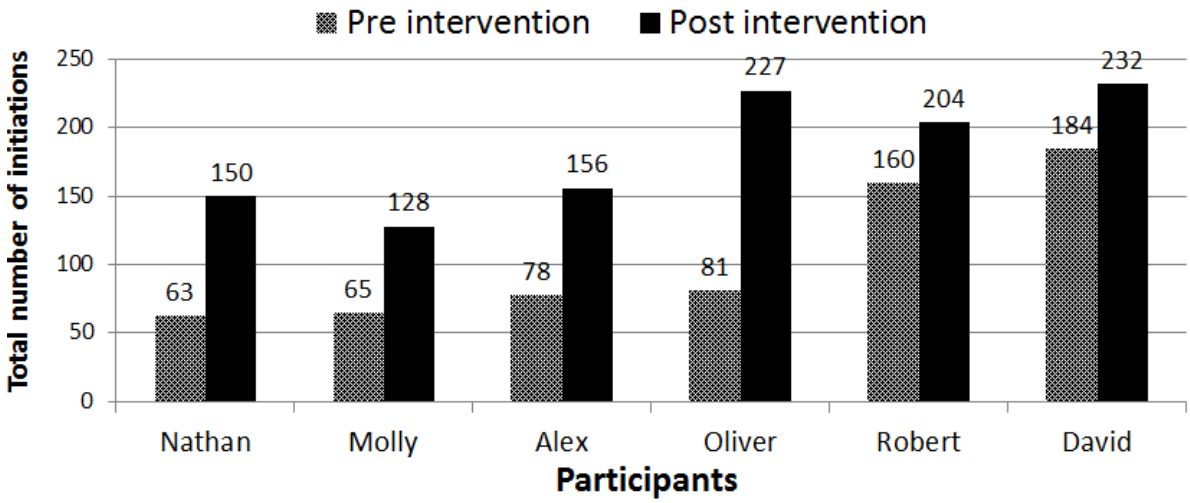
Children were filmed in four activities (i.e. sensory room, snack time, soft play and 1:1 work). Two hours of video recordings (i.e. thirty minutes per activity) were coded for each child pre and post intervention using CICCA. CICCA data are presented first for the whole group of the six children (see Table 11) and later for each child individually (see Figure 3).

Table 11: Total number of initiations, group means and SD observed across the four activities pre and post intervention (2 hours recordings)

Spontaneous initiations with adults	**Pre intervention** *0 month*	**Post intervention** *6 months*
Total initiations across 4 activities	631	1097
Average initiations for 2 hours	105	183
SD	53	40
Range	63-184	128-232
Group mean/ hour	53	92
Cohen's d	**1.6 (large effect size)**	

Total initiations for the six children increased from 631 pre intervention to 1097 post intervention, and the mean numbers of initiations from 105 to 183. The SD decreased post intervention (i.e. from 53 to 40) suggesting less variation among the children's spontaneous communication. To compare these findings with other studies, the mean initiations per hour was also calculated. This almost doubled (i.e. from 53 to 92). To show the size of the difference between group means (i.e. pre and post intervention) Cohen's d was used. Cohen's d was 1.6. This exceeds by far the 0.8 cut-off for a large effect size, which suggests that the group means of total initiations increased significantly following the introduction of the AISI.

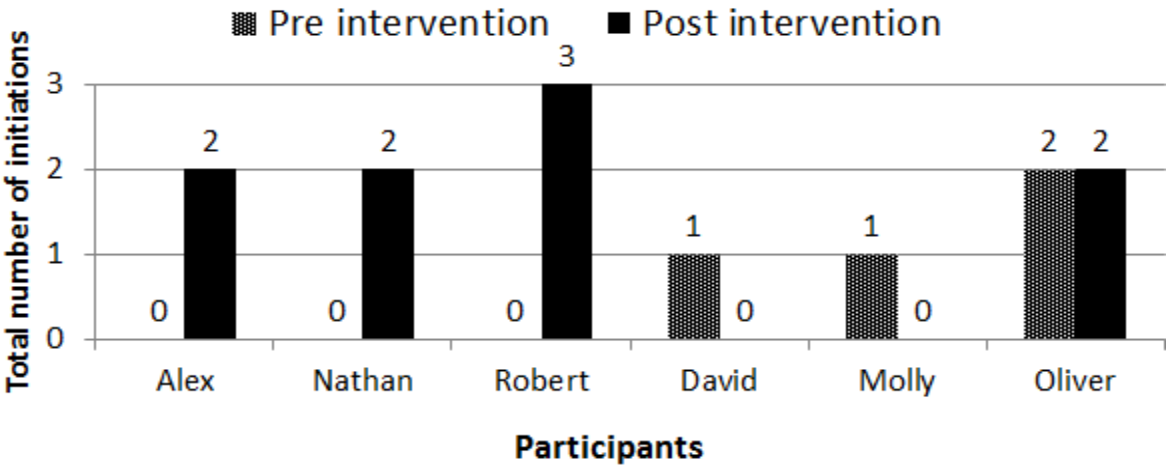
Figure 3: Total initiations with adults pre and post intervention for each child across all four activities (hours observed: 2 hours per child pre and post)



All children significantly increased the frequency of their individual initiations to adult (see Figure 3). Nathan and Molly initiated only once every two minutes pre intervention, while post intervention all children initiated at least once per minute. Oliver and David initiated almost four times per minute post intervention. Nathan initiated the least communication pre intervention and David, the only verbal child, the most, with three times as many as Nathan. Oliver showed the greatest change post intervention going from 81 to 227 initiations post intervention. Robert and David showed the least increase.

The times children initiated to their peers were very few both pre and post intervention (see Figure 4). Three of them increased the times they initiated to peers post intervention, two decreased them and one initiated the same number of times pre and post intervention.

Figure 4: Total initiations with peers pre and post intervention for each child across all four activities (hours observed: 2 hours per child pre and post)



6.3.1.2 Discussion

Overall, Oliver was the child who increased his initiations to adults the most whilst Robert and David increased their initiations to adults the least. Possible explanations for Oliver's great change might be that he was the most difficult child to engage pre intervention appearing oblivious to both staff and children, with very limited vocalisations. As a result, there was considerable scope for improvement. Robert and David, on the other hand, were relatively good at initiating communication, pre intervention.

It is hard to compare these findings with other studies as to the researcher's knowledge there is no other study which followed the exact same methodology, namely to measure the number of children's spontaneous communication before and after the implementation of an intervention on adult interactive style in an action research design. Moreover, in no other study were all children observed in a school setting, over a six

month period across such a range of activities. Therefore, these findings will be compared to those of similar studies, whilst acknowledging their differences.

There are a number of reasons why findings from this study might not be found in other studies. The definitions of spontaneous communication and the sample characteristics may be different. The present study found that the six children initiated communication on average 0.9 times per minute pre intervention, and 1.5 times per minute post intervention. Both of these are well above the 0.06 mean initiations per minute Stone and Caro-Martinez (1990) found and the 0.2 mean initiations per minute Chiang (2009) found. This may be because the present study used a more liberal definition of spontaneity (i.e. all children's attempts to communicate, which were not verbally prompted, were counted). In addition, in Stone and Caro-Martinez's study, observations were conducted during unstructured activities, and were not filmed, so some communicative acts may have been missed. Clifford et al. (2010) reported two initiations per minute for their sample, which is higher than the initiations in this study, post intervention. However, their sample included children from the wider autism spectrum and they were slightly older than the sample in this study (i.e. 48-73 months as opposed to 45-62 months).

Some few cases of peer to peer initiations were observed but they were not often captured in the video recordings due to the nature of the research design (adults working with children 1:1 or in small groups). However, even if the research design promoted peer-to–peer initiations, these would be expected to be fewer than initiations towards adults as other studies have highlighted the preference of autistic children to initiate communication with adults than peers. Chiang and Lin (2008) found that 84% of

children's spontaneous communication in their sample was directed to adults and 16.% was directed to peers. In their study initiations to peers were limited but not as low as in the present study. Their study involved children from a variety of naturalistic settings and it showed that children with autism attending mainstream schools communicated the most frequently with their peers when compared to autism specialist or generic special schools and homes. This might account for the higher percentage of children in Chiang and Lin's (2008) study communicating with peers when compared with the children of the present study. The fact that children with autism have greater difficulty in initiating to peers than adults was reflected in Hauck's et al. (1995) study which reported that autistic children initiated social interactions one third as often as the comparison group of children with DD of the same mental and chronological age. Potter and Whittaker's study (2001) reported that almost all the communicative initiations were directed towards familiar adults while very few initiations were directed to other children with autism. The sample characteristics of Potter and Whittaker's study were very similar to the sample of this study (i.e. diagnosis of autism, average age: 4.5 years, minimal or no speech, peers with autism), and so were the findings.

6.3.2 Frequency of initiations from analysis of the questionnaire data

6.3.2.1 Results

The teacher had to give an estimate of how often the six children initiated communication. The options were 'not at all', 'not often', 'often' and 'very often'. The findings are presented in Table 12.

Table 12: Ratings given by the class teacher on the spontaneous communication of the children

Child	*Pre intervention*	*Post intervention*
Molly	1	2
Alex	1	2
Robert	2	3
Nathan	2	3
David	1	3
Oliver	1	2

0= not at all, 1= not often, 2= often, 3= very often

Pre intervention, four children were rated as 'not often' initiating communication and two children as 'often' communicating. Overall, this pattern was not very different to that found from the video data. There were some differences though. For example, Nathan was rated as communicating 'often' pre intervention and 'very often' post intervention. But the video data showed that he was the child who communicated the least pre intervention, and although he doubled the times he initiated post intervention, he was not one of the children who initiated the most. The teacher's ratings for David pre intervention, and Oliver post intervention also did not agree with the video data. David was rated by the teacher as communicating 'not often' pre intervention, while the video data showed that he was the child who initiated communication the most. Oliver was rated by the teacher as initiating just 'often', post intervention, whilst he was one of the children who initiated the most, post intervention. From the teacher's report on the QDSCC it became clear that all children increased their initiations towards their peers (see Table 13).

Table 13: Ratings given by the class teacher on children's initiations to peers pre and post intervention

Child	*Pre intervention*	*Post intervention*
Molly	1	2
Alex	1	3
Robert	0	1
Nathan	1	2
David	2	3
Oliver	0	2

0= not at all, 1= not often, 2= often, 3= very often

6.3.2.2 Discussion

The main reasons for the slight discrepancies between video and QDSCC data may be that the teacher was not able to notice every child's communicative attempt in a busy classroom. Also staff usually worked in small groups with the children and so could not know each of the children in detail. Additionally, the teacher may have been deceived by specific characteristics of some children which masked their difficulties and abilities. For example, Nathan was a quite passive child (e.g. being happy to follow adults' directions), David often used 'inappropriate' behaviour which was not perceived as communicative (e.g. dropping to the floor when he wanted to stop an activity) and Oliver often used people as tools to achieve his goals (e.g. pulling the adult's hand to wind up a toy for him). In the case of Nathan, the teacher possibly overestimated the frequency of his spontaneous communication, being influenced by his high responding skills to other's communication. In the case of David and Oliver, she might have underestimated them due to the unconventional and 'immature' ways they communicated. These differences support the need to collect data on children from more than one source and to consider their accuracy and reliability. It should also be mentioned that the QDSCC data showed an increase in all children's initiations towards

their peers. Although increasing initiations to peers was not the focus of this study, analysis of the questionnaire data showed that AISI might have an effect on peer to peer initiations. This needs to be further investigated.

6.3.3 Frequency of initiations from analysis of the focus group interviews

6.3.3.1 Results

Two focus group interviews were conducted with the three members of staff to get their views on children's progress and AISI. Lorna was the pseudonym for the teacher and Emma and Amber were the pseudonyms for the TAs. This section presents staff's views on the children's frequency of spontaneous communication.

Lorna and Emma both felt that David, and then Robert were the children who increased their initiations the most, post intervention. Lorna said, about David:

> *'I feel that he is using his communication much more effectively because we are more open to him initiating it. He is still amazingly difficult and it hasn't taken away all the challenging bits but I do feel that there has been some really nice positive chatty bits with him where he has been relaxed with you and talked to you in a very functional way'.*

Emma added to this:

> *'His anxiety seems less and I know he tries to choose which adult to work with and he does that because he feels comfortable with you if you communicate with him. And he knows that he will make himself understood. […] See his behaviour as communication rather than inappropriate behaviour helps'.*

They both agreed that Robert changed a lot post intervention by being '*much more sociable and willing to initiate*'. The three staff considered Molly and Oliver the most difficult children to reach, arguing that they want to do things only on their own terms.

Lorna said about Molly that, '*she is definitely much more people orientated*' and about Oliver that:

> *'We are still tools in his environment but we are more useful to him now than we were before'.*

She said that it was still unlikely for them to engage in interactions purely for interactions' sake or enjoyment and that at post intervention their communication was mainly instrumental, a medium to a particular end (e.g. request a toy or help).

The three staff found it difficult to say whether Alex had changed and argued that Nathan had not changed greatly, as he had always been reasonably sociable. The main difference they could see in him was that he asked more for things, post intervention.

6.3.3.2 Discussion

Interestingly, the children in whom the staff saw the greatest difference were the two children who increased their initiations the least (i.e. David and Robert). However, both children decreased the times they initiated reject or used CB. This might be a reason why they were perceived as being more communicative, post intervention. According to the video data, Nathan was the second child to increase his initiations post intervention (i.e. from 63 to 150) after Oliver (i.e. from 81 to 227). However, the staff did not see a big difference in him possibly because he was a passive child whose behaviour did not disrupt the classroom. Oliver's change was not given a lot of credit perhaps because it was perceived by staff as lower level initiation. From their discussions, it became clear that while they could identify communicative acts as for joint attention and social

interaction, they had difficulties to attribute communicative intent to behaviour regulation acts.

6.4 Effect of type of activity on spontaneous communication

The four activities children and staff were video recorded at (i.e. sensory room, snack, soft play and 1:1 work) varied across a number of pairs of variables (i.e. structured versus unstructured, must do versus fun, adult-directed versus child-directed, motor-based versus sedentary, familiar versus unfamiliar, preferred versus non-preferred, easy versus difficult, language-based versus non-language-based, social versus solitary and busy versus calm) as defined by SCERTS to gain representative data (Prizant et al., 2006).

6.4.1 Effect of activity from analysis of the video data

6.4.1.1 Results

Only five children were video recorded in the sensory room. David showed some difficult behaviour during his last pre intervention session in the sensory room (e.g. lashing out at people, damaging equipment) maybe due to hyper sensitivity to visual and hearing stimuli. Staff did not feel that he would benefit from continuing the sessions post intervention. He therefore did not take part in sensory room activities post intervention.

Interestingly, the activities which showed clinical significance (large effect size - Cohen's d) post intervention are not the same with the activities which increased the most. Table 14 presents data for the whole group and Figure 5 gives data on each individual child. Initiations increased post intervention for all the four activities. The

range of initiations also increased for the three activities, with the exception of sensory room (i.e. the minimum value increased but not the maximum). The percentage of initiations in each activity remained more or less the same pre and post intervention with soft play accounting for one third of initiations in both research phases. When the effect size was calculated, the largest increase was found in snack time and 1:1 work (Cohen's d: snack=1.5 and 1:1 work= 0.97). However, all activities showed a large effect size (soft play approached the cut-off 0.8) post intervention.

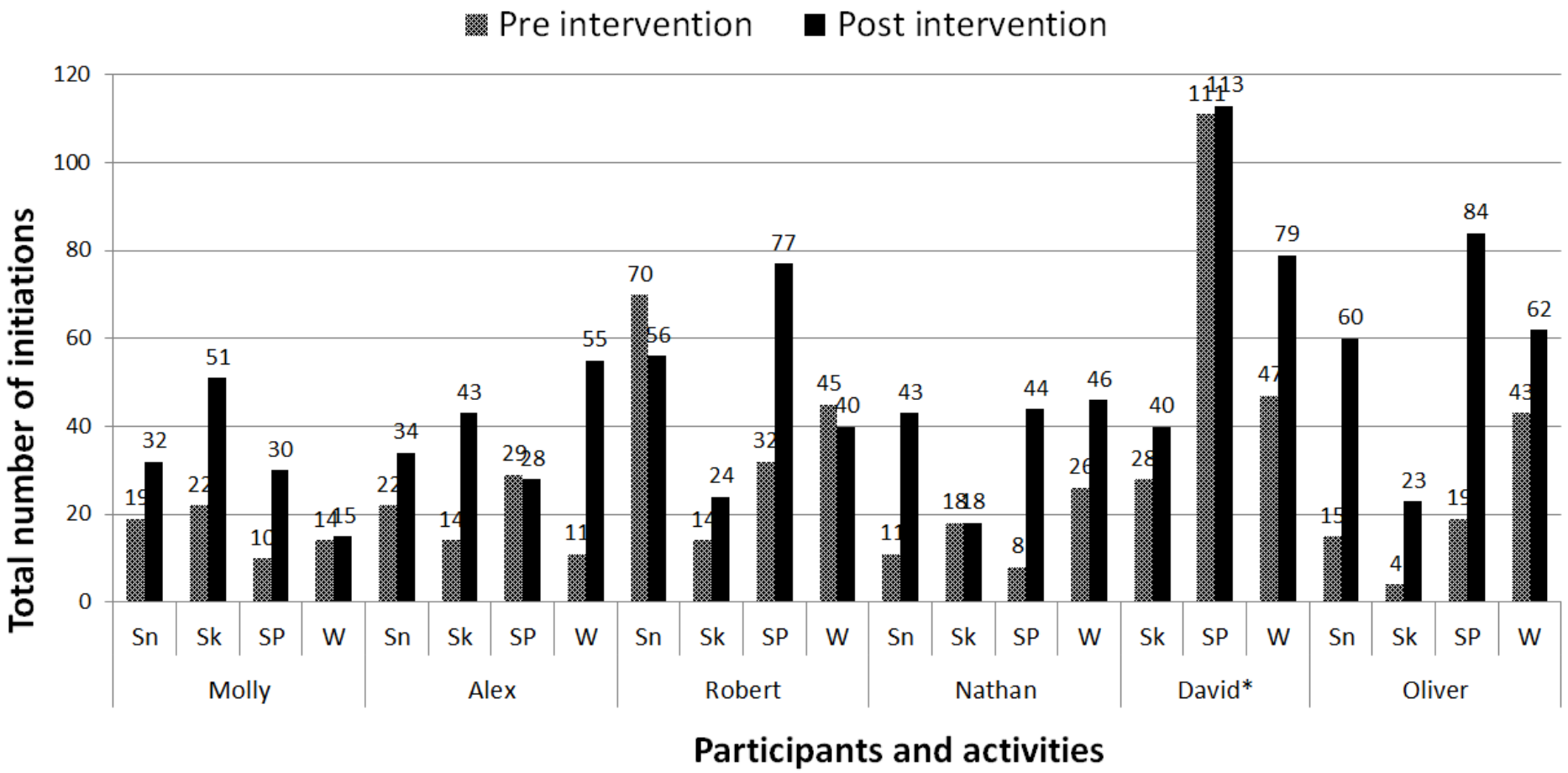
Table 14: Total number of initiations, group means, SD and range observed in the four activities pre and post intervention

Activities	***Spontaneous initiations with adults***	**Pre intervention** *0 month*	**Post intervention** *6 months*
*Sensory room**	*Total initiations*	137	225
	Average initiations for 2 hours	38	45
	SD	33	13
	Range	11-70	32-60
	Group mean/ hour	69	113
	Percentage	22	21
	Cohen's d	***0.91 (large effect size)***	
Snack time	*Total initiations*	100	199
	Average initiations for 2 hours	17	33
	SD	8	13
	Range	4-28	18-51
	Group mean/ hour	50	100
	Percentage	16	18
	Cohen's d	***1.5 (large effect size)***	
Soft play	*Total initiations*	209	376
	Average initiations for 2 hours	35	63
	SD	39	34
	Range	8-111	28-113
	Group mean/ hour	105	188
	Percentage	33	34
	Cohen's d	**0.76** ***(medium effect size)***	
1:1 Work	*Total initiations*	186	297
	Average initiations for 2 hours	31	50
	SD	16	22
	Range	11-47	15-79
	Group mean/ hour	93	149
	Percentage	29	27
	Cohen's d	**0.97** ***(large effect size)***	

*sensory = only 5 children were video recorded

When the number of initiations was considered, the greatest increase was found during soft play. Figure 5 shows the number of initiations per child in each activity. Oliver significantly increased his attempts to communicate in all four activities. Molly also increased her initiations in all four activities and David in all three activities he was recorded at. Alex and Nathan increased their initiations in three out of the four activities and Robert was the only child who increased his initiations in only two of the four activities (i.e. snack time and soft play). It is remarkable that all five children, with the exception of Robert increased their individual initiations in the sensory room, some of them considerably (e.g. Nathan from 11 to 43 and Oliver from 15 to 60). Robert decreased his initiations in the sensory room, post intervention (from 70 to 56).

Figure 5: Number of initiations of the four activities for each of the six children pre and post intervention



Sn= sensory room, Sk= snack time, SP= soft play and W= 1:1 work

6.4.1.2 Discussion

The findings with regard to activity effect were contradictory. The activities which had the largest effect size post intervention (i.e. snack time and 1:1 work) were not the same with the activity which increased the most in terms of the total number of initiations (i.e. soft play). The fact that only five children were video recorded in the sensory room may account for why the total number of initiations in the sensory room was so much lower than the initiations in the soft play despite their similar structure. One explanation for the large effect size for snack time and 1:1 work might relate to the fact that the children enjoyed the structure and predictability of these activities. Moreover, these two activities can be highly motivating for many children. In this study, almost all children enjoyed snack time and most of them liked doing their work too. On the other hand, in the sensory room and soft play, children often needed skills such as anticipation, turn-taking, reading other people's minds to keep the interaction going and these might have affected their spontaneous communication, at least for some children. Additionally, the principles staff were asked to implement in the classroom were more closely related to what they were already doing (e.g. minimal speech, use of non-verbal cues to support understanding). In contrast, some of the principles they had to apply in the sensory room and soft play (e.g. imitation, respond to all communicative attempts even the 'inappropriate' ones) were beyond the school's conventional curriculum and not always easy to implement. The decrease in Robert's initiations in the sensory room, post intervention, might have happened because in one of the three pre intervention sensory sessions his behaviour was not typical and this should have influenced the findings.

Findings from previous studies are also contradictory in terms of the effect of activity on spontaneous communication. Some studies showed that structured activities are more likely to promote spontaneous communication whilst some others claimed the opposite. O' Reilly et al. (2005) found that a 12 year-old student with autism, learning difficulties and no speech initiated the most communication in the form of self-injurious behaviours during academic activities. Similarly, Chiang (2009) found that her sample (aged between 2.2 and 16.2 years, with limited or no speech) were more likely to initiate in academic activities. Chiang (2008a) reported that her sample of autistic children and pre-adolescents (age range from 3.4 to 16.2 years, with limited or no speech) were likely to initiate the highest level of communication (i.e. caused by the least intrusive prompts such as natural cues) during lunchtime. On the other hand, Potter and Whittaker (2001) claimed that in their sample (aged between 2 and 6 years with limited speech) unstructured activities (e.g. burst and pause/rough and tumble games, imitation of the children) were more likely to promote spontaneous communication. The present study comes to confirm the equivocal evidence on this issue.

6.4.2 Effect of activity from analysis of the questionnaire data

The class teacher was asked to state which activities elicited the most social communication for each child, pre and post intervention (see Table 15). She was not limited to her responses.

Table 15: Activities likely to elicit spontaneous communication pre and post intervention as reported by the teacher in QDSCC

Children	*Pre intervention*	*Post intervention*
Molly	Musical activities, outside play	Snacks, choice time, interactive activities
Alex	When he wants something (e.g. the timetable to move on) in familiar contexts	All the time, when he wants something
Robert	Musical activities/ interactive games (e.g. peek-a-boo and 'ready, steady, go'), when it's quiet	Familiar interactive games
Nathan	Cause and effect toys (e.g. click clack track), while looking at favourite books	Sensory room, soft play, when he wants something
David	Outside play, snack time	All the time
Oliver	Snack time and when he wants people to go away	Sensory, soft play, when wants something

The teacher's responses mostly reflected the video data. For Molly, agreement was very high; snack and interactive activities (i.e. sensory room and soft play) were the activities in which she initiated the most according to the video data, post intervention. The teacher was also accurate with Robert as she considered interactive games (played mainly in sensory room and soft play) one of the activities he initiated the most, post intervention. This reflects the video data which showed that Robert initiated 70 times in the sensory room pre intervention and 77 times in the soft play post intervention. Post intervention, the teacher thought that David and Alex initiated communication all the time. These findings are similar to the video data. David increased his initiations in all three activities he was filmed at and Alex in three of the four. Nathan and Oliver were rated by the teacher as initiating communication in sensory room and soft play and

when they wanted something. Initiations in sensory room and soft play increased for both of them according to the video data which also showed that these two were among the children who increased the times they initiated request the most post intervention (Figure 6, Chapter Seven).

6.4.3 Effect of activity from analysis of the focus group interviews

6.4.3.1 Results

During the second focus group interview (Stage 7) staff were asked about the activities they had seen greater differences pre and post intervention with regard to children's spontaneous communication. The three members of staff agreed that children's initiations were increased, most in the sensory room and soft play. This reflects the findings of the total number of initiations (as opposed to Cohen's d findings).

The three members of staff acknowledged that in work sessions, initiations were not easy. Lorna said that:

> *'[In 1:1 work] there is an element of adult direction that you can't get away from. So there is less opportunity for child initiations other than the child chooses which bits out of their boxes they do'.*

She reported that David liked a lot choosing the activities of his workbox and this resulted in an increase in his initiations in 1:1 work time. None of the staff thought that children initiated the most in snack time, the activity with the largest effect size, post intervention.

6.4.3.2 Discussion

The staff thought that children increased their initiations most in the sensory room and soft play post intervention. This agrees with the findings when the total number of initiations was considered but goes against the Cohen's d findings. Possibly the fact that some children initiated much more times in sensory room and soft play was more obvious for the staff than the fact that most children increased their initiations, some of them not very significantly, in snack time and 1:1 work.

6.5 Summary

This chapter presented the findings on the frequency of children's spontaneous communication and the effect each of the four activities had on communication when the staff used AISI. All six children considerably increased the times they initiated communication post intervention. With regard to the effect of the activities on children's communication, only tentative conclusions can be drawn. This study reflected the discrepancy of findings from previous studies. Effect size calculations (Cohen's d) showed that snack time and 1:1 work had the largest significant change post intervention while when the total number of initiations was considered, soft play showed the greatest increase. More research needs to be done about the activities' effect on children's communication. An important point to mention here is that future studies need to give full details of the activities they explore to give comparable data. This is because sensory room and soft play activities, for example, might be run in a completely different way from one school to the other. The next chapter presents the communicative functions and methods children used before and after staff were introduced to AISI.

CHAPTER SEVEN

FINDINGS: FUNCTIONS AND METHODS OF SPONTANEOUS COMMUNICATION

7.1 Introduction

Spontaneous communication can serve a range of communicative purposes and can take a number of forms. Function is the term given to the purpose of a communicative act and the form it takes is often referred to as the method. Bruner (1981) describes three pre-linguistic communicative functions that emerge in TD infants. These are behaviour regulation, joint attention and social interaction. Wetherby and Woods (2006) define these as follows. Behaviour regulation consists of verbal or gestural communicative signals to regulate another person's behaviour. Joint attention can be defined as the verbal or gestural communicative signals to draw another person's attention to a person, an object or event. Social interaction is the verbal or gestural communicative signals to draw another person's attention to oneself. In this study, behaviour regulation includes requesting, rejecting and protesting, joint attention includes commenting, giving and seeking information and social interaction includes expressing feelings, seeking attention, seeking approval, initiating social routines and social games. Methods of communication range from pre-symbolic (e.g. motoric acts) to symbolic (e.g. pictures, signs, speech) (Prizant et al., 2006). In this study, pre-symbolic methods include CB, eye contact, eye pointing, laughing, pointing (contact and distal), proximity, re-enactments, simple motor actions, smiling, vocalisations and babbling. Symbolic methods include echolalia (immediate and delayed), objects of reference, single words,

signs/gestures, symbols/pictures and word combinations. For a detailed definition of each communicative function and method see Appendix 5.

In this chapter, data from three instruments are presented. These are video data recorded on CICCA, the QDSCC for the teacher and the focus group interviews. The findings are compared with those of similar studies, acknowledging differences and similarities between them.

7.2 A note on the analysis of the video data on functions and methods using the Checklist for the Initiation of Communication in Children with Autism (CICCA)

The six children were video recorded for two hours in four different activities (i.e. sensory room, snack time, soft play, 1:1 work) pre and post intervention. CICCA was used to code the frequency of their initiations alongside the functions their initiations served and the methods the children used. Two issues arose when coding communicative functions and methods. Firstly, a decision had to be made on what to do when a child used the same method repetitively for the same purpose (e.g. a child constantly pushing away the adult's hand to protest), and secondly, when one communicative function was expressed by more than one method at the same time (e.g. a child using eye contact, manipulating adult's hand and uttering a single word to request an object). The following decisions were made. When a child was using the same method more than once for the same purpose, the method was coded as one occurrence. A five-second-rule was put in place and if the child continued to use the same method for the same purpose, a second occurrence was recorded. Applying this rule would have been impossible without using the video records. A decision was made that a communicative act could not serve more than one function (e.g. requesting and

expressing feelings). The dominant function was coded, where two functions were expressed. This decision can be argued against but it simplified the calculations concerned with the frequency of the communicative acts. When a child used many different methods for the same purpose, all the different methods were coded under the one relevant function

7.3 Communicative functions

This section starts with the communicative functions which had a large effect size. It also presents the total frequencies each function was coded pre and post intervention for the six children as well as the average, the range and the percentages. The findings are discussed while taking into consideration similar studies.

7.3.1 Change in the communicative functions from the video data

7.3.1.1 Results

The communicative functions were split into the three broad categories of behaviour regulation (i.e. requesting and rejecting or protesting), joint attention (i.e. commenting or giving information and seeking information) and social interaction (i.e. expressing feelings, seeking attention, seeking approval, social routines and social games). Cohen's d was calculated to measure the size of the difference between group means in terms of standard deviation. Requesting was the function which showed the largest effect size (Cohen's d= 1.67), post intervention. Initiating social games (Cohen's d= 1.48), seeking attention (Cohen's d= 0.95) and expressing feelings (Cohen's d= 0.88) also had a large effect size. Cohen's d showed large effect size only for behaviour regulation and social interaction functions.

The function that showed the most increase overall was requesting (i.e. from a total of 286 to 460) representing 42% of the total communicative acts post intervention (see Table 16). The frequency, with which children expressed feelings, considerably increased post intervention (from a total of 133 to 264). Commenting also showed an increase post intervention (i.e. from a total of 32 to 74). This was largely down to one child, David, the only verbal child. He initiated 31 of the total 32 comments pre intervention and 72 of the total 74 comments, post intervention. None of the children sought information pre intervention but David did so, post intervention. He initiated 15 of the total 16 seeking information acts. In contrast, the children initiated fewer social routines post intervention. This section presents the changes seen in each function. Individual profiles for the changes in the functions for each of the six children can be found in Appendix 14.

Table 16: Total number of communicative functions, and the average and range for the six children pre and post intervention

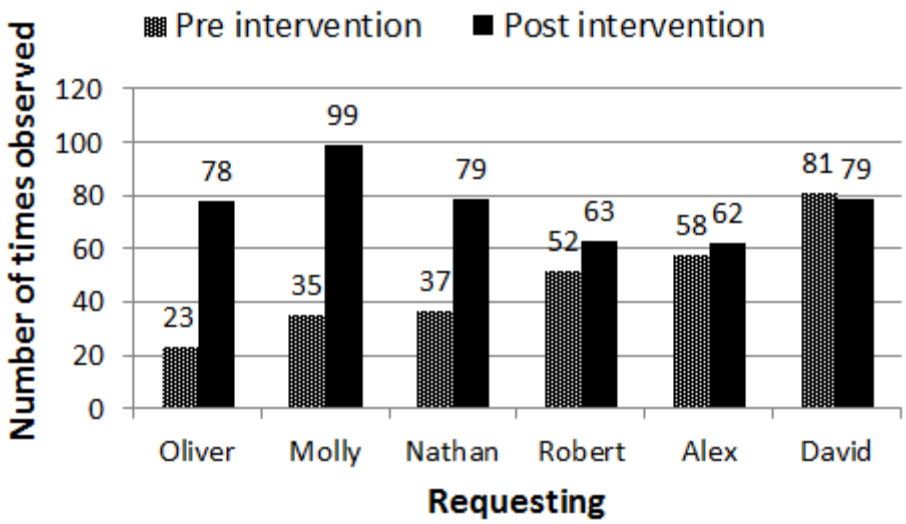
Communicative functions	Pre intervention				Post intervention				Cohen's d
	Total numbers	Average per 2 hrs	Range	Percentage	Total numbers	Average per 2 hrs	Range	Percentage	
Behaviour regulation									
Request	286	48	21-81	45	460	77	62-99	42	1.67*
Reject	155	26	11-59	25	200	33	12-65	18	0.38
Joint attention									
Comment	32	5	0-31	5	74	12	0-72	7	0.31
Seek information	0	0	N/A	0	16	3	0-15	2	0.62
Social interaction									
Express feelings	133	22	6-48	21	264	44	11-84	24	0.88*
Seek attention	9	2	0-4	2	26	4	0-11	2	0.95*
Seek approval	2	0	0-1	0	5	1	0-2	0	0.64
Social routines	7	1	0-7	1	2	0	0-1	0	-0.32
Social games	7	1	0-2	1	50	8	0-15	5	1.48*

*** Cohen's d ≥ 0.8= large effect size**

- *Requesting*

Requesting was coded when '*the child asked for an object, service or activity*' (Stone and Caro-Martinez, 1990). All children, apart from David, increased their requests (see Figure 6). The average initiation of request increased from 48 pre intervention to 77 post intervention and in both times it accounted for more than 40% of the total initiations (see Table 16).

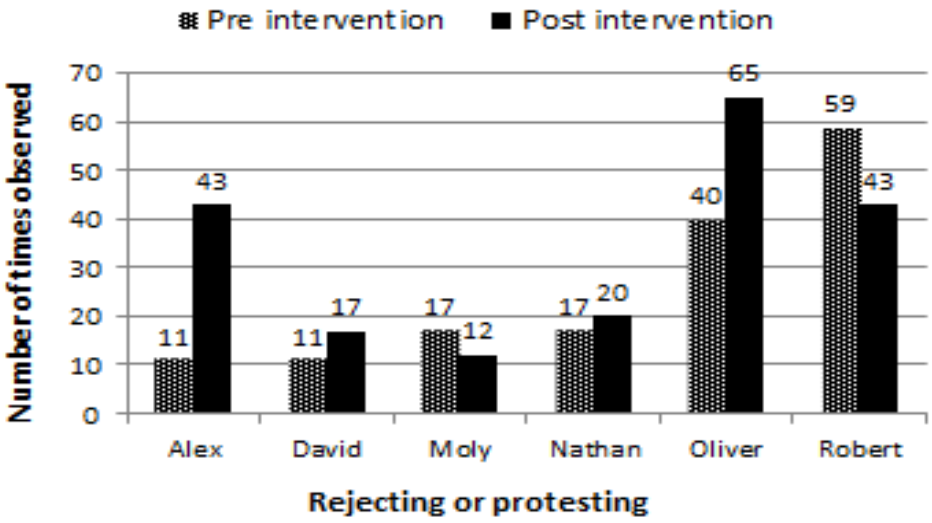
Figure 6: Requesting for each of the six children, pre and post intervention



- *Rejecting or protesting*

Rejecting or protesting was coded when '*the child refused an object, protested an action or wished to terminate an event that had already begun*' (Stone and Caro-Martinez, 1990). Protests considerably increased for two of the children, Alex and Oliver, post intervention (see Figure 7). Three other children protested more or less with the same frequency pre and post intervention and Robert decreased his protests, which were very frequent pre intervention.

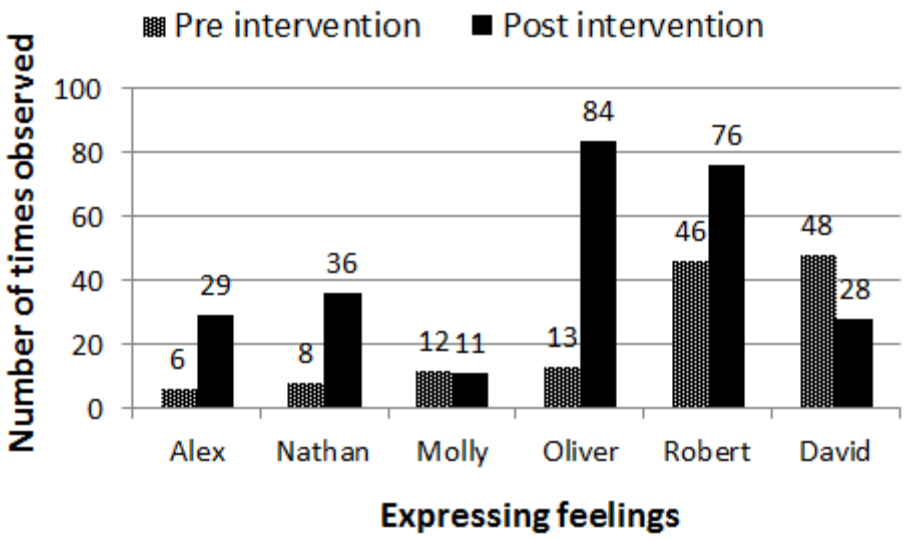
Figure 7: Rejecting or protesting for each of the six children, pre and post intervention



- *Expressing feelings*

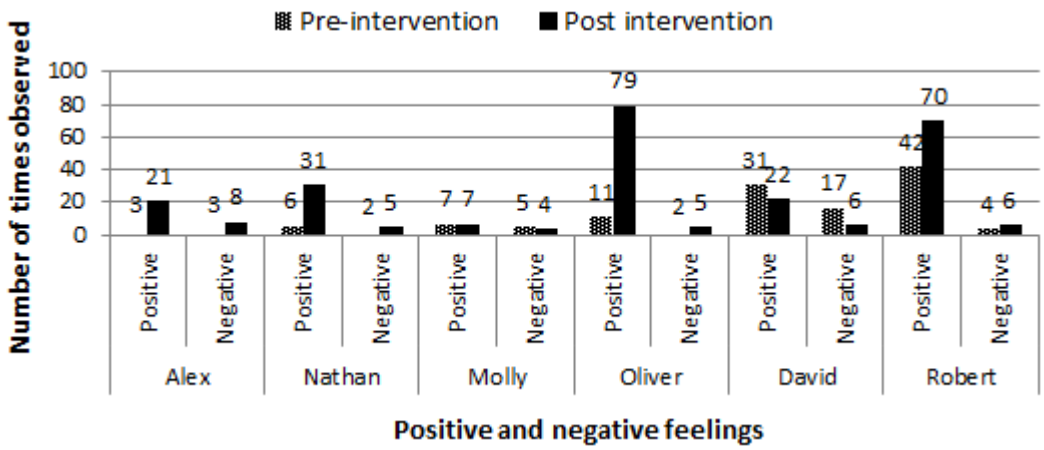
Expressing feelings was coded when '*the child shared with a partner how they felt, likes or dislikes*' (modified from Stone and Caro-Martinez, 1990). Four children increased the times they expressed their feelings post intervention (see Figure 8). The increase for Oliver was great (i.e. from 13 times pre intervention to 84 post intervention). David decreased the times he expressed feelings by 20 times and Molly expressed her feeling more or less with the same frequency in both research phases.

Figure 8: Expressing feelings for each of the six children, pre and post intervention



To explore the expression of feelings more, they were split into two categories, namely positive and negative. Frustration, upset, sadness and confusion belong to the first category whilst happiness, excitement, affection, satisfaction belong to the second category. Four children increased both their positive and negative feelings post intervention (see Figure 9). Molly showed more or less the same number of positive and negative feelings pre and post intervention and David decreased both positive and negative feelings. It should be noted here that many of David's feelings pre intervention were negative (e.g. frustration, anxiety, anger).

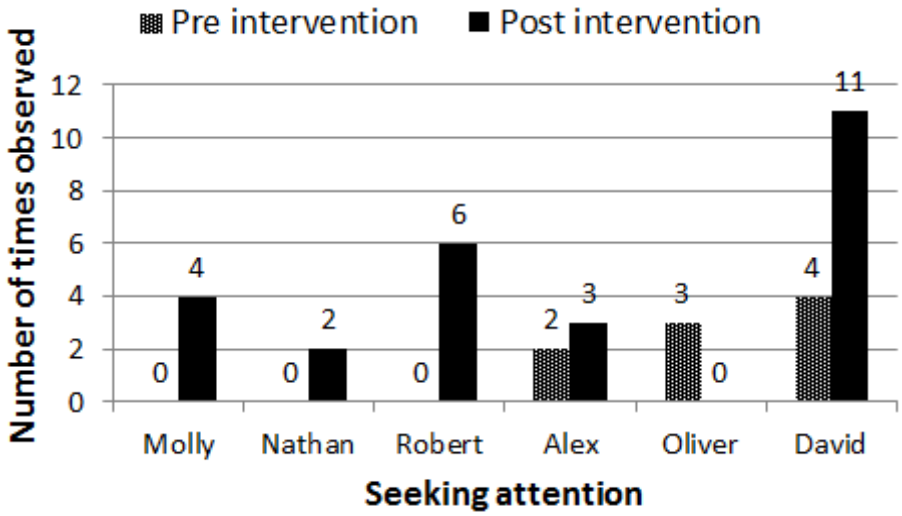
Figure 9: Number of times each child showed positive and negative feelings pre and post intervention



- *Seeking attention*

Seeking attention was coded when '*the child tried to be noticed*' (Stone and Caro-Martinez, 1990). It accounted for 2% of the total initiations pre and post intervention (see Table 16). Although coded only few times, five of the children sought attention post intervention. David increased this function the most (from 4 to 11 times) and Oliver was the only child who did not seek attention post intervention (see Figure 10).

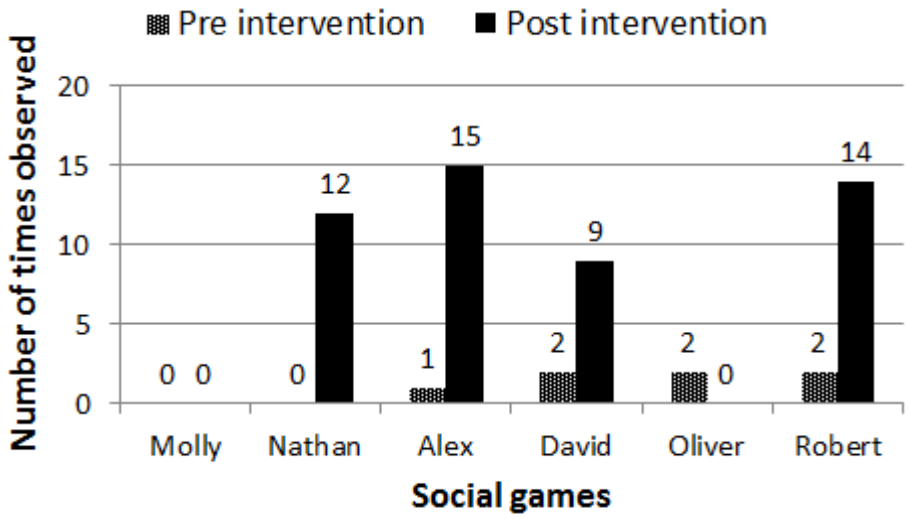
Figure 10: Seeking attention for each of the six children, pre and post intervention



- *Initiating social games*

Initiating social games was coded when '*the child initiated either widely known social games such as round and round the garden, peek-a-boo, row, row the boat or self-created ones such as hiding below/behind objects, tickling games*' (modified from School's SLT, 2009). Four children increased their initiation of social games (see Figure 11). Molly and Oliver were the two children who did not increase initiation of social games. Pre intervention, initiating social games was coded only 7 times and after the introduction of AISI, initiating social games was coded 50 times.

Figure 11: Initiating social games for each of the six children, pre and post intervention



- *Seeking approval and initiating social routines*

Seeking approval was coded when '*the child asked for permission of what they were doing*' (modified from Agius, 2009) and it was seen very few times both pre and post intervention. It increased from 2 to 5 times and it accounted for less than 0.5% of the total initiations in both research phases (see Table 16). Molly, David and Oliver did not

show this function at all. Initiating social routines was coded when the child carried out simple routines of a social nature (e.g. say '*hi*', '*goodbye*', wave to somebody) (Stone and Caro-Martinez, 1990). Initiating social routines decreased from 7 times pre intervention to 2 times post intervention (see Table 16). The 7 social routine acts observed pre intervention were all initiated by David who initiated social routines only once post intervention.

- *Commenting or giving information and seeking information*

Joint attention functions (i.e. commenting or giving information and seeking information) were the least frequent to observe. Commenting was coded when '*the child showed or spoke about people, objects or events that were either readily apparent to the listener or related to past or future events*' (modified from Stone and Caro-Martinez, 1990). Seeking information was coded when '*the child asked for information about people, objects or events that were either readily apparent to the listener or related to past or future events*' (modified from Stone and Caro-Martinez, 1990). Commenting was seen more often than seeking information. Both were coded mainly for David and, as a result, neither of them had a large effect size. Apart from David, Molly commented once pre intervention and twice post intervention and Alex sought information only once post intervention.

7.3.1.2 Discussion

Requesting was found the most commonly used communicative function reflecting the findings of previous studies. Chiang and Lin (2008) and Chiang (2009), in their studies of thirty-four autistic children and young adults with limited speech (aged between 2.2 and 16.2 years), reported that request was the most frequent function. Stone and Caro-

Martinez (1990) in their study of thirty children with autism (aged between 4 to 13 years) found that requesting was the third most common communicative function accounting for 22% of total communication in their sample. The fact that the children in Stone and Caro-Martinez's study (1990) were considerably older than the children of the current study may account for fewer occurrences of requesting and more occurrences of functions pertaining to social interaction (i.e. seeking attention and initiating social routines).

In a similar vein, several studies found that both requesting and rejecting were equally frequent. For example, Potter and Whittaker (2001) found that the children in their sample mainly communicated to request and reject or protest. Their sample was very similar to the sample of the present study (e.g. young children with autism – aged between 2 and 6 years - with minimal or no speech) but larger (n=18). Agius's (2009) findings were similar. She observed eleven non-verbal children with autism (aged between 3 and 5:06 years) during meal times at school and at home and found that requests and protests were the most common. Initiating behaviour regulation acts (i.e. requesting, rejecting and protesting) are also common among children with other special needs, apart from autism. Carter (2003) studied twenty-three children with high support needs (aged between 7:2 and 16:1 years) and found that requesting, rejecting and protesting were 80% of the total of children's communicative initiations. More specifically, requests accounted for 68% of the initiations coded and reject/protest accounted for 13 % of them.

Most children increased their expression of feelings. This finding suggests that the introduction of AISI increased the expression of both positive and negative feelings for

the majority of the children possibly because they were more aware of the adults post intervention. This contradicts with existing literature arguing that children with autism rarely express their feelings (Dawson et al. 1990; Ozonoff et al., 1990) and when they do so, their feelings are mainly negative (e.g. sadness, fear and anxiety). For example, Bieberich and Morgan (1998) showed that during semi-structured play sessions with their mothers, autistic children showed more negative affect than their peers with Down syndrome. Supportive of the above argument is another study by Capps et al. (1993), which compared the answers of sixteen parents of children with autism to that of nineteen parents of TD children on a series of questionnaires on their children's emotions. The former perceived their children as highly expressive of negative emotions such as sadness, fear, shame, guilt whilst the latter thought that their children were more expressive of positive emotions. ICD-10 (WHO, 1992) also regards fear and anger as the most commonly expressed emotions by people with autism. This is true to a certain extent as verbal individuals with autism describe numerous examples of being overwhelmed by negative emotions (Jackson, 2002; Grandin, 2006; Sainsbury, 2009). However, these findings come mainly from studies of children and individuals from the higher end of the autism spectrum and one should consider potential differences with young non-verbal children with autism. The current study attempts to highlight the extent to which negative feelings may become a self-fulfilling prophecy in individuals with autism. This means that being aware of the difficulties many children with autism may experience with understanding and expressing their emotions, NT adults may not encourage them to express their feelings and as a result autistics miss important opportunities to practice these skills. Indicative are the findings of Dawson's et al. study (1990) that mothers of children with autism are likely to smile less in response to their children when compared to mothers of TD children.

Few naturalistic studies have included the function of expressing feelings. Stone and Caro-Martinez (1990) found that this function was coded very few times. This might have happened for two reasons. Firstly, the fact that the observations were not video recorded could have led to missing occurrences which are often expressed in unconventional ways by people with autism (Mesibov et al., 1997; Freeman et al., 2002). Secondly, the widespread belief at this time (i.e. 1990s) that children with autism rarely express their feelings (Dawson, et al., 1990; Ozonoff, et al., 1990) could have biased the observers. The expression of feelings was coded for 10% of the total communicative acts in Agius's (2009) sample (named as showing emotions), which is below the 21% pre intervention and the 24% post intervention expressing of feelings coded in the current study. Stone and Caro-Martinez (1990) coded this function only four times (1.5% of the total communicative acts). Freeman et al. (2002) reported that the most frequent function thirty-six students with autism (aged from 6 to 24 years) showed while interacting with familiar adults was expressing feelings. It should be noted here that these students were filmed during unstructured social interactions which possibly gave opportunities for participants to express their feelings. It is interesting to also note that Agius (2009) observed her sample during meal times and Stone and Caro-Martinez during unstructured activities, lunch included. However, their findings were very different. Freeman et al. (2002) acknowledged that expressing feelings does not appear in many studies as a frequent communicative function in autistic people as they tend to use unconventional behaviours which cannot be recognised by unfamiliar adults. In the present study, the researcher cannot be considered as an unfamiliar adult as I had spent more than two months in the classroom before the pre intervention video

recordings. This is also the case for the sample in Agius's study (2009) as they were children she was working with before as a SLT.

Seeking attention, which was coded only a few times in this study, was the most frequently coded communicative function in Stone and Caro-Martinez's study (1990). It accounted for 23% of the total children's communicative acts. Agius (2009) found that seeking attention was one of the least observed functions accounting for 5% of the total communicative acts. Most probably this difference in the frequency of seeking attention was due to different definitions used. For Stone and Caro-Martinez (1990) looking at the adult was sufficient to code seeking attention, whereas this was not the case in the current study and the study by Agius (2009).

Initiating social games was increased for four of the six children post intervention. The two children who did not increase this function were Molly and Oliver, who were described by the teacher as '*object rather than people orientated*'. Possibly children with this characteristic prefer to initiate to get an object rather than an interactive game. This is further reinforced by the fact that these two children showed the most increase from the six children in requesting (see Figure 6). In some studies (e.g. Chiang and Lin, 2008; Chiang, 2009), social games were not explored as a separate function but they were included in the category of requesting and this should be kept in mind when comparing the findings. Initiating social routines was coded very few times in this study and their frequency dropped post intervention. David was almost the only child who initiated social routines and the drop post intervention might be explained by the fact that he possibly replaced these learnt behaviours (mainly say '*hello*') by more meaningful comments (e.g. pointing and naming objects in his environment/peers).

Both commenting and seeking information were coded few times in this study mainly for David. This is more or less depicted in other studies too. In Stone and Caro-Martinez's study (1990), commenting was coded 41 times accounting for 15% of the total initiations whereas seeking information was coded only 7 times accounting for 3% of the total initiations. In Chiang's study (2008a) children initiated comments on average 19 times which is well above the 5 times on average pre intervention and the 12 times on average post intervention coded in the current study. Chiang (2009) did not code the times children sought information. This is also the case for Agius (2009), who did not include this function in her study.

It is useful to consider these findings with the theory of social communication development in TD children. Bruner (1981) describes three communicative functions that emerge prior to the onset of speech in infants with TD, namely behaviour regulation, joint attention and social interaction. Although TD children acquire the three functions synchronously, children with autism often develop one function at a time (Wetherby, 1986). Behaviour regulation (i.e. requesting and rejecting or protesting) is the first communicative function that autistic children acquire (Wetherby, 1986). Requests increased the most in the present study confirming Wetherby's (1986) theory. According to her, the next function to emerge is that of social interaction (i.e. expressing feelings, seeking attention, seeking approval and initiating social routines and social games). Initiating social games, seeking attention and expressing feelings, had a large effect size in the current study. Joint attention (i.e. commenting or giving information and seeking information) is a later function to emerge in children with autism (Wetherby, 1986). This function was observed only a few times and mainly in

the verbal child in the sample, David. Based on this theory, Wetherby et al. (2007) conducted a study comparing children with TD, DD and autism. They found that autistic children had a similar frequency for acts relating to behaviour regulation, lower on behaviours for social interaction and remarkably lower for joint attention acts. The present study adds support to Wetherby's theory (1986) as post intervention data showed that 60% of children's communication was for behaviour regulation purposes, 32% for social interaction purposes and 8% for joint attention.

These findings can also be viewed within the framework of the social motivation theory and the neuropsychology of social development. The social motivation theory purports that:

> *'People typically engage in prosocial behaviors not because they expect some kind of direct benefit to offset their efforts but because they find it inherently rewarding'*. (Chevallier et al., 2012, p. 232)

However, a question to ask here is 'What is rewarding for children with autism?' Scott Van Zeeland et al. (2010) studied the value of monetary (i.e. coins) and social rewards (i.e. smiles) for sixteen able autistic boys as opposed to sixteen TD peers. They found that the autistic boys did not find social stimuli rewarding. This is in agreement with Mundy (1995) and Chevallier et al. (2012). Mundy (1995) highlights that the type of reward may affect the frequency of behaviour regulation and social-emotional acts (e.g. joint attention and social interaction). Behaviour regulation acts result in non-social rewards (e.g. the child gets the toy they want) whilst social-emotional acts give rise to social behaviours (e.g. eye contact, sharing of affect).

Another reason as to why behaviour regulation acts are more often than other types of social communication in autism is given by the neuropsychology of social development. Mundy (1995) mentions that different types of social communication are influenced by different neurological systems. Social emotional behaviours are more associated with the left frontal lobe activity, the neuropeptide system and the mid brain system. Behaviour regulation behaviours are connected to a partially independent system of neuroexecutive regulation and endogenous reward. According to him, the former neurological systems are working less effectively than the latter system. Further reinforcing the theory of neuropsychology of social development, Scott Van Zeeland et al. (2010) found that there were reduced neural responses to social stimuli by children with autism.

7.3.2 Changes in communicative functions from the questionnaire data

7.3.2.1 Results

The teacher was asked to estimate how often the six children used each of the three communicative functions (i.e. behaviour regulation, joint attention and social interaction) on a four point rating scale. The data on behaviour regulation are presented in Table 17 for each of the children.

All children increased requesting, which agrees with the video data. Only David was observed to request two times less, post intervention (which was not captured in the questionnaire data) but this is a small difference. With regard to rejecting or protesting there were a few differences between the teacher's report and the video data. Both data agreed that Molly and Robert decreased their rejecting behaviours and Alex and David increased them. Oliver was reported by his teacher to reject a similar number of times

pre and post intervention, but video data showed that he considerably increased rejecting post intervention (i.e. from 40 to 65).

Table 17: Behaviour regulation pre and post intervention for the six children as reported on the QDSCC

Child	Function	Pre intervention	Post intervention
Molly	Request	1	2
	Reject	1	0
Alex	Request	2	3
	Reject	1	3
Robert	Request	0	2
	Reject	1	0
Nathan	Request	2	3
	Reject	2	0
David	Request	2	3
	Reject	1	3
Oliver	Request	1	2
	Reject	1	1

0= not at all, 1= not often, 2= often, 3= very often

With regard to joint attention, no differences were found from the questionnaire data pre and post intervention. All six children were rated 0 on both joint attention functions (i.e. commenting or giving information and seeking for information) on the QDSCC. This happened both pre and post intervention and did disagree with the video data for one child, David. David commented 31 times pre intervention and 72 times post intervention (e.g. naming peers, objects in his environments and clothes he was wearing). He also sought information (e.g. where some of his peers were, when the time for a favourite activity was) 15 times post intervention. These were not picked up by his teacher.

With regard to social interaction, the most interesting finding was the fact that none of the six children was reported to express feelings, either pre or post intervention. The video data showed that four of the six children (i.e. Alex, Robert, Nathan and Oliver) considerably increased the times they expressed feelings post intervention. Molly expressed her feelings more or less with the same frequency pre and post intervention and David significantly decreased this, post intervention. The rest of the social interaction functions, according to the teacher's ratings, are presented in Table 18.

Table 18: Social interaction functions pre and post intervention for the six children as reported in the QDSCC

Child	Function	Pre intervention	Post intervention
Molly	Seek attention	1	2
	Seek approval	0	0
	Social routines	0	2
	Social games	0	0
Alex	Seek attention	0	2
	Seek approval	0	2
	Social routines	0	3
	Social games	1	2
Robert	Seek attention	0	2
	Seek approval	0	0
	Social routines	0	2
	Social games	0	3
Nathan	Seek attention	0	1
	Seek approval	0	0
	Social routines	0	2
	Social games	1	3
David	Seek attention	2	3
	Seek approval	0	0
	Social routines	2	3
	Social games	2	2
Oliver	Seek attention	0	0
	Seek approval	0	0
	Social routines	0	1
	Social games	0	1

0= not at all, 1= not often, 2= often, 3= very often

All children, apart from David, were reported to have increased their initiation of social games post intervention. David was reported to initiate social games with the same

frequency pre and post intervention. This agrees to a certain extent with the video data which showed that all children, David included, increased this function. Interestingly, the teacher reported that all six children started using or increased the times they used social routines (e.g. say '*hi*', '*thank you*') post intervention. This does not concur with the video data which showed that only David initiated few social routines, pre intervention (e.g. saying '*hello*') which he decreased post intervention. Regarding seeking attention, the teacher appeared accurate in her ratings. She reported that all children, with the exception of Oliver, showed this function post intervention. This is exactly what the video data showed. With regard to seeking approval, the teacher rated only Alex as having showed this behaviour post intervention. This slightly disagrees with the video data which showed that apart from Alex, Robert and Nathan also showed this behaviour post intervention. Seeking approval was coded very few times (twice pre intervention and five times post intervention) and this should have made it even more difficult for the teacher.

7.3.2.2 Discussion

The teacher's reports reflected to a certain extent the video data. More light should be shed on potential reasons for discrepancies between video and QDSCC data. For example, the teacher did not pick up David's attempts to comment and seek information. Two possible reasons can account for this. Firstly, the teacher said how difficult and disruptive for the rest of the class David's behaviour was. So, she might have been overwhelmed by this and could not see his joint attention behaviours. Secondly, given that the teacher had many years of experience in teaching children with autism, she could have been aware of the fact that autistic people are likely to have joint

attention difficulties (Baron-Cohen et al., 1992; Charman et al., 1997; Murdock et al., 2007) and she could have answered the QDSCC with this in mind.

With regard to social interaction, the most interesting finding was the fact that none of the six children was reported to express feelings, either pre or post intervention. This is surprising and unlikely to be the case. It is however in agreement with some past literature suggesting that children with autism have difficulty in understanding and expressing their emotions (Dawson et al., 1990; Ozonoff et al., 1990). The teacher being influenced by past literature or deceived by the unconventional ways people with autism are likely to express their feelings (Mesibov et al., 1997; Freeman et al., 2002) could be two possible reasons as to why this discrepancy between QDSCC and video data has occurred. Another discrepancy between video and QDSCC data is related to initiation of social routines. The teacher reported on the QDSCC that children increased social routines post intervention while this does not reflect the video data. The teacher might have been influenced as a result of the Hawthorne effect (i.e. being introduced to a different adult style, children should have increased all the measured functions) or she might have given a broader definition to social routines (e.g. often request, seek attention and approval might be considered social routines in children with autism and limited speech). Overall, the difficulty in the teacher knowing in detail every single child and the possibility of her giving different definitions to communicative functions than the researcher may account for most discrepancies between video and QDSCC data.

7.3.3 Changes in communicative functions from the focus group interviews

Although it was difficult to explore the issue of communicative functions in an interview format (i.e. there were too many functions to be discussed for each of the six children), staff were asked during the second focus group interview (Stage 7) in which ways children had changed their spontaneous communication after the implementation of AISI. They were encouraged to speak about the frequency and the communicative functions and methods for each child. Analysis of the transcripts through NVivo showed many similarities between staff's reports and video data. To start with David, the three staff agreed that he increased his joint attention skills (both commenting and seeking information). This is in contrast with the QDSCC data where he scored 0 both pre and post intervention.

Lorna, who completed the QDSCC, recalled during the second focus group interview:

> *'He is telling you what he sees in the pictures in the books […] He is pointing at pictures and he says 'outside' and you say 'yes the boy is outside'.*

Emma commented on David's improvement in requesting skills:

> *'He is asking you for something when he knows it is not its time and if you reassure him that it is coming or ask him to wait, he is accepting this'.*

Amber added to this:

> *'He is also asking for things he needs like toilet or a drink when it is out of routine times'.*

Nathan, Oliver and Molly were reported to have significantly increased requesting and Robert and Oliver were also reported to have increased their initiation of social games.

For Robert, burst and pause games such as *ready, steady, go* seemed to have worked very effectively. Emma recalled an event with Oliver, who was considered by Lorna to be 'object orientated':

> *'We had a lovely time in soft play, very interactive. Yesterday I went outside and he came up to me and he smiled and took my hand and I think he was probably hoping I was taking him to the soft play. He enjoys the interaction'.*

This is very interesting given that Oliver was not observed to initiate social games post intervention and these are the main activities conducted in the soft play. This also highlights the importance of collecting data from different sources and with different participants. To reinforce this argument, Lorna mentioned that this had never happened with her and Oliver. She said:

> *'It's lovely when you said about Oliver in soft play because when I have taken him he has been very just to his own thing. There wasn't something he needed me to do so therefore you can stay over there. So it's good if he actually enjoys being with you'.*

And Amber further reinforced the argument that staff cannot know the exact skills of every single child because they may show very different behaviour, depending on the adult they work with. She said:

> *'He was very interactive with me there [soft play] the other day. He understood we can have some good fun together […] he was initiating a lot'.*

Last, but not least, focus groups evidenced that children did show feelings confirming the video data and challenging the QDSCC data. Amber reported about Molly, who did not increase the times she expressed feelings, post intervention (according to both video and QDSCC data), that:

'When she gets cross with us […] it's much more directed at the adult'.

This quote reflects the researcher's feeling that the changes in children's spontaneous communication were even greater than what was shown in the video data.

7.4 Communicative methods

This section discusses the communicative methods which had a large effect size. It continues by giving details on the total frequencies of the methods used by the six children, the average, the range and the percentages pre and post intervention. It then highlights individual differences and compares the findings with those of similar studies.

7.4.1 Changes in communicative methods from the video data

7.4.1.1 Results

The communicative methods coded from the video data were split into two broad categories which were pre symbolic and symbolic. From the pre symbolic methods, the following five had a large effect size: proximity/touch (Cohen's d= 2.35), re-enactments (Cohen's d=1.47) simple motor actions (Cohen's d= 1.01), smile (Cohen's d=0.98) and vocalisations (Cohen's d= 0.97). From the symbolic methods, two had a large effect size. These are the objects of reference (Cohen's d= 1.22) and the symbols/pictures (Cohen's d= 0.96).

The total frequencies are presented here according to the methods used (see Table 19). Individual communicative profiles for each of the six children can be found in Appendix 14.

- *Simple motor actions*

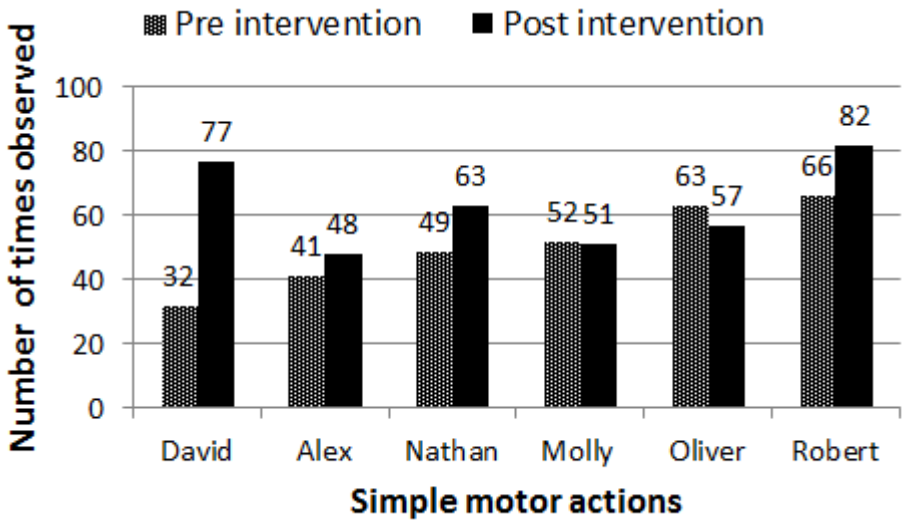
Simple motor actions were coded when '*the child clapped hands, flapped hands or objects, jumped up and down, used another's person hand or body to perform a desired action, pulled or pushed objects or persons, turned or run away from an activity, threw somebody's hand on or towards something, threw or hid objects, tried to escape from somebody, took an object or gave an object to somebody, resisted physically following somebody or doing something, prohibited with their body somebody from doing something*' (modified from Prizant et al., 2006). Simple motor actions was the method used the most both pre and post intervention in terms of percentages (see Table 19). It was used by the six children pre and post intervention and it accounts for around 30% of their spontaneous communication (32% pre intervention and 29% post intervention). Four out of the six children increased using simple motor actions post intervention (see Figure 12).

Table 19: Total number of communicative methods, average, range and percentage for the six children pre and post intervention

Communicative methods	Pre intervention				Post intervention				Cohen's d
	Total number	Average per 2 hrs	Range	Percentage	Total number	Average per 2 hrs	Range	Percentage	
Pre symbolic methods									
Challenging Behaviour	70	12	2-35	7	51	9	3-18	3	-0.33
Eye contact	74	12	0-33	8	134	22	3-48	8	0.64
Laugh	61	10	0-31	6	135	23	0-63	8	0.66
Point	18	3	0-16	2	24	4	0-24	1	0.12
Proximity/ Touch	49	8	1-20	5	136	23	13-29	8	2.35*
Re-enactments	20	3	0-7	2	66	11	2-21	4	1.47*
Simple Motor Actions	303	51	32-66	32	488	81	48-161	29	1.01*
Smile	47	8	0-20	5	87	15	9-25	5	0.98*
Vocalisations/babbling	159	27	15-45	17	267	45	13-72	16	0.97*
Symbolic methods									
Echolalia (IM+DE)	4	1	0-4	0	18	2	0-10	1	0.65
Object of Reference	2	0	0-1	0	8	1	0-3	0	1.22*
Single Words	97	16	0-89	10	159	27	0-128	9	0.24
Symbols/Pictures	37	6	3-13	4	92	15	4-34	6	0.96*
Word combinations	12	2	0-11	1	16	3	0-14	1	0.13

*** Cohen's d ≥ 0.8= large effect size**

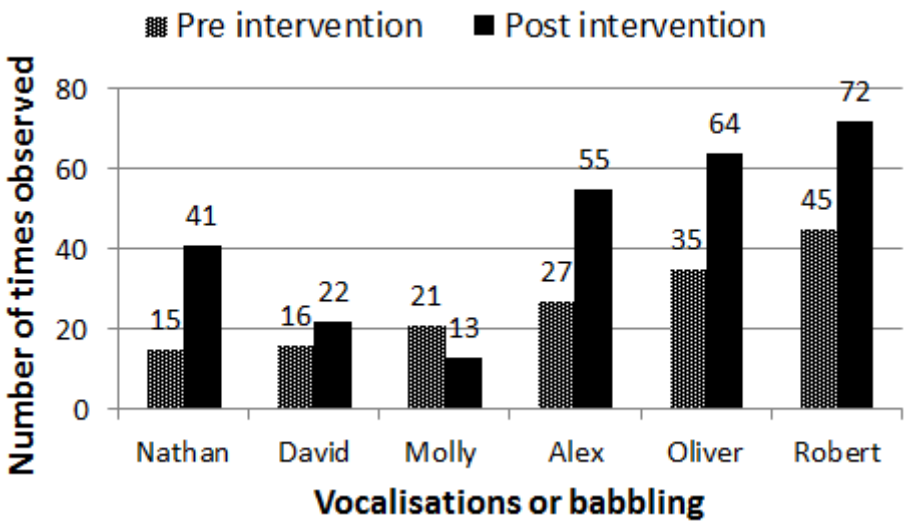
Figure 12: Number of times each of the six children used simple motor actions pre and post intervention



- *Vocalisations*

Vocalisations or babbling was coded when '*the child produced either prolonged voiced vowels incorporating a variety of intonation patterns and experimenting with volume (vocalisations) or purposeful repetitions of the same consonant-vowel combination (babbling)*' (School's SLT, 2009). Vocalisations or babbling was the second most frequent method and it accounted for about 16% of the children's communication (i.e. 17% pre intervention and 16% post intervention). Five of the children in the sample increased using vocalisations post intervention (see Figure 13).

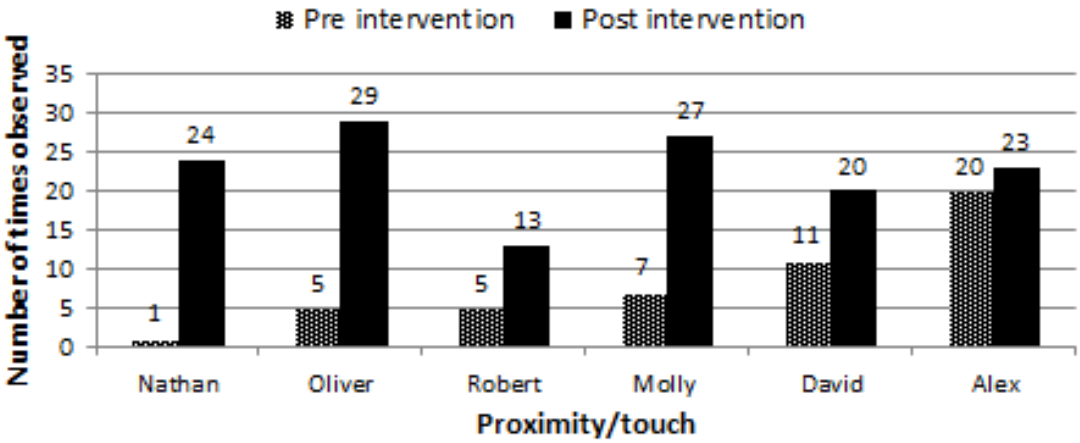
Figure 13: Number of times each of the six children vocalised or babbled pre and post intervention



- *Proximity or touch*

Proximity or touch was coded when '*the child either approached a person by extending arms, touching or hugging them or brought an object towards the direction of another person*' (modified from Prizant et al., 2006). Using proximity or touch to communicate increased for all the six children, post intervention (see Figure 14). Proximity or touch increased from 49 times pre intervention to 136 times post intervention and accounted for 8% of communication, post intervention (see Table 19).

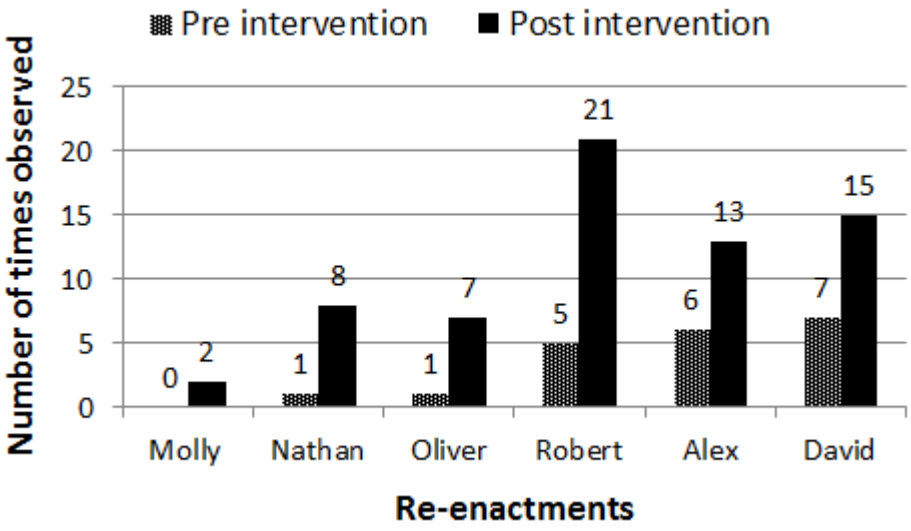
Figure 14: Number of times each of the six children used proximity/touch pre and post intervention



- *Re-enactments*

Re-enactments were coded when '*the child replicated an event or part of an event (e.g. a child put the caregiver's hands in the position of the movements that go with 'Incy Wincy Spider' and vocalised an approximation of 'incy' to request that social game)*' (Prizant et al., 2006). Re-enactments increased for all six children post intervention (see Figure 15). They were used for 2% of the spontaneous communication pre intervention, and for 4%, post intervention (see Table 19).

Figure 15: Number of times each of the six children used re-enactments pre and post intervention



- *Smiling and laughing*

Smiling and laughing was coded when '*the child smiled or laughed at an object, person, event or in the presence of another person*' (Agius, 2009). Both smiling and laughing increased for five of the six children post intervention (see Figure 16 and Figure 17 respectively). The average smile per child increased from 8 pre intervention to 15 post intervention whilst the average number of laughs increased from 10 pre intervention to 23 post intervention (see Table 19).

Figure 16: Number of times each of the six children used smiling pre and post intervention

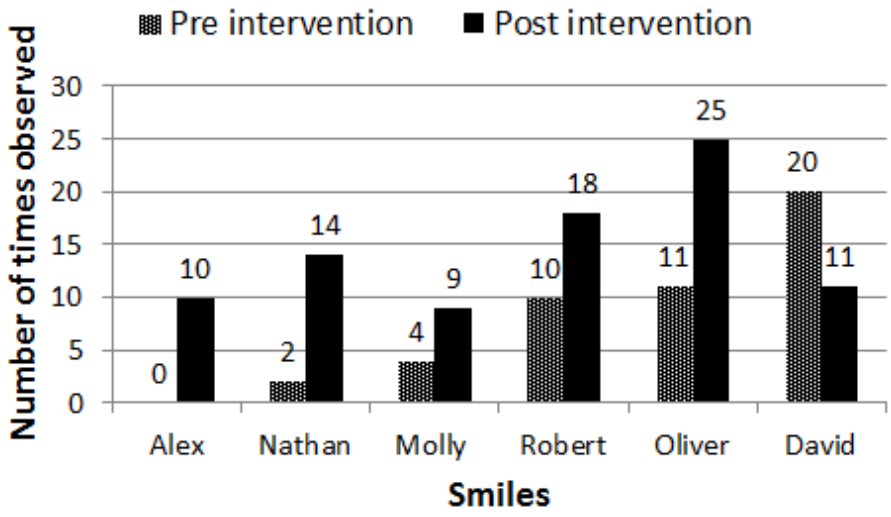
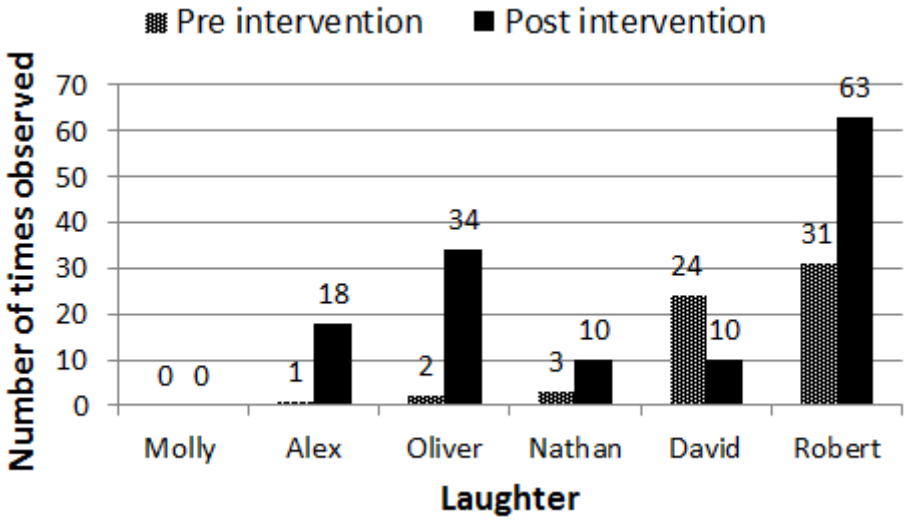


Figure 17: Number of times each of the six children used laughter pre and post intervention

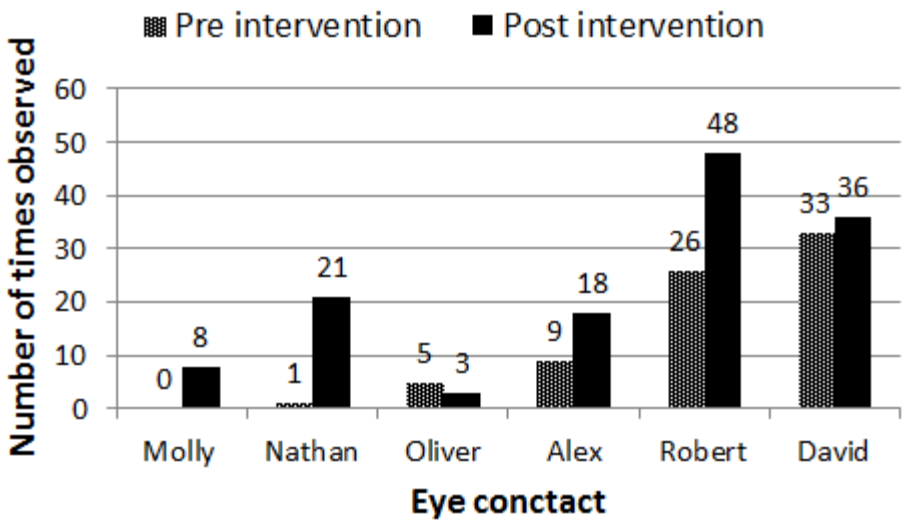


- *Eye contact*

Eye contact was coded when '*the child looked directly into another person's eyes or face for at least two continuous seconds*' (modified from Agius, 2009). The use of eye

contact increased for all children apart from Oliver (see Figure 18). The average time the six children used eye contact post intervention was 22 accounting for 8% of the total communication (see Table 19).

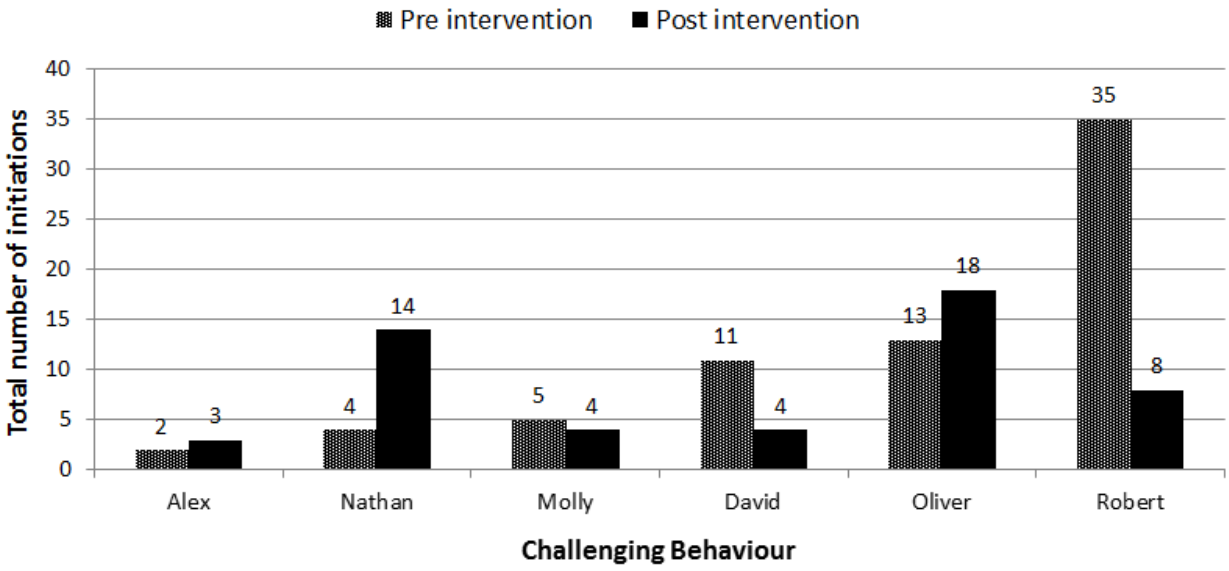
Figure 18: Number of times each of the six children used eye contact pre and post intervention



- *Challenging Behaviour (CB)*

CB was coded when '*the child showed or attempted to show behaviours that may have put people or the individuals themselves in danger of physical damage (e.g. bite, cry, hit, kick, pinch somebody, shout or scream, spit, pull hair, throw objects, throw oneself on the floor, self-injuries)*' (modified from Agius, 2009). CB was the only communicative method which decreased a lot post intervention (from 70 times pre intervention to 51 times post intervention and from 7% to 3%). Robert, the child who seemed to benefit the least from AISI according to the video data, decreased the times he used CB significantly post intervention (i.e. from 35 to 8) (see Figure 19).

Figure 19: Number of times each of the six children used CB pre and post Intervention



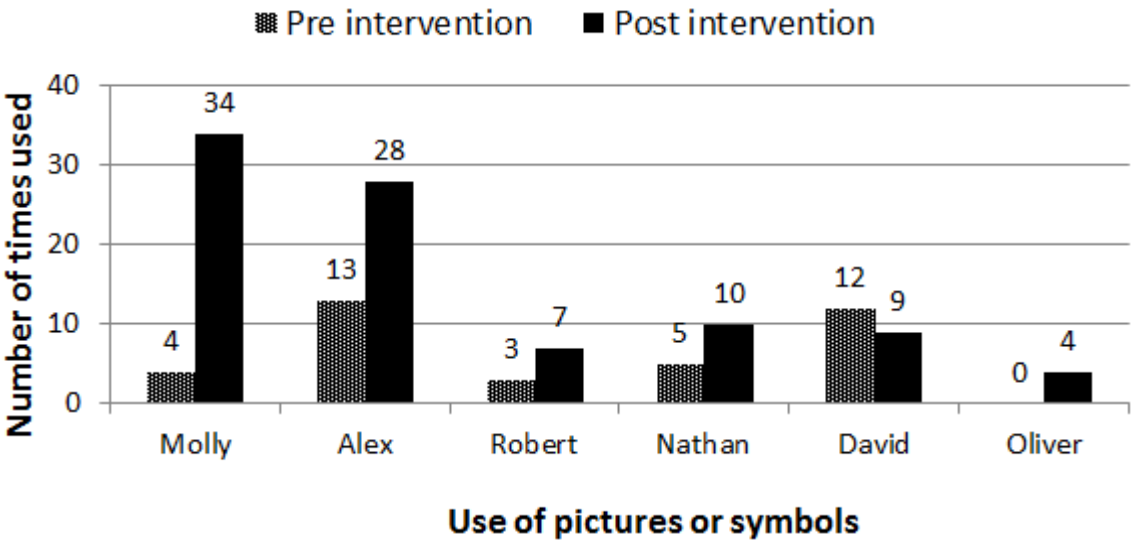
- *Pointing*

Pointing was coded when '*the child extended their index finger and either touched an object or person or pointed to them by far (contact and distal point). Even when the child used another finger (apart from the index) or the whole palm with the intention to point to something, the behaviour was rated as pointing*' (modified from Stone et al., 1997). David was the only child who used pointing both pre and post intervention. He slightly increased his pointing, post intervention (i.e. from 16 times to 24 times).

- *Use of symbols*

Use of symbols was coded when '*the child exchanged or attempted to exchange symbols or pictures with the intention to communicate*' (modified from Prizant et al., 2006). Use of symbols increased significantly post intervention for most children (see Figure 20). With the exception of David, all children used more symbols to initiate communication post intervention. The average use of symbols or pictures pre intervention was 6 and this increased to 15 post intervention.

Figure 20: Number of times each of the six children used pictures or symbols pre and post intervention



- *Use of speech (single words and word combinations)*

The children's level of verbal communication was assessed by the SLT. Oliver was assessed as using very little vocalisation, David as using occasional words (10-20) and the rest as using vocalisations. Use of speech was coded in this study when '*the child used one or more perfect or non-perfect rendition of words (e.g. 'tah' for 'car'). They may have only been recognisable by those who knew the child well but they were used meaningfully and consistently in their correct context*' (School's SLT, 2009). The use of speech increased for three children, post intervention. The rest of the children did not use speech at all either pre or post intervention (see Figure 21). Two children who were rated at the communication level of vocalisations at the initial assessment stage (i.e. Alex and Robert) were actually observed to use some few words, pre intervention. The words the two children mainly used were related to social games such as '*ready, steady, go'* or '*more'* to continue a favourite social game. Both these children increased the

times they used words post intervention. Words were used, as expected, mainly by David (89 times pre intervention and 128 times post intervention). Most of his words pre intervention were related to asking for food (e.g. biscuit, banana) or favourite toys (e.g. Thomas, bike) whereas post intervention he added to these, words related to commenting (e.g. shoes, square, other children's names) (see Table 20 for more details on the words used by the children). As expected David was the child who also used most often word combinations (i.e. 11 times pre intervention and 14 times post intervention).

Figure 21: Number of times each of the six children used single words pre and post intervention

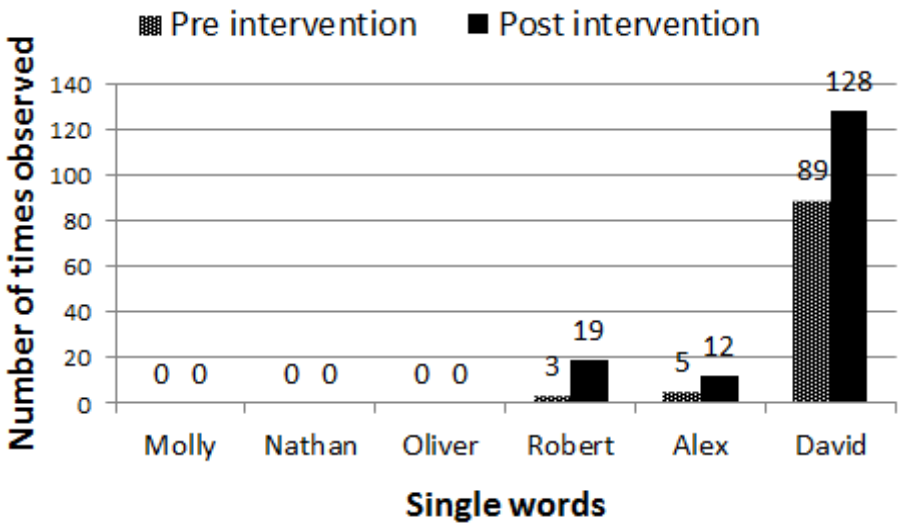


Table 20: Spoken words (single words and word combinations) pre and post intervention for each child

Children	Pre intervention		Post intervention	
	Single words	**Word combinations**	**Single words**	**Word combinations**
Alex	hide (x2), again (x3) **Total: 5**	– **Total: 0**	again (x11), go **Total: 12**	– **Total: 0**
David	biscuit (x10), blackcurrant (x5), bye (x2), David, orange (x2), banana (x2), stop, sleep (x20), hello, boing (x12), toilet, one, car (x7), chocolate (x9), two, three, five, Nathan (x3), bike (x2), cake (x2), finish, dog (x2), Thomas (the tank engine), teletubbies **Total: 89**	orange juice, twinkle twinkle little star, night night, sleep tight (x2), bye bye (x6) **Total: 11**	biscuit (x7), Ken (x13), George (x4), orange (x7), blackcurrant (x5), Tiago (x2), sleep (x31), shoe (x9), George (x3), finish, wee (x3), mama (x2), Oliver, hello, outside, finish, toilet, spider (x3), cake (x8), shoes, garage (x2), book (x2), bike (x2), bird (x3), triangle (x4), square (x4), semi-circle (x3), circle, three, rectangle, bye (x2) **Total: 128**	sleep tight, wake up (x2), bye bye, hello Ken, hello George, ready steady, soft play (x3), sensory room (x2), fire engine, happy birthday **Total: 14**
Robert	again (x3) **Total:3**	and again **Total: 1**	again (x3), boing (x5), ready (x9), stop (x2) **Total: 19**	stamp feet, boing, boing stop **Total: 2**

- *Objects of reference*

Use of objects of reference was coded when '*the child touched or gave to others objects which represent something (e.g. shoe when wanting to go outside, an empty cup or plate to signify they were thirsty or hungry)*' (School's SLT, 2009). The increase in use of objects of reference was also important. While only two children (i.e. Robert and Nathan) used this method pre intervention, all children apart from David used objects of reference, post intervention at least once. Table 21 shows the objects of reference used by the five children.

Table 21: Objects of reference used pre and post intervention for each child

Children	***Pre intervention***	***Post intervention***
Alex	-	'finish' tray
David	-	-
Molly	-	plate (x2), bottle
Nathan	cup	cup
Oliver	-	bottle
Robert	bottle	bottle, plate

- *Echolalia (immediate and delayed)*

Although echolalia was coded as two separate categories (immediate and delayed) in the analysis, the two categories were merged into one. This happened mainly because echolalia was observed very few times and there was no need to analyse them as two categories. Immediate echolalia was coded when '*the child repeated immediately speech produced by others*' whereas delayed echolalia was coded when '*the child repeated speech produced by others after a certain period of time*' (both Prizant et al., 2006). Only two children used echolalia pre and post intervention, Molly and David.

7.4.1.2 Discussion

Very few studies explored in detail the communicative methods children with autism use (e.g. Agius, 2009). Most of them classified the methods in broader categories (unaided AAC, aided AAC and speech for Chiang and Lin, 2008; Chiang, 2009 and motoric acts, speech, vocalisations and gestures for Stone and Caro-Martinez, 1990) and gave results for these. Alternatively, others (Potter and Whittaker, 2001) did not provide the list with all the communicative methods which were researched but presented the methods which were more frequently observed. The findings of this study were compared with the findings of the above studies, commenting on differences and similarities.

The fact that proximity/touch, re-enactments, simple motor actions, smile and vocalisations had a large effect size suggests that the six children were much more aware of the adults' presence post intervention. Specifically, the increase in the use of eye contact might mean that the children were differentiating more between people and inanimate objects while the increase in smiles suggest that children enjoyed more being with adults.

When the total number of initiations was considered, simple motor actions were the method which increased the most. This reflects to a certain extent the findings of previous studies. Stone and Caro-Martinez (1990) found that motoric acts were the most frequently used method accounting for 52% of the total children's spontaneous communication. Vocalisations were the second to increase method in terms of total initiations. The frequency with which vocalisations were coded in this study concurs with Stone and Caro-Martinez's (1990) study in which the occurrence of vocalisations

was 16% of their total spontaneous communication and it is also comparable to the 22% figure Agius (2009) found in her study, in which vocalisations was the most frequent communicative method.

Proximity or touch accounted, in this study, for 8% of the total communication post intervention. Agius (2009) investigated touch alone, and this was coded only for 0.6% of the total communication. The method of reaching out in her study was very similar to how proximity was defined in the current study. Reaching out was coded for 7% of the communication acts in the Agius's study which when added to the percentage touch was coded, gives a total of around 8%. Re-enactments accounted for 4% of the total communication in the present study, post intervention. This finding is considerably lower than the 12% Potter and Whittaker (2001) found for the children in their sample. However, Potter and Whittaker do not provide a list of the methods they coded. They just reported the three methods which were used most frequently (i.e. physical manipulation, re-enactments and pointing). Therefore, any conclusions about the reasons for this difference would be tentative.

In the present study, the average smile per child was 15 post intervention and the average number of laughs was 23. These findings are similar to Agius's (2009) study. In her sample, the average number of smiles was 10 and laughing 6. Apparently the children in the present study tended to laugh more than in Agius's sample. A possible explanation might be the different activities in which the children were video recorded. In the present study, children were video recorded in places such as sensory room and soft play, which are more likely to promote laughter as a result of interactive games or

burst and pause games. On the contrary, meal times, in which the children in Agius's study were video recorded, are not as likely to promote laughter.

With regard to eye contact, the findings of the current study are not very similar to that of previous studies. In Agius's (2009) study, the average use of eye contact was 31 times accounting for 16% of the total children's communication. This is far below the average 22 times eye contact was coded for this study accounting for 8% of the total communication. This difference could be attributed to the stricter definition of eye contact used in this study. Agius (2009) did not have the two second prerequisite and as a result more eye contacts were coded.

The decrease in CB, found in this study, concurs with many authors arguing that as communication improves, the incidence of CB reduces (Sigafoos, 2000; Whitaker et al., 2001; Clements, 2005). Robert decreased a great deal the times he used CB post intervention. This suggests that he might have found other ways of communicating. However, the occurrence of CB was well above the 1% figure given by Agius (2009). It should be noted here that Agius (2009) defined CB as the use of self-injury, tantrums and aggression excluding behaviours such as crying, kicking, hitting, shouting and screaming which were considered to be CB in the present study.

David was the only child who was coded to use pointing. He also increased its use post intervention. This might be related to his increase in commenting and seeking information. Agius (2009) found that in her sample, pointing accounted for 2% of the total initiations which is about the same for this study too.

All children, with the exception of David, increased the times they used symbols or pictures post intervention. The average times they used symbols or pictures post intervention was 15, which is well above the 1 time per 120 minutes on average found by Chiang (2009). This might have happened as the present study was conducted in an autism specialist school in which symbols and pictures were the main communicative method used. Chiang's (2009) study included children and young adults from a variety of naturalistic settings (e.g. autism specialist schools, generic special schools, mainstream schools and children's homes) and the preferred communicative method in each one of these is not known. So other methods (e.g. sign language, Makaton, speech) could have been used instead. In the current study use of signs or gestures was coded only twice pre intervention and not at all post intervention.

The main explanation for the increase in using symbols or pictures post intervention might be that staff tended to pre-empt children's needs pre intervention; they were not waiting for the children to hand in the symbols before giving them the desired objects. For example, some children were often taking the pictures off the communication board and holding them, instead of handing them to the adults. Adults could then see what the children wanted and they were providing them with the objects without giving time for the communication exchange to happen. After the introduction of AISI, adults became more aware of the importance of waiting for the exchange to happen and the use of symbols increased.

Video data showing that Alex and Robert used a few words pre intervention should be further discussed. These two children were rated at the communication level of vocalisations at the initial assessment stage but they were coded to use few words, pre

intervention. This discrepancy between pre intervention assessment and pre intervention video data might have happened because of the liberal definition given to the use of words in this study. In other studies, speech was coded only when recognisable words were used (Carter, 2003). This is possible to have happened when the children were assessed by one of the school's SLT and then these data were then used for the pre intervention assessment of the current study. The fact that Alex and Robert did not use words consistently might have also account for the SLT's decision to classify them at the verbal stage of vocalisations.

Only two children, David and Molly, used echolalia. This was expected of David who greatly developed his speech post intervention as echolalia can be a precursor to language development, according to Prizant et al (2006). Most autistic children have a gestalt style of language acquisition. So in the beginning they use echolalic utterances with no communicative intent. Gradually some children will use these utterances to communicate for a number of functions and they will also add spontaneous speech. Molly appeared to be using a lot of delayed echolalia for self-stimulation or self-regulation purposes and little of this was used to request objects and activities or to express feelings. It is not clear why echolalia was observed in Molly, but not in any other child with similar characteristics (e.g. CARS score above 50, level of verbal communication: vocalisation, severe impairment in learning ability and ‹12 age equivalent in months). The answer might be that not all children with autism develop echolalia.

7.4.2 Changes in communicative functions from the questionnaire data

7.4.2.1 Results

Not all of the communicative methods which appeared in CICCA were included in the QDSCC. The reason for this is that there was a need to keep the questionnaire short, so only the most common methods (used in previous studies) were included.

The teacher's ratings are presented in two Tables: Table 22 shows the pre symbolic methods and Table 23 presents the symbolic methods. Pointing was not included in Table 22 (although it appeared in the QDSCC and in previous studies) as it was rated as 0 for all children apart from David. David was rated on pointing as 2 pre intervention and 3 post intervention.

Table 22: Pre symbolic communicative methods for the six children pre and post intervention for the six children as reported in the QDSCC

Child	Activity	Pre intervention	Post intervention
Molly	CB	0	1
	Eye contact	1	2
	Proximity/touch	1	2
	Simple motor actions	1	2
	Vocalisations/bubbling	0	1
Alex	CB	1	2
	Eye contact	1	1
	Proximity/touch	2	3
	Simple motor actions	2	3
	Vocalisations/bubbling	0	1
Robert	CB	0	1
	Eye contact	1	2
	Proximity/touch	1	2
	Simple motor actions	1	1
	Vocalisations/bubbling	0	2

Nathan	CB	2	2
	Eye contact	2	2
	Proximity/touch	2	3
	Simple motor actions	1	2
	Vocalisations/bubbling	0	2
David	CB	3	3
	Eye contact	2	3
	Proximity/touch	2	3
	Simple motor actions	1	2
	Vocalisations/bubbling	3	3
Oliver	CB	0	1
	Eye contact	0	2
	Proximity/touch	1	2
	Simple motor actions	1	2
	Vocalisations/bubbling	0	2

0= not at all, 1= not often, 2= often, 3= very often

Overall, the teacher's ratings for pre symbolic methods were very similar to the findings from the video data. Proximity/touch was the communicative method which had the largest effect size. This is in agreement with the teacher's ratings who reported that the six children increased the times they used this method, post intervention. The teacher also reported that, apart from Robert, all children increased the use of simple motor actions, post intervention. This is in total agreement with the video data which showed that Robert was the only child who slightly decreased the times he used simple motor actions, post intervention (from 66 times pre intervention to 63 times post intervention). According to the teacher, vocalisations increased for all children with the exception of David, who used this method very often pre intervention and continued to use it with the same frequency post intervention. The teacher rated all children as showing some CB post intervention. Some of them were not considered to have shown CB pre intervention

(i.e. Molly, Robert and Oliver). This finding disagrees with the video data which showed that all children showed some CB pre intervention.

Table 23: Symbolic communicative methods for the six children pre and post intervention for the six children as reported in the QDSCC

Child	Activity	Pre intervention	Post intervention
Molly	Objects of reference	0	0
	Symbols/pictures	0	2
	Echolalia	0	1
	1-2 words	0	0
Alex	Objects of reference	1	1
	Symbols/pictures	2	3
	Echolalia	0	0
	1-2 words	0	0
Robert	Objects of reference	0	0
	Symbols/pictures	0	2
	Echolalia	0	1
	1-2 words	0	0
Nathan	Objects of reference	0	1
	Symbols/pictures	1	3
	Echolalia	0	0
	1-2 words	0	0
David	Objects of reference	0	1
	Symbols/pictures	1	3
	Echolalia	0	2
	1-2 words	3	3
Oliver	Objects of reference	0	0
	Symbols/pictures	0	2
	Echolalia	0	0
	1-2 words	0	0

0= not at all, 1= not often, 2= often, 3= very often

With regard to symbolic methods, QDSCC data largely agree with the video data. The use of objects of reference is an exception as the teacher's rating did not agree with the

video data. Lorna stated that only David and Nathan used objects of reference, post intervention whilst according to the video data all children, apart from David, did so. According to the teacher, all children increased a lot the use of pictures or symbols, post intervention. This finding is highly supported by the video data. The teacher reported that Molly and Robert started using a bit of echolalia while David started using it a lot post intervention. This also agrees with the video data which showed the exact same thing. Regarding the use of words, Lorna reported that only David used words pre and post intervention. She actually rated him as communicating 'very often' using words in both phases. This slightly disagrees with the video data which showed that Alex and Robert also used some few words pre and post intervention.

7.4.2.2 Discussion

The QDSCC and video data reported similar findings on both pre-symbolic and symbolic methods. With regard to pre-symbolic methods the greatest discrepancy was seen in CB which occurred pre intervention. Different reasons may account for this. Molly's CB was very limited (5 times) and possibly escaped the teacher's attention. Oliver's main CB was very high pitched shouts and screams and for the teacher this might not have been CB. As far as Robert is concerned, the discrepancy between QDSCC and video data is important. Robert was coded to head-bang, head-butt and pinch people many times pre intervention. Several times these behaviours were very intense and it is almost impossible for the teacher not to have noticed them. A possible reason as to why she did not rate these behaviours in the QDSCC is that she had not considered them communicative.

The main disagreement between video and QDSCC data as far as symbolic methods are concerned is observed in the use of objects of reference and words. Lorna reported on the QDSCC that only Alex, David and Nathan used objects of reference but the video data showed that all children, with the exception of David, used objects of reference. This difference might be attributed to the fact that Lorna had only seen these three children using this method. This is not impossible, as use of objects of references was coded only a few times in the videos (i.e. 2 times pre intervention and 8 times post intervention). Although Alex and Robert were both coded in the videos using words, this was not reflected in the QDSCC. This is possibly attributed to a more strict definition of what a word consists of that the teacher used.

7.4.3 Changes in communicative methods from the focus group data

As with the communicative functions, changes in communicative methods were difficult to report in an interview format. However, the staff were given a list of the children participating in the study and were asked in which ways they had changed their spontaneous communication (second focus group interview, Stage 7). Focus group interview data agreed to a large extent with the findings from video and QDSCC data. For most of the children staff claimed that they increased proximity, eye contact and smiles. About Molly and Nathan, the three staff highlighted the increase in using symbols or pictures. An extract from the transcription when they talked about Nathan and the change in his behaviour is very interesting:

Amber: *'[Nathan] looks for you to give you pictures […]'.*
Emma: *'He actually gives you the picture now'.*
Lorna: *'Yeah, he understands the need for partnership in communication'.*
Emma: *'He'll come and find you'.*

The difference staff saw in children's eye contact was probably greater than that captured by the videos. It is interesting to mention here that Molly was not coded to give eye contact pre intervention but she was seen to use this method port intervention. This is confirmed by Lorna who said:

> *'She does approach you now and gives you much more eye contact. She will pick up pictures of things that she wants and she looks for the adults, try to find them which she didn't do before[…] She really looks at you now'.*

Another important remark is that although Lorna rated Robert as not using words to initiate communication in the QDSCC, Emma challenged this by saying in the focus group that '*[Robert] says a lot of words to initiate routines'.* This is in accordance with the video data and highlights the importance of collecting data using multiple sources and participants.

David's great increase in using speech was also depicted in the focus group interviews. Lorna admitted that:

> *'His vocabulary has increased huge amount actually. He used to have certain words for certain things. Everything was a duck […] all men were daddy and staff like that. But he is developed. Not all animals are ducks'.*

Oliver was the child who changed the most, according to the video data. Although the staff did not name him, when asked which child changed the most, Oliver's great change was more than obvious in a discussion during the focus group interview:

Emma: *'[Oliver] screams occasionally but he used to scream much more. When he first came he was just pushing us away, wasn't he?'*
Lorna: *'Yes he was. While now he comes up to you and smiles, doesn't he?'*
Amber: *'That's true'.*
Lorna: *'And the lovely Barney [music toy]…He finds you across the room to press it'.*

A last very important finding was that children in the sample were observed to use the newly learnt skills with different people. Amber said about Alex:

> *'He will approach other people, visitors, people coming in the room which he probably wouldn't have done before'.*

This finding should be further researched with regard to the argument that people with autism have difficulties with generalising learnt skills (Klin et al., 2003; Golan and Baron-Cohen 2006). Does the same happen when the skill is learnt in a naturalistic environment and as a result of a change in the adults' interactive style?

7.5 Summary

This chapter presented some very important findings. Post intervention, the children seemed more aware of the presence of the adults. They showed this by approaching the adults, looking at them, smiling at them and speaking to them (both vocalisations and speech). All children were also coded to express feelings in contrast to some past literature and the teacher's ratings in the QDSCC (0 for all children in both research phases). Molly, Alex and mainly David were also coded to initiate joint attention in contrast to the teacher's ratings in the QDSCC (0 for all children in both research phases). The extent to which staff are influenced by past literature when assessing their student is a topic which needs further research.

Although there were no great differences among the data from the three methods (i.e. video data, teachers' reports on QDSCC and focus group data), there were some slight disagreements. This highlights the importance of triangulating the research methods. This study cannot draw final conclusions with regard to which method was more

accurate. Discrepancies among the data might be attributed to a number of factors that the reader should be aware of such as staff's limited knowledge of the children or researchers' biases. The latter are likely to be limited in this study given the inter-rater reliability checks to which more than 20% of the videos were subjected. No matter which is the case, it should be mentioned here that the assessment of children and the coding of their behaviour by an external person in class is very important and useful. Chapter Eight discusses the extent to which staff managed to change their interactive style. It explores the implementation of AISI as a whole and gives details on the frequency each AISI principle was used.

CHAPTER EIGHT

FINDINGS: IMPLEMENTATION OF AISI

8.1 Introduction

To explore the extent to which staff implemented AISI principles post intervention, three methods of data collection were used. These were video recordings, a self-evaluation checklist and two focus group interviews. This chapter gives an overview of the way data from each method were analysed and presents the findings for each of the twenty-one AISI principles in separate sections. AISI principles were split into two broad categories: the general principles (thirteen) and communicative opportunities (eight). General principles relate to the adults' body language, speech and timing, whereas communicative opportunities are situations adults set up to give the child the chance to practise spontaneous communication.

8.2 Notes on the data analysis for AISI principles

8.2.1 Video recordings

To code the videos, the Adult Interactive Style Coding Checklist (AISCC) was used. Every time an AISI principle was observed, an occurrence was coded. A five-second-rule was put in place for adults' coding. If the staff continued to use the same AISI principle for more than five seconds, a second occurrence was recorded. Applying this rule would have been impossible without using the video records. Cohen's d and Excel sheets were used to analyse the group data. Cohen's d was used to show the size of the difference between group means and Excel sheets were used to calculate the average, the range and the percentages for each principle used.

The video data were triangulated with data obtained from a self-evaluation checklist filled by the staff and two focus group interviews (Stages 6 and 7).

8.2.2 Self-evaluation checklist

At the end of each day they were filmed, staff had to complete a self-evaluation checklist (see Appendix 8 for a blank copy). This gave their views on how often they thought they used each AISI principle and at the same time it reminded them of the twenty-one principles. It would be ideal to tick each principle as soon as they used it but due to their workload the only time they could fill in the self-evaluation checklist was at the end of the day. As it would be extremely difficult for staff to remember at the end of the day the exact number of times they used each principle, they were asked to pick one of the following frequencies: 'not at all', '1-5 times' and 'many times'. Then the average frequency they reported was calculated using Excel sheets.

8.2.3 Focus group interviews

Two focus group interviews were conducted with the three staff. The aim of the first focus group interview (Stage 6) was to decide on the final set of the AISI principles after a month of practising them (e.g. explore potential difficulties in understanding and implementing AISI, discuss first changes seen in children). The second focus group interview (Stage 7) attempted to get the staff's views on the effectiveness of each principle and their impact on the children. During the focus group interviews staff had to fill in two types of checklist, one about the ease of understanding and implementing the AISI principles (see Appendix 15 for a blank

copy) and one on their effectiveness (see Appendix 16 for a blank copy). Data arising from these checklists were analysed and presented in Excel.

8.3 Use of AISI across all three staff

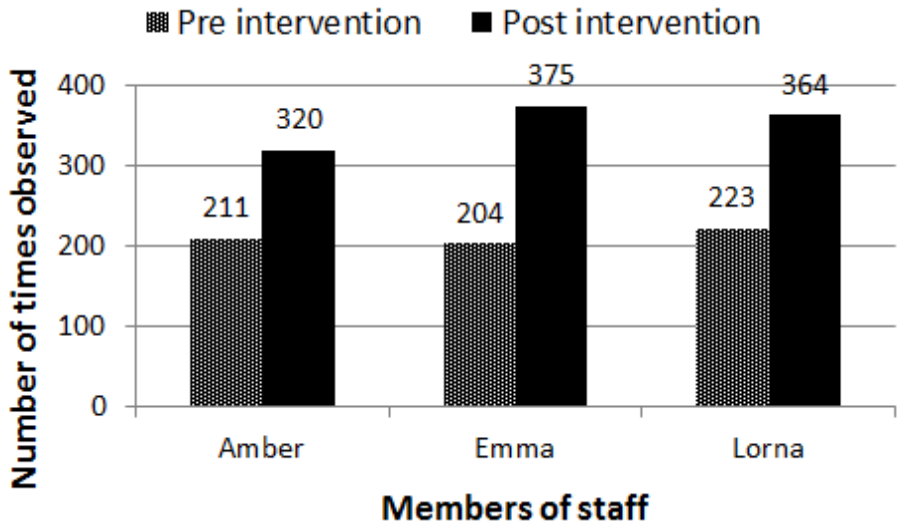
8.3.1 Results

8.3.1.1 Video data

The number of times staff used the AISI principles pre and post intervention was measured to show the extent to which staff implemented the intervention (see Figure 22). Effect size Cohen's d was also calculated to give the clinical significance of the difference between pre and post intervention use of AISI (Cohen's d= 6.5). Then the four principles each staff used the most, post intervention are presented in Figure 23. Table 24 shows the times each principle was used, in an effort to see which of the principles were more useful and applicable for the children and the staff of this study. Cohen's d was also calculated to show the clinical significance of the difference for each principle.

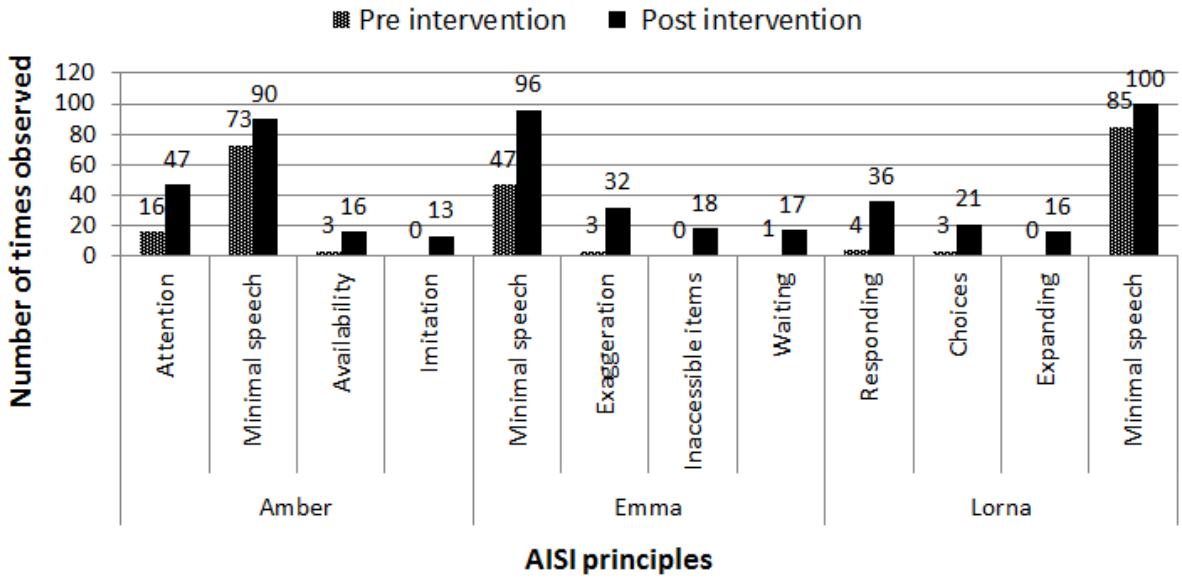
All three staff significantly increased their use of the AISI principles post intervention. Emma increased her use of AISI principles the most, followed by Lorna and Amber. Emma used AISI the least pre intervention, and the most post intervention.

Figure 22: Total number of times each member of staff used the AISI principles pre and post intervention



Cohen's d= 6.5

Figure 23: The four AISI principles each staff increased the most



According to the video data, the use of minimal speech is the only common principle among the four staff increased the most.

Table 24: Number of times the three staff implemented each of the AISI principles, pre and post intervention and Cohen's d effect size

AISI principles	Pre intervention				Post intervention				Cohen's d
	Total number	Average	Range	Percentage	Total number	Average	Range	Percentage	
General principles									
1.Gain child's attention	39	13	1-22	6	66	22	4-47	6	0.51
2.Establish proximity	21	7	2-14	3	41	14	12-16	4	1.43*
3.Show availability	39	13	3-25	6	75	25	16-41	7	0.95*
4.Wait for initiations	6	2	0-5	1	23	8	1-17	2	0.92*
5.Respond to communicative attempts	15	5	1-10	2	66	22	13-36	6	1.83*
6.Assign meaning to random actions or sounds	34	11	9-13	5	55	18	12-27	5	1.23*
7.Imitate the child	4	1	0-2	0.6	36	12	11-13	3	9.88*
8.Follow child's focus of attention	27	9	3-20	4	26	9	8-10	2	-0.05
9.Use exaggerated pitch, facial expression, gestures and body language	19	6	3-8	3	49	16	5-32	5	0.99*
10.Use minimal speech	205	68	47-73	32	286	95	90-100	27	1.90*
11.Provide time	0	0	N/A	0	10	3	0-8	1	1.13*
12.Expand on child's communicative attempts	1	0	0-1	0.2	21	7	1-16	2	1.18*
13.Use non-verbal cues	208	69	60-85	33	212	71	54-84	20	0.09
Communicative opportunities									
14.Offer choices	11	4	3-5	2	39	13	4-21	4	1.53*
15.Stop part-way	2	1	0-1	0	15	5	0-9	1	1.3*
16.Give small portions	1	0	0-1	0	15	5	0-12	1	1.05*
17.Make items inaccessible	6	2	0-6	1	24	8	0-18	2	0.87*
18.Give materials they will need help with	0	0	N/A	0	0	0	N/A	0	0
19.Contradict expectations	0	0	N/A	0	0	0	N/A	0	0
20.Give non-preferred items	0	0	N/A	0	0	0	N/A	0	0
21.'Forget' something vital	0	0	N/A	0	0	0	N/A	0	0

*** Cohen's d ≥ 0.8= large effect size**

Fourteen of the twenty-one AISI principles (ten general principles and four communicative opportunities) had a large effect size, post intervention. Imitation (Cohen's d= 9.88) was the principle which had by far the greatest clinical significance, post intervention. With regard to communicative opportunities, offering choices (Cohen's d= 1.53), stopping part-way (Cohen's d= 1.3), giving small portions (Cohen's d=1.05) and making items inaccessible (Cohen's d= 0.87) had a large effect size post intervention.

8.3.1.2 Self-evaluation checklist data

The self-evaluation checklist showed that six general principles and one communicative opportunity were rated to be used 'many times' per day for the majority of the days the intervention was filmed. These are gaining the child's attention, establishing appropriate proximity or touch, showing availability, using minimal speech, providing time for the child to process the given information, using non-verbal cues and offering choices.

Table 25: Average frequency staff reported to use each AISI principle on the self-evaluation checklist

Principles	Amber	Emma	Lorna
General principles			
1.Gain attention	**M**	**M**	**M**
2.Establish appropriate proximity	**M**	**M**	**M**
3.Show availability	**M**	**M**	**M**
4. Wait for initiations	F	F	**M**
5.Respond to child's communicative attempts	F	**M**	**M**

6.Assign meaning to random actions or sounds	F	F	F
7.Imitate the child	F	F	**M**
8.Follow the child's focus of attention	F	F	**M**
9.Use exaggerated pitch, facial expression, gestures and body language	F	F	**M**
10.Use minimal speech	**M**	**M**	**M**
11.Provide time	**M**	**M**	**M**
12.Expand on child's communicative attempts	F	**M**	**M**
13.Use non-verbal cues	**M**	**M**	**M**
Communicative opportunities			
14.Offer choices	**M**	**M**	**M**
15.Stop part-way	F	**M**	**M**
16.Give small portions	F	F	N
17.Make items inaccessible	N	F	N
18.Give materials they will need help with	N	N	N
19.Contradict expectations	F	N	N
20.Give non-preferred items	N	N	N
21.Withdraw attention	F	N	N
22. 'Forget' something vital	N	N	N

M= <5 times per day, F= 1-5 times per day, N= not at all

8.3.1.3 Focus group interview data

Other factors which might have played a role in the extent to which staff used each of the AISI principles were their views on the principles' ease to be understood and implemented and their effectiveness. These data were obtained in the focus group interviews. Table 26 presents the staff's views on the ease to understand and implement each of the AISI principles and Table 27 the effectiveness of each principle for each of the three staff.

Table 26: Staff's views on the ease of understanding and implementing the AISI principles - Focus Group 1

AISI PRINCIPLES	Understand		Implement	
	Easy	Difficult	Easy	Difficult
General principles				
Gain attention	All		Emma/Lorna	Amber
Establish appropriate proximity	All		Amber	Emma/Lorna
Show availability	All		Amber/Emma	Lorna
Wait for initiations	All		All	
Responds to communicative attempts	All		All	
Assign meaning to random actions or sounds	All		All	
Imitate the child	All		All	
Follow the child's focus of attention	All		Amber/Lorna	Emma
Use exaggerated pitch, facial expression, gestures and body language	All		Amber/Emma	Lorna
Use minimal speech	All		All	
Provide time	All		All	
Expand on communicative attempts	All		Emma/Lorna	Amber
Use non-verbal cues	All		All	
Communicative opportunities				
Offer choices	All		All	
Stop part way	All			All
Give small portions	All		All	
Make items inaccessible	All			All
Give material they will need help with	All		Amber/Emma	Lorna
Contradict expectations	Amber/Emma	Lorna	ALL	
Give non preferred items	All		ALL	
'Forget' something vital	All		ALL	

Seven general principles and four communicative opportunities were rated by the three staff as easy to understand and implement. The general principles the three staff considered easy to understand and use were waiting for initiations, responding to the child's communicative attempts, assigning meaning to random actions or sounds, imitating the child, using minimal speech, providing time and using non-verbal cues. The communicative opportunities they all found easy were offering choices, giving small portions, giving non-preferred items and 'forgetting' something vital.

Table 27: Effectiveness of principles - Focus Group 2

AISI principles	Amber (TA1)	Emma (TA2)	Lorna (T)
General principles			
Gain attention	1	2	2
Establish appropriate proximity	0	3	2
Show availability	2	3	2
Wait for initiations	3	2	3
Responds to communicative attempts	2	3	2
Assign meaning to random actions or sounds	1	2	1
Imitate the children	2	2	3
Follow the child's focus of attention	3	1	3
Use exaggerated pitch, facial expression, gestures and body language	2	1	2
Use minimal speech	3	3	3
Provide time	3	3	3
Expand on communicative attempts	2	2	1
Use non-verbal cues	3	2	3
Communicative opportunities			
Offer choices	3	3	3
Stop part-way	0	2	2
Give small portions	3	3	3
Make items inaccessible	0	2	2
Give material they will need help with	0	1	2
Contradict expectations	0	1	0
Give non preferred items	0	1	0
Withdraw attention	0	1	1
forget' something vital	0	0	1

0= not effective, 1= quite effective, 2= effective, 3= very effective

Seven general principles and two communicative opportunities were rated by the three staff either effective or very effective. The general principles were showing availability,

waiting for initiations, responding to child's communicative attempts, imitating the child, using minimal speech, providing time and using non-verbal cues. The communicative opportunities were offering choices and giving small portions.

8.3.2 Discussion

Video data showed that all three members of staff changed their interactive style to a great extent. This increase is particularly impressive when one considers that staff were only coded for forty minutes. The fact that the four principles each staff increased the most are not the same, with the exception of the principle of minimal speech, suggests that they used a wide range of AISI principle post intervention. The extent to which staff used each one of the principles was probably influenced by their personality and the children they worked with while being filmed. The ease to understand and implement each principle as well as its effectiveness might have played a role in each staff's decision on which principles to use. The frequency with which they were rating the principles on the self-evaluation checklist might have also been an indication of their applicability. When comparing the principles which were highly ranked in all the above data sets, naming video recordings, self-evaluation checklist and focus group interviews, using minimal speech and offering choices are the two principles reported to be widely used. More reasons as to why some principles increased more than others are explored in the following section which presents the pre and post intervention differences for each AISI principle.

8.4 AISI principles for each staff

8.4.1 Results

This section presents each AISI principle individually. Video data are compared with staff's reports on the self-evaluation checklist and the focus group interviews. Figure 24 depicts three of the general AISI principles. The purpose of creating these figures was to present the AISI principles in conferences and train practitioners in how to use them. Using performing arts as a medium to disseminate research findings is a growing field in qualitative social sciences research (Keen and Todres, 2007). Dance, drama, poetry, documentaries and drawings are only some examples of how researchers can present their work. Jones (2006) says that using arts give the researchers:

> *'Opportunities to move beyond imitation of "scientistic" reports in dissemination of our work and look towards means of (re)presentation that embrace the humanness of social science pursuits'.* (p. 67)

Drawings were also proven a great way of showing AISI while protecting children's and staff's anonymity (BERA, 2011). A commissioned artist made the drawings based on photos taken from the videos of the research, which were sent to him via email. Two of them are included in this chapter but more can be found in Appendix 17.

Figure 24: Adult establishes appropriate proximity, shows availability and waits for initiations

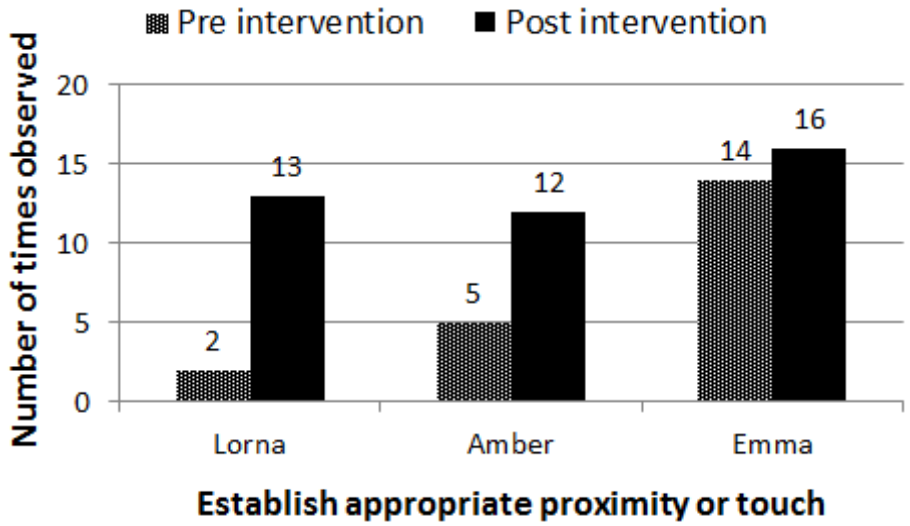


Drawn by N. Papadopoulos

8.4.1.1 Establishing appropriate proximity or touch

Establishing appropriate proximity or touch was coded when '*the adult approached the child in distance less than 1 metre and might have touched them too*' (modified from Nind and Hewett, 2001). The video data showed that the three members of staff increased this principle post intervention (see Figure 25). The frequency of using it doubled post intervention. Lorna increased its use the most post intervention but she was also the staff who used it the least, pre intervention.

Figure 25: Number of times the three staff established appropriate proximity or touch pre and post intervention according to the video data



In the self-evaluation checklist, the three staff said that they used this principle on average more than five times per day. The focus group data showed that although staff found this principle easy to understand, they thought that it was hard to implement. Emma and Lorna were the ones who struggled the most to use proximity and touch with the children.

Lorna spoke about the difficulty of establishing appropriate proximity in a real world classroom environment, during the focus group interview. She said:

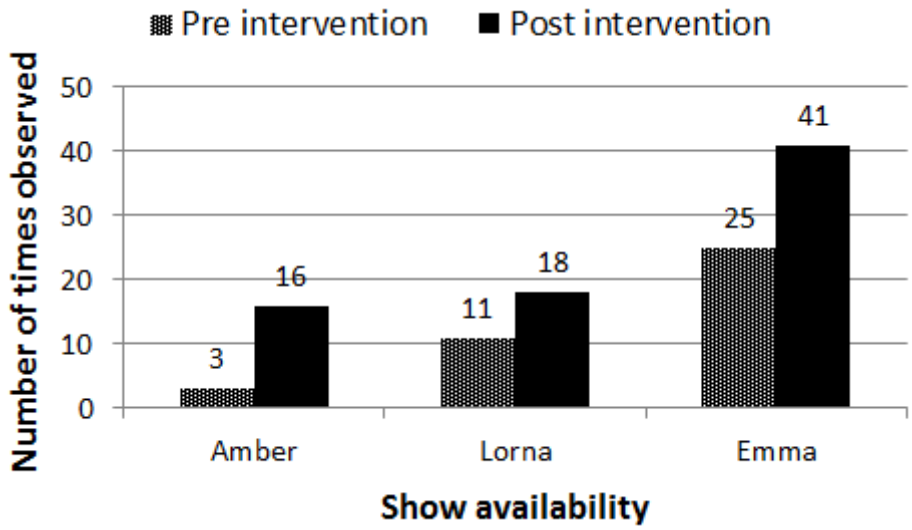
> *'I think this is quite hard to implement because it's fine if you are in a situation where you can back off, wait for them and get the appropriate proximity. But when you are sort of in the middle of doing things […]. For David, for example, appropriate proximity would be him over there and us somewhere else, in another room probably. And Robert quite often gets upset when you are too close to him but you need to be close to him to stop him from hurting himself. So I think in some respects that's quite hard'.*

Amber thought this principle was easy to implement, but not effective. When asked the reason for this, she raised the issue of sensory hypersensitivities some children experience. She said: '*there are times that I feel we are invading their space'*. In contrast, Emma and Lorna thought it was effective.

8.4.1.2 Showing availability

Showing availability was coded when '*the adult extended their hands towards the child having wide and questioning eyes'* (modified from Prizant et al., 2006). The times the three staff showed availability post intervention almost doubled (see Figure 26). Emma used this principle the most pre intervention and also increased the times she showed availability the most post intervention.

Figure 26: Number of times the three staff showed availability pre and post intervention according to the video data



The self-evaluation checklist reflected these findings as all staff reported having showed availability on average more than five times per day. All staff found this

principle easy to understand and all but Lorna, easy to implement as well. However, Lorna acknowledged that:

> *'It's quite a good way of reducing children's prompt dependence […] you take your hand away but you leave it in sight'.*

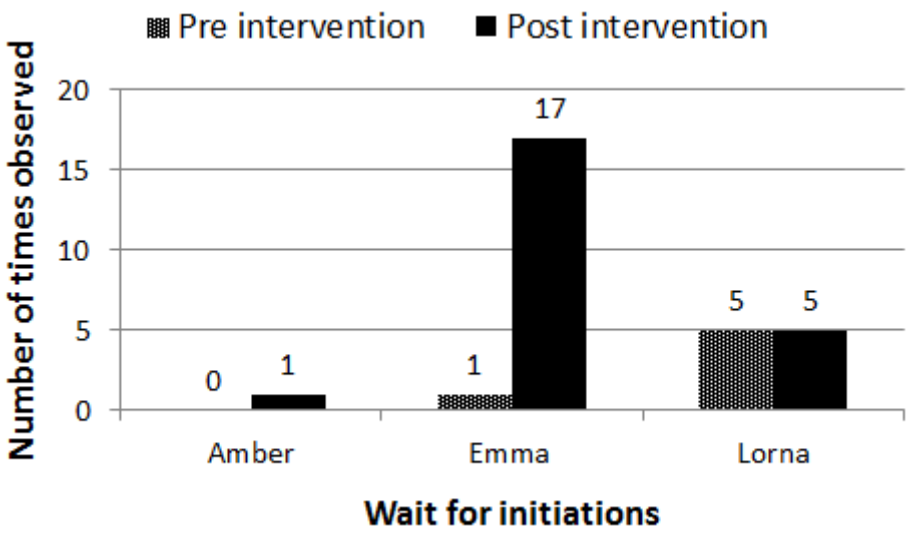
The three staff thought that showing availability was effective and Emma considered it very effective. Lorna said:

> *'I've done the hand signalling when you leave your hand out and you just wait for them to take it and I think this is useful'.*

8.4.1.3 Waiting for initiations

Waiting for initiations was coded when *'the adult set up the stage for interaction and waited for at least five seconds for the child to initiate'* (modified from Prizant et al., 2006). Although the percentage of staff using waiting went from 1% pre intervention to 2% post intervention (see Table 24) this is largely due to Emma. Emma increased the times she waited from 1 to 17 post intervention (see Figure 26). On the contrary, Amber used waiting only once post intervention whilst Lorna did so 5 times pre intervention and 5 times post intervention.

Figure 27: Number of times the three staff waited for initiations pre and post intervention according to the video data



On the self-evaluation checklist, two of the three staff said they did not use this principle very often. Only Lorna did so. However, this was not reflected in the video data. All three staff said that waiting was easy to understand and implement. With regard to its effectiveness, two staff thought it was very effective and Emma considered it just effective. A key finding was that sometimes adults had to wait longer than felt comfortable. However, after being introduced to AISI, all staff said they became confident with waiting. Amber said:

> *'I think I am better about waiting. I was probably too eager to anticipate what the children wanted and I feel I benefitted from that principle'.*

Figure 28: Adult responds to the child's communicative attempts, uses minimal speech, gives the child time to process the information and uses non-verbal cues

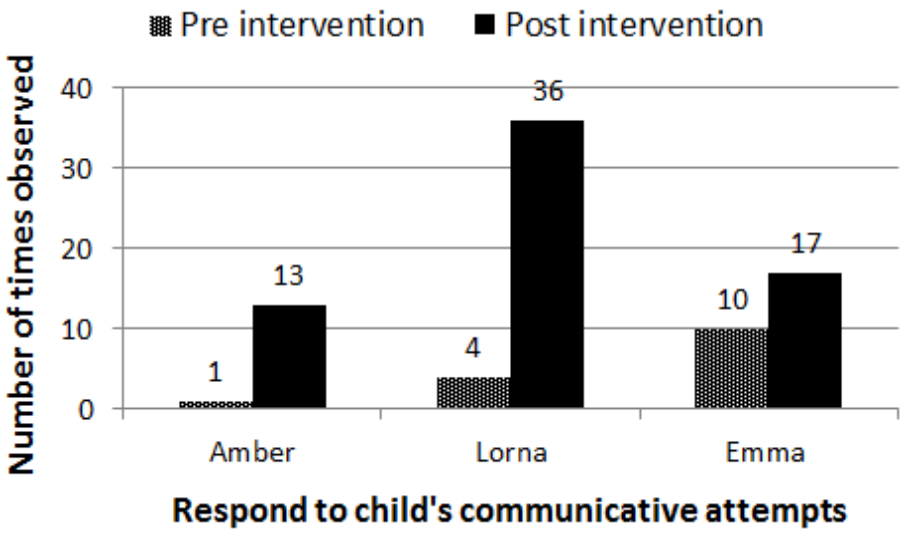


Drawn by N. Papadopoulos

8.4.1.4 Responding to the child's communicative attempts

Responding to the child's communicative attempts was coded when '*the adult gave the object the child asked for, took away the object they protested for, allowed them to start and terminate activities when they communicated these. In cases that the child could not finish their activity yet or have the object they wanted, the adult acknowledged the communicative attempt and indicated steps for completion of the present task*' (modified from Prizant et al., 2006). Video data showed that the number of times staff used this post intervention increased from 15 to 66 accounting for 6% of the total AISI principles, post intervention (see Table 24). Lorna increased it by far the most (see Figure 29).

Figure 29: Number of times the three staff responded to the child's communicative attempts pre and post intervention according to the video data



The self-evaluation checklist showed that Emma and Lorna used this principle many times a day. Amber reported she used it a few times a day. This agrees with the video data. In the focus group interviews, staff said that responding to the child's communication was easy to understand and implement. Emma said that this was very effective. She said that:

> *'Responding to children's attempts to communicate is getting easier since you proposed to do that. I realised how important it is'.*

She also mentioned Alex who:

> *'Gets very frustrated [...]Sometimes he does not know that we've understood it and so he still tries to communicate what it is he wants to do. But the answer is no'.*

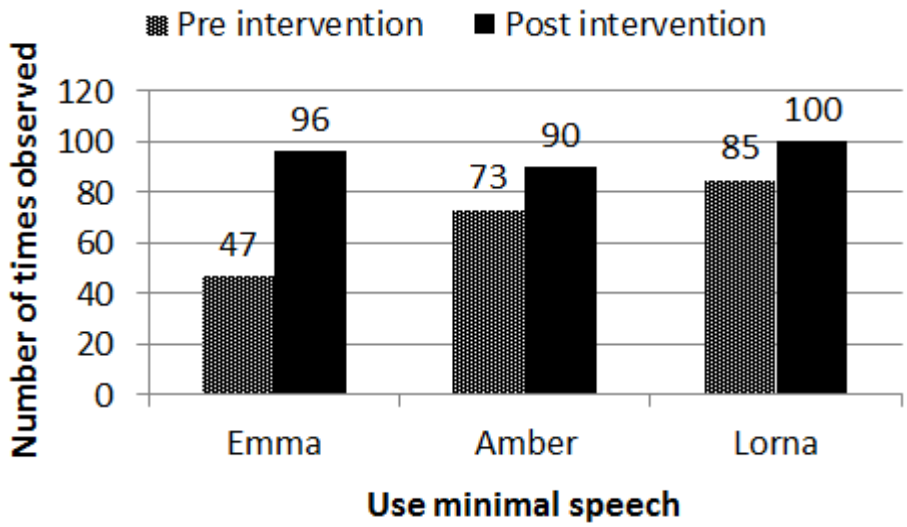
Lorna gave an example of the effective use of this principle in combination with the use of non-verbal cues:

> *'We used a red cross with David, really because he's got that level of understanding. When he was asking for something but it wasn't time for it, we put the cross on it so he knew it wasn't time for it'.*

8.4.1.5 Using minimal speech

Minimal speech was coded when '*the adult used up to four relevant concrete words and mapped them exactly onto aspects of the situation in hand*' (modified from Potter and Whittaker, 2001). The video data showed that the use of minimal speech was the principle which increased the most post intervention (see Figure 30). Interestingly the three staff used minimal speech 90 to100 times each, post intervention. Minimal speech was the second most frequently used principle pre intervention (after non-verbal cues). The average time this method was used increased from 68 times pre intervention to 95 times post intervention (see Table 24). Although it increased, the percentage of its use in relation to other principles dropped from 32% pre intervention to 27% post intervention.

Figure 30: Number of times the three staff used minimal speech pre and post intervention according to the video data



The video data concur with that of the self-evaluation checklist and the focus group interviews. All three staff said they used minimal speech many times per day. On a similar note, the focus group interviews showed that the three staff found the principle easy to understand and implement. They all thought that this was the easiest of all the AISI principles to understand, as it was included in their induction material when they joined the school and they had been practising it since then. However, Amber stated that this did not come without effort, as it goes against the personality of some people. She admitted:

> *'I am finding it easier than I used to. Cause I made a real effort not to say too much hopefully and I think I've improved with that'.*

The three of them also thought that this was the easiest of all AISI principles to implement. However, Emma raised the point that minimal speech is subjective and Lorna added to this that:

> *'It depends who is doing it. Some people's minimal speech isn't what I would consider minimal speech'.*

As expected from its wide use in both research phases, minimal speech was rated as very effective from the three members of staff.

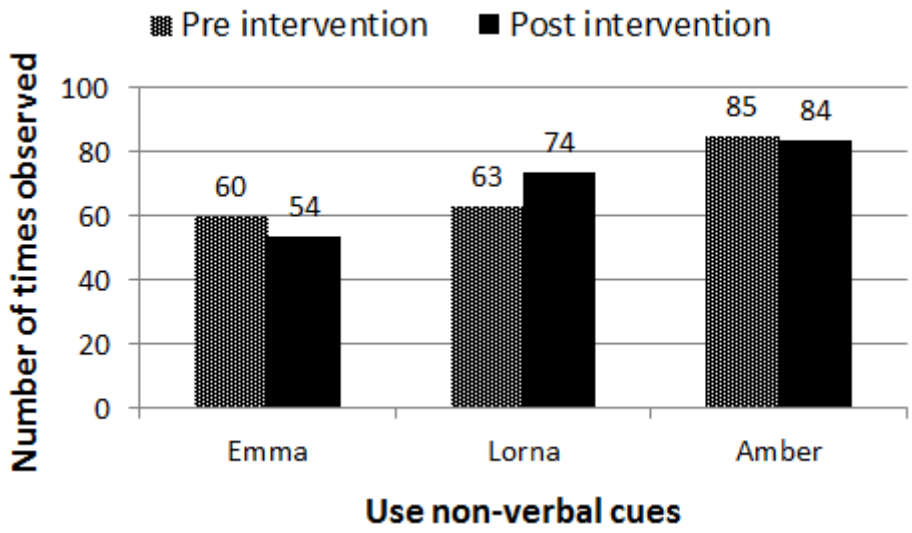
8.4.1.6 Providing time

This principle was coded when '*the adult gave the child verbal or non-verbal information and provided them with at least five seconds to process the given information*' (modified from Nind and Powell, 2000). According to the video data, none of the members of staff used this principle, pre intervention. Post intervention, Amber used it twice and Emma 8 times. The self-evaluation checklist data contradicted the video data as the three staff reported using this principle many times per day. The focus group data showed that staff had no difficulty in understanding or implementing this principle, which they all also considered very effective. Lorna mentioned that this principle mainly benefitted Robert, Oliver and Molly.

8.4.1.7 Using non-verbal cues

Using non-verbal cues was coded when '*the adults used symbols or pictures, objects of reference, gestures, body language, physical prompts or Makaton signs*' (modified from Prizant et al., 2006). Video data showed that this principle was used the most pre intervention with an average of 69 times (see Figure 31). Staff continued using it a lot post intervention. It had a slight increase from 208 times to 212 times with an average use of 71 times (see Table 24). However, when compared to the rest of AISI principles, the percentage of using non-verbal cues dropped from 33% to 20% post intervention.

Figure 31: Number of times the three staff used non-verbal cues pre and post intervention according to the video data



An example of using a range of non-verbal cues to support children's understanding is that of Nathan who wanted to finish his work before it was time. He showed this by standing up. Amber then showed him his personal timetable (which confirmed it was still work time), tapped on his chair and waited for him to sit down. After a few seconds and while Nathan was still standing, she showed him again the timetable and guided him physically to sit down.

Data coming from the self-evaluation checklist totally agree with the video data. All staff reported using non-verbal cues many times per day. In the focus group interviews, all three staff reported that it was an easy principle to understand and use. They also all agreed that using non-verbal cues, alongside minimal speech, were the two easiest to understand and implement principles as they were already core elements in their practice. However, they acknowledged that AISI reminded them of their importance

and gave them ideas for further practice. Amber and Lorna considered it a very effective principle, while for Emma it was less so.

In the first focus group interview (Stage 7), Lorna and Emma discussed the way they used signs and gave their opinion about their use with children with autism. Lorna maintained that:

> *'We use some signs. The SLT did a list of signs that we would use receptively. The trouble is that some of them are quite abstract, kind of more abstract than speech or words or anything. So she did do a kind of guidance, the ones that we could use receptively but not necessarily expect the children to use them. And to be honest a sign is gone just as quickly as a spoken word so that's why we tend not to but there are possibilities of perhaps using them a little bit more'.*

Emma added her opinion on this by saying:

> *'I've worked at schools where they used Makaton and not pictures and I worked here with the pictures and I think that the pictures are just fantastic. Behaviour wise they have several meanings and the children understand them better, I think, than Makaton. Makaton is good but for children with not so clear speech'.*

And Lorna continued:

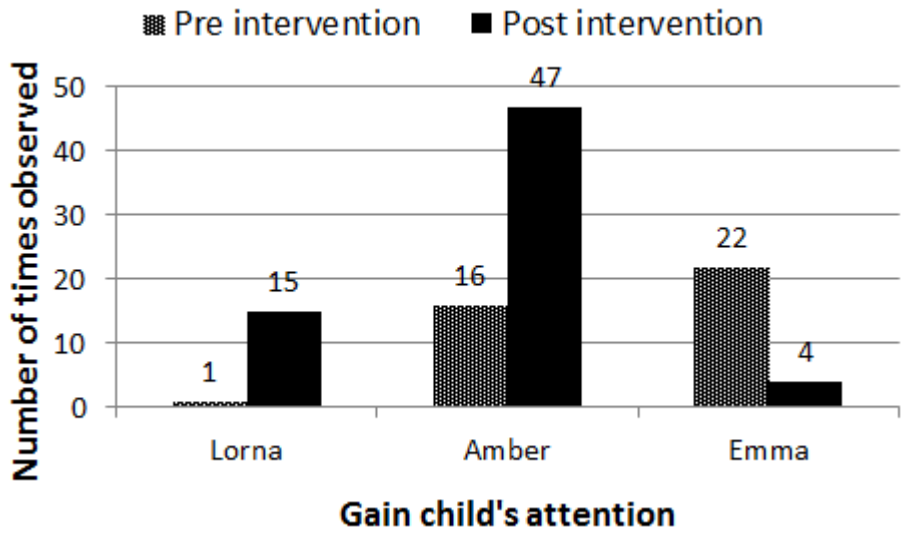
> *'I think the delay in processing cause us a problem with the signs because a sign is gone in the same ways as a spoken word is. My last school was severe learning difficulties and we didn't use pictures. It was the pre-digital cameras and stuff anyway. But it was very clear that the words that the children picked up, and they were of a range of different disabilities, were the ones linked with signs. The songs that they picked up were the ones that had more actions in which is interesting but I think the delay in processing here is always an issue, isn't it? That's not a reason for not using them but you have the same problem with the signs as you do with the spoken words that it's gone once you've used them'.*

This is the exact way signs and Makaton were used within AISI.

8.4.1.8 Gaining child's attention

Gaining the child's attention was coded when '*the adult called the child's name before addressing them; they may alternatively have said something like 'Hello Paul', 'Where is Paul?' or 'Paul's turn'* (modified from Prizant et al., 2006). Video data showed that two of the three staff increased this principle, post intervention (see Figure 32). The total number of times staff gained the child's attention increased from 39 pre intervention to 66 post intervention accounting in both research phases for 6% of the AISI principles used (see Table 24). It is only Emma who decreased her use.

Figure 32: Number of times the three staff gained the child's attention pre and post intervention according to the video data



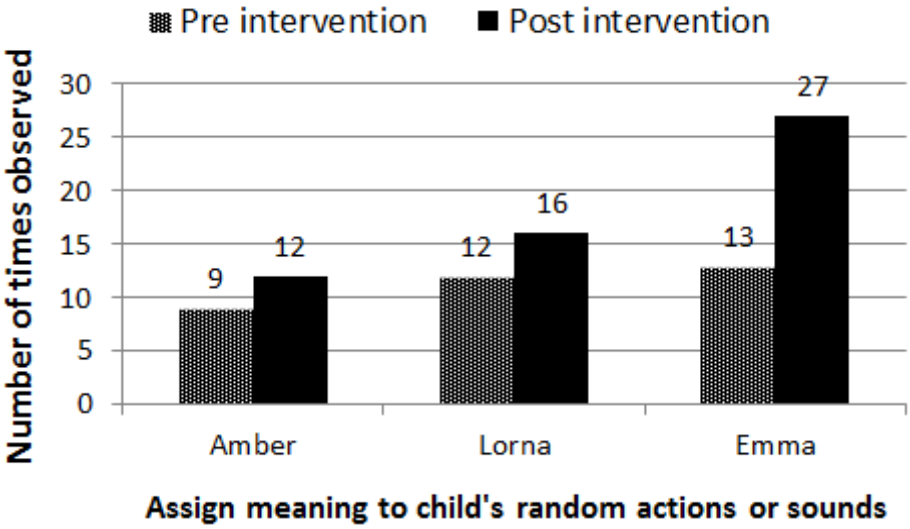
The self-evaluation checklist showed that the three staff gained the child's attention before communicating with them many times post intervention. All three staff said they used this principle on average more than five times a day. The focus group data showed

that, with the exception of Amber, all staff found this principle easy to understand and implement. Amber had some reservations about gaining the child's attention before communicating with them. She said that it does not always work. She rated gaining the child's attention as only a quite effective principle whereas both Emma and Lorna rated it as effective.

8.4.1.9 Assigning meaning to random actions or sounds

This principle was coded when '*the adult reacted as if the child's behaviour was communicative, even when it was not*' (modified from Christie et al., 2009). From the video data, it is evident that all staff increased the use of this principle post intervention (see Figure 33). Emma used it the most both pre and post intervention. For Amber and Lorna, there was an increase, but it was small. This is why in both research phases assigning meaning to random actions or sounds accounted for 5% of the total AISI principles (see Table 24).

Figure 33: Number of times the three staff assigned meaning to random actions or sounds pre and post intervention according to the video data



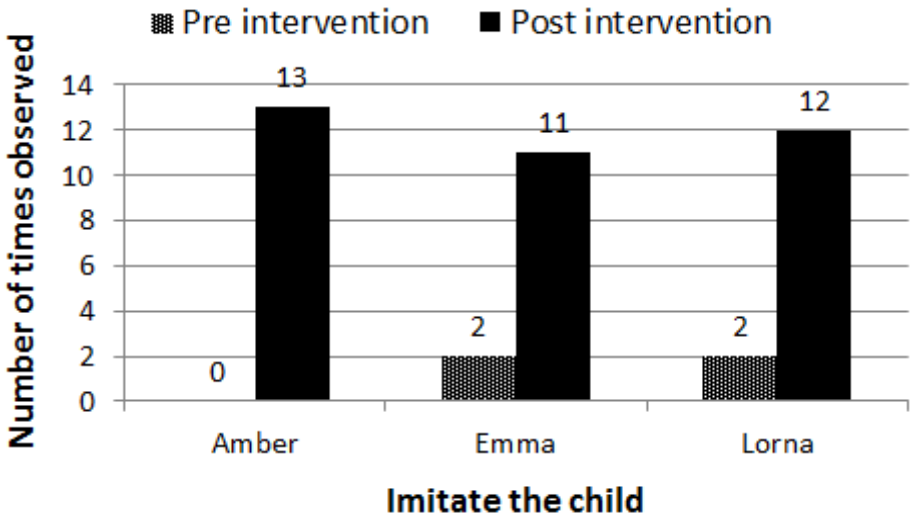
Examples of this principle seen in practice were the adult sitting face to face with a child who was rocking and acting out ‘row, row your boat’ or turning this into a see-saw game. On another occasion, Oliver shouted as a response to Lorna putting away the light curtain in the sensory room with no communicative intent whatsoever, but Lorna reacted as if Oliver had requested her to put the curtain back. This principle seemed to have worked very well with David, the only verbal child.

The self-evaluation checklist showed that staff used this principle only a few times per day. In the focus group interviews, staff said that there was no problem in either understanding or implementing this principle. However, two staff were not sure about its effectiveness.

8.4.1.10 Imitating the child

Imitation was coded when ‘*the adult imitated the child’s verbal (e.g. vocalisations, words) or non-verbal (e.g. actions) behaviour*’ (modified from Prizant et al., 2006). The video data showed that the three staff increased the times they imitated the children, post intervention (see Figure 34). The average use of imitation increased from only once pre intervention to 12 times post intervention. Amber who did not use imitation at all pre intervention was the person who used it the most post intervention.

Figure 34: Number of times the three staff imitated the child pre and post intervention according to the video data



On the self-evaluation checklist, Amber and Emma said that they used imitation only a few times per day but Lorna said she used it many times. All members of staff agreed that it was an easy principle to understand and implement. Amber and Emma thought that it was effective and Lorna was very supportive of its effectiveness. According to staff's reports in the focus groups, Robert and Molly responded best to being imitated. Robert increased a lot his eye contact when being imitated. Amber recalled a session with Robert in which imitation worked very well:

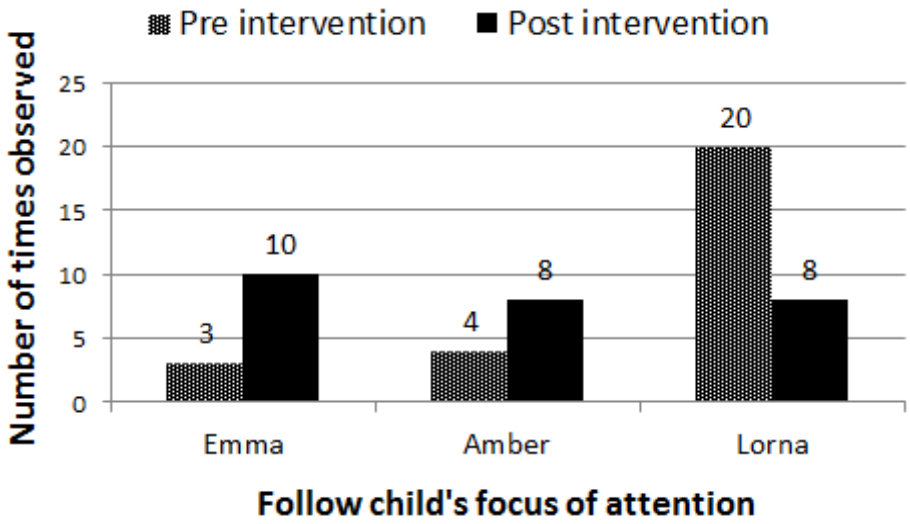
> *'When he was in the sensory room he was lying on his back and he had his legs up and I just copied him and he started looking at me. Then he got one of the cushions and he put his head on it and then I got a cushion and I put my head on it. We were facing each other and I felt we had some moments of communication'.*

8.4.1.11 Following the child's focus of attention

Following the child's focus of attention was coded when '*the adult followed what the child was doing or commented on it*' (modified from Prizant et al., 2006). According to

the video data, this principle increased for two members of staff, post intervention and decreased for one, Lorna (see Figure 35). Actually this was the only AISI principle which had a negative effect size (Cohen's d= -0.05). However, the difference is not important if seen in terms of the average times this principle was used; in both pre and post intervention the average times the staff followed the child's focus of attention was 9 (see Table 24).

Figure 35: Number of times the three staff followed the child's focus of attention pre and post intervention according to the video data



Extracts from the videos showed Alex stacking the cushions in the sensory room and Emma singing '*hide hide under the cushions, hide hide under the cushions, that's what we will do now*' or Nathan pressing the buttons of the cloud panel in the sensory room and Emma singing '*press, press the button, press, press the button, that's what we will do now*'. It is interesting to note here that Emma was the only person who sang what the child was doing. Another example of following the child's lead was that of Amber

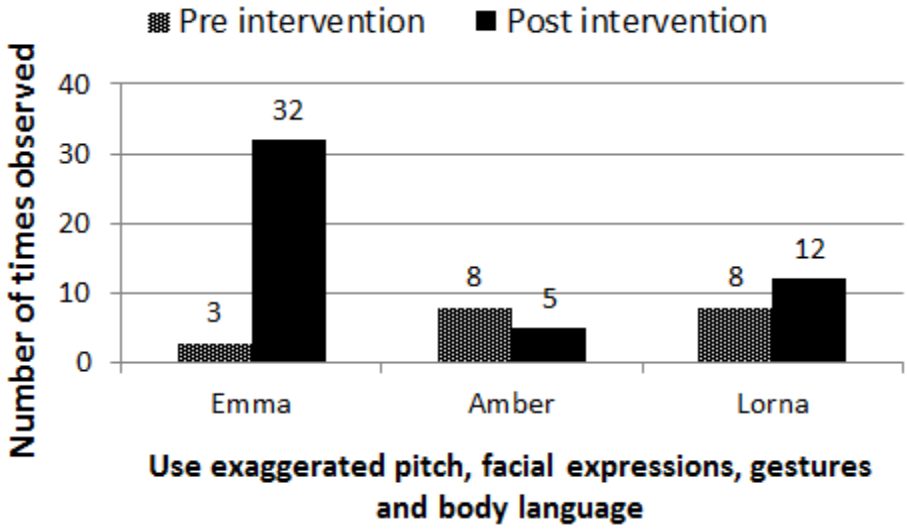
and Molly in the soft play. Molly was looking herself in the mirror and Amber said '*Molly in the mirror*'.

The self-evaluation checklist data showed that two staff were following the child's focus of attention a few times per day while Lorna was doing so many times. According to the focus group data, this principle was fairly easy to understand and implement by the staff. Only Emma found following the child's focus of attention difficult in practice. Emma also did not appear confident with the effectiveness of this principle while both her colleagues found it very effective.

8.4.1.12 Using exaggerated pitch, facial expressions, gestures and body language

This principle was coded '*when staff used more animated pitch or more lively facial expressions, gestures or body language than usual*' (modified from Kaufman, 1994; Greenspan and Wieder, 1998). According to the video data, two staff increased the use of this principle (see Figure 36). Emma used it post intervention 32 times more than pre intervention. However, both Amber and Lorna used it only a few times in both research phases.

Figure 36: Number of times the three staff used exaggerated pitch, facial expressions, gestures and body language pre and post intervention according to the video data



Robert seemed to enjoy this principle a great deal. For example in the sensory room, he spent all the ten minutes of a session playing *ready, steady, go* with Lorna who was turning on and off the bubble tube. When her voice was getting more animated, Robert's excitement rose. Nathan also liked it, while David became overwhelmed especially with staff's exaggerated pitch.

The data from self-evaluation checklist did not reflect the video data. Lorna reported to use this principle many times per day but this was not seen in the videos. Emma, on the other hand, who used it many times in the videos, did not report this in the self-evaluation checklist. Only Lorna found it difficult to implement this principle in practice. She said that:

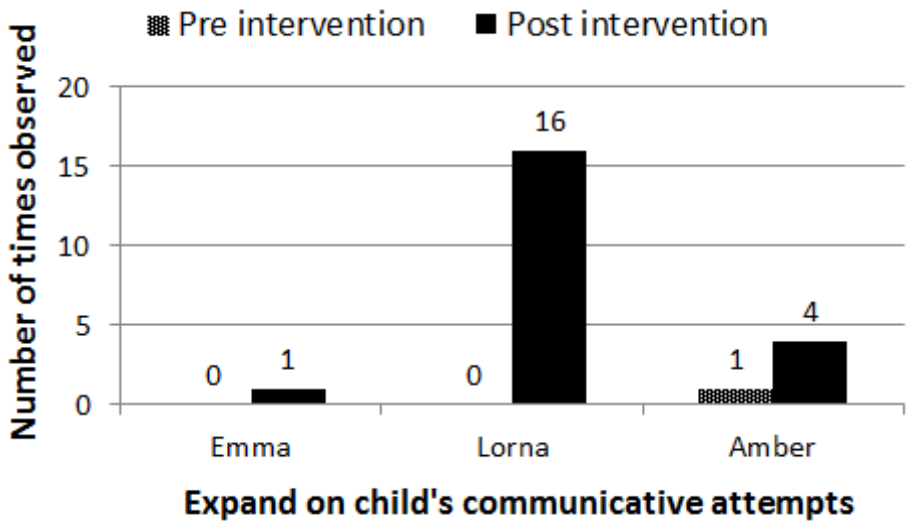
'That's easy […] as long as nobody is watching you'.

Regarding its effectiveness, Emma was the only member of staff who had doubts about it.

8.4.1.13 Expanding on the child's communicative attempts

Expanding on the child's communicative attempts was coded when '*adults' utterance was the length of child's utterance plus one*' (modified from Rogers and Dawson, 2010). This means that when the child did not use words, the adult used single words and when the child did use some words, the adult used two and three word phrases building on the child's initiations. Video data showed that this principle was used only once pre intervention and a few times, mainly by Lorna, post intervention (see Figure 37).

Figure 37: Number of times the three staff used expanded on the child's communicative attempts pre and post intervention according to the video data



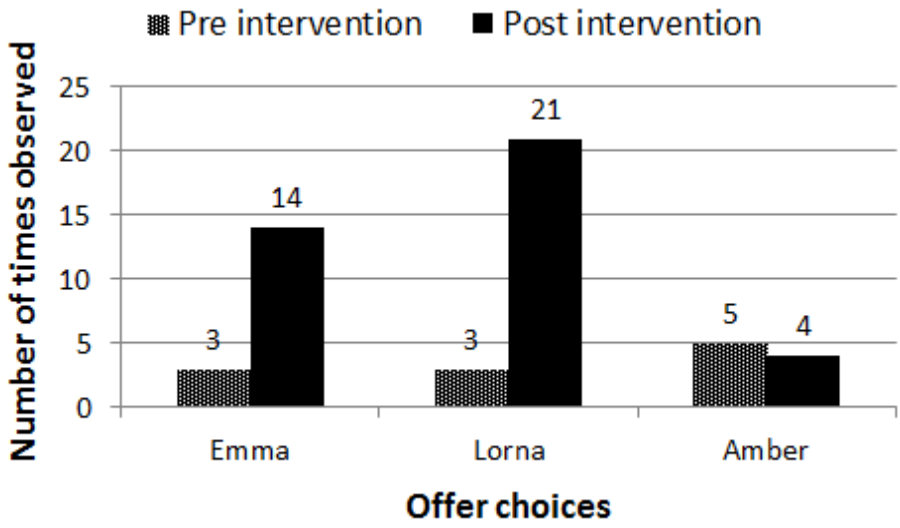
This principle appeared more effective with David who used single words to communicate. Many times he commented on objects in his environment (e.g. his clothes, other children) and he appeared to expect adults to build on this communication. For example when David said '*shoes'* and pointed to his shoes, Emma told him '*David's shoes'* or '*black shoes'*.

Data from the self-evaluation checklist did not reflect the video data as far as Emma was concerned. She reported using this principle many times per day which was not captured in the videos. All staff found this principle easy to understand but Amber had difficulties with implementing it. Lorna doubted its effectiveness.

8.4.1.14 Offering choices

Offering choices was coded when '*the adult gave a choice of activity or food without any verbal prompt; the adult might have held out two objects for the child to choose or provided the child with a photo choice board*' (modified from Potter and Whitaker, 2001; Prizant et al., 2006). According to the video data, offering choices was the communicative opportunity which increased the most (from 11 times pre intervention to 39 times post intervention). It was also the communicative opportunity with the largest effect size (Cohen's d=1.53, see Table 24). The three staff used this principle pre intervention and two of them, Lorna and Emma, considerably increased its use post intervention (see Figure 38).

Figure 38: Number of times the three staff offered choices to the child pre and post intervention according to the video data



Offering choices was used a lot post intervention with the children's workboxes. During 1:1 work, children were allowed to choose the activity they wanted. They had to do all the activities from the workbox, but they could decide on the order they were going to do them. This was so successful that Lorna put a sticker on all the children's workboxes (even the ones who did not participate in the study) to remind staff about giving them a choice of activities.

Data from the self-evaluation checklist reflected the video data. All staff reported to have used this principle many times per day. During the focus groups, all staff stated that they were fine with both understanding and using this principle. Especially for Emma, it was one of the easiest AISI principles to understand as it was already part of the school's practice. They all found offering choices a very effective principle.

8.4.1.15 Stopping part-way

Stopping part-way was coded when '*the adult stopped part-way through a child's favourite activity, usually when it was in its peak*' (modified from Potter and Whittaker, 2001). According to the video data, this principle was coded only twice pre intervention, once by Emma and once by Lorna. Post intervention, it was coded 9 times for Amber and 6 times for Emma. All staff were observed to play *rough and tumble* or *burst and pause* games with the children and purposely stop to elicit request for more. There were also many examples of staff singing children's favourite songs and dropping the ending word or phrase depending on the child's language ability. It is of great importance to mention here that children who were considered non-verbal such as Robert or Molly sang words dropped by the adults in their favourite songs.

Self-evaluation checklist data showed that all three staff used this principle a few times per day. Although the three staff considered this principle easy to understand, they had some difficulties with implementing it. This was due to the children's limited concentration span which resulted in losing them sometimes as they walked away as soon as the adult stopped part-way through an activity. This is the reason Amber rated this principle as not effective. Emma and Lorna rated this principle as effective despite the concerns voiced about children's limited concentration span.

Lorna described an event with Nathan in the soft play where she used this principle effectively. She was tickling him and then stopped quite a few times and Nathan was taking her hands, putting them on his belly to ask for more.

Amber explained that this principle would not work effectively in the classroom environment. She argued that:

> *'I need to be engaged with Alex especially or else he just walks off and then I've got to get him back to the table, which is not easy. I feel that this is not the right thing for Alex, at least in the classroom. But it might work in sensory room or soft play. I wouldn't do it when I am too focused on the table because I feel I have such a job getting him at the place I want him to be. I just feel that doing this (stop part-way) would wind him up'.*

8.4.1.16 Giving small portions of food or drink

Giving small portions was coded when '*the adult gave the child small portions of food or drink so that the child could ask for more*' (Potter and Whitaker, 2001). The video data showed that this principle was not coded very often. Amber was the only person who used it pre intervention once, whereas Emma and Lorna used it post intervention; Emma used it 3 times and Lorna 12 times.

The self-evaluation checklist data confirmed the video data. Even Lorna, who was coded to give small portions of food or drink a few times post intervention, reported in most of her self-evaluation checklists that she did not use this principle at all. The three staff thought that there was no problem with understanding or implementing this principle.

They all considered it a very effective principle but they thought that it might be problematic with some children. The problem would be mainly with children who had rigid thinking and behaviour. Lorna mentioned the example of Robert and Oliver who wanted their whole biscuit. If the biscuit was cut into smaller pieces, they would not eat

it. A possible explanation Lorna gave for this was that for their level of understanding a piece of biscuit does not look as the whole biscuit in the photo on their communication board. This principle would also be problematic for Alex and David. As Lorna said:

> *'The number of biscuit pictures they've got on their [communication] board is the number of biscuits they have. If we break the biscuits in smaller pieces, that would stop that understanding; you have two biscuits and then it's finished. So I think this would be a problem [for these two children]'.*

Especially for David she said:

> *'[He] will see it as an ever-ending flow of biscuits. He wouldn't know whether it would come to an end. Definitely, not with David because he needs to know he has a number of biscuits and then it's finished. And I think with Alex as well. He needs to have a clear idea of how many biscuits he gets and if we break them I think this would be quite confusing for him'.*

However, Lorna acknowledged that this principle would be very effective with the other two children in the study (i.e. Molly and Nathan) or for these four when they had other snacks such as fruits, crisps, chocolate and with their drinks. The other two staff agreed that giving the child small portions of food or drink was a very effective principle.

8.4.1.17 Making items inaccessible

Making items inaccessible was coded when '*adults put items in sight but out of reach so that the child needed to ask for them*' (Potter and Whitaker, 2001). According to the video data, the total times this principle was used increased from 6 times pre intervention to 24 times post intervention. However, this was mainly due to Emma who

used it 18 times. Lorna was coded to use this principle the same number of times pre and post intervention (i.e. 6 times) and Amber did not use it at all.

Some very successful examples of using this principle were when staff put children's favourite toys on the top of the cupboard and stayed in front of it so the children could ask them to bring the toys down. Alternatively, staff put up the light curtain in the sensory room and the children had to ask them to put it down again.

Self-evaluation checklist data agreed to a great extent with the video data. Amber and Lorna reported that they rarely used this principle whereas Emma acknowledged that she used it a few times. The data from the focus group interviews showed that although all members of staff thought that making items inaccessible was an easy to understand principle, it was not easy to implement. Amber rated this principle as ineffective. She justified her opinion by saying:

> *'I think that the children I am working with would just get extremely angry or lose interest'.*

Emma and Lorna thought it was effective.

8.4.1.18 Giving the child materials they will need help with

This principle would be coded when '*the adult gave the child materials they could not make them work without the adult's help*' (Potter and Whitaker, 2001). In video data coded for the adults, none of the staff used this principle either pre or post intervention. However, during coding children's videos and in activities which were not filmed staff were observed to use this principle. For example, many times during work time for

children who enjoyed doing their work, staff did not open the lid of the workbox until the child asked. Other examples were giving the child the cars they asked for but in a box with the lid on or getting some new wind-up toys which the child could not make work by themselves.

Self-evaluation checklist data agreed with the video data. Staff reported that in most days they did not use this principle. They all thought it was an easy to understand principle and only Lorna found it difficult to use. The reasons for her reservations were:

> *'There is also the element that some children become quite motoric in that. […]. Although they know how to do it they systematically take your hand to do it because they see that being part of the activity. For example, Nathan has a tendency to do that. […] It's not asking for help, it's a learnt sequence of events. And you have to kind of watch that because it's difficult to spot… it looks like they are asking for help but they are not. Because they don't need help, they can do it themselves'.*

8.4.1.19 Contradicting expectations

Contradicting the child's expectations would be coded when '*the adult did something out of routine or unexpected*' (Potter and Whitaker, 2001; Griffin and Sandler, 2010). Some of the examples presented to the staff were to turn a toy animal over to see whether the child would restore it to the original position or read a book upside down and turn the pages backward. In the videos coded for the staff none of them used this principle either pre or post intervention. However, Emma was observed to use it once pre intervention, but this video segment was not one of those coded for the staff. While Robert was staring into space, she stepped in front of him and he walked away rejecting her effort to communicate with him.

The data gained from the self-evaluation checklist agreed with the video data. Emma and Lorna stated that they did not use at all this principle most of the days while Amber reported she used it a few times. Two of the three staff (i.e. Emma and Lorna) claimed that contradicting the child's expectation was difficult to understand. They both reported that it was the most difficult of the AISI principles to understand. The three of them were not sure about its effectiveness with the children of their classroom.

Lorna said that they tried this principle with children in previous years. But she doubted that this would work with the children of this study, possibly with the exception of David. She said:

> *'[In previous years] with more able children I've put sometimes the days of the week up and I put one upside down or we looked at the book and put it upside down. We've done it when we've had a group of verbal children [following the main EYFS curriculum]. We've done it with Andrew last year. 'Oh what's the matter Andrew?' and he would say 'it's upside down'. And we would say 'oh yes, so it is '. If I start now putting them upside down many children will start putting them upside down. That's a tricky one. I can see the usefulness of it with certain children here. Maybe with David. David drives cars around, he knows which way they go so we can do something with this. You don't want to provide the others with an unhelpful work model, do you?'.*

When staff tried to drive the cars upside down with David instead of commenting he just copied the adult.

8.4.1.20 Giving non-preferred items

Giving the child non-preferred items would be coded when '*adults gave the child items they were not interested in to elicit protest or comment*' (Potter and Whitaker, 2001).

For example, the adult could put in the child's plate snacks that they did not like or give them a toy that they did not want. It has to be noted here that the adult should have given the child these items when the latter had not asked for something else. Otherwise, this principle would confuse the children and make them upset.

Although staff were observed a few times to put on the children's plates fruits and vegetables that the latter did not like to expose them to different experiences, this was not coded in the videos. None of the staff used this principle either pre or post intervention. The three staff reported, in the self-evaluation checklist, that they did not use this principle often. Actually, most of the days they reported that they did not use this principle at all.

They all thought that it was an easy principle to understand but two of them (i.e. Amber and Lorna), felt that it was difficult to use. Amber said about the use of non-preferred items:

> *'I haven't found a situation I've been able to do that comfortably'.*

The three staff questioned the effectiveness of giving non-preferred items to the children. It was only Emma who admitted that she saw this principle working with David. She gave the following example:

> *'When you give him the snack board with only fruit pictures on it, which isn't a preferred item to him, he will ask [verbally] for the preferred item (i.e. biscuits)'.*

This confirms Lorna's comment that this principle is more effective for:

> *'children who are further down the line with their communication skills […] and much more verbal. You could do stuff like that with them because they could cope with that and then ask you what they want'.*

8.4.1.21 'Forgetting' something vital

Forgetting something vital would be coded when '*the adult set up a situation where they did not do something of vital importance*; *this could be to give the child paper without crayons in colouring time or putting on child only one shoe*' (Christie et al., 2009). The video data showed that none of the staff was coded to use this principle either pre or post intervention. This was seen in the self-evaluation checklist data too. The three staff reported that they did not use this principle most days. All staff had no problem with understanding and implementing the principle but they had doubts about its effectiveness.

However, an effective way of using this principle was mentioned by Lorna:

> *'Not pulling their coats' zip up. I've done this with David today and he asked for the zip to be done up. That's actually a really positive communication from him rather than lying on the floor and laughing at you. We can do that when they put the coats on. The ones who insist to have their zips done if you don't do the zips up, they will come to you to ask for it. David will. Coats are quite good because some of them have to have them done properly. Others like Molly and Robert are not bothered. It's not gona work for them but that's a good one to do'.*

However, post intervention Lorna drew staff's attention to potential problems arising from using this principle. She said:

> *'You could trigger a problem with behaviour if you get them the car mat out forgetting to give them the cars. You have to do it only with the children that they can cope with it such as David or Nathan, possibly, not the others'.*

Amber maintained that the main difficulty with the children of the sample was that they may not be able to let the staff know that something is missing. She said:

> *'They may get upset since by giving a picture which in the past was bringing them the whole set of toys now will bring them only the garage without the cars or only the train without the man to put on'.*

8.4.2 Discussion

After presenting the main findings regarding the implementation of AISI principles, this section explores the literature behind each principle and compares the findings of the present study to that of similar studies.

Establishing appropriate proximity and contact was a significant component of AISI according to the staff. Both SCERTS (Prizant, 2006) and the Hanen approach (Manolson, 1992) advise adults to get down to the child's level to have face to face interaction and physical proximity. Nind and Hewett (2001) and Potter and Whittaker (2001) recommend positioning oneself even below the child's eye level as this increases the child's confidence and sense of security. For Sonders (2003), the ideal distance is within 60 cm. Nind and Hewett (1994) consider touch a fundamental form of communication for people with limited or no speech as the children of this study. However, Bogdashina (2003) maintains that some people with autism might be hyper tactile and feel uncomfortable when being touched and this should be known to the people interacting with them. Shaw (2002), the mother of a young autistic teenager,

argues that her son's tactile defensiveness was so strong that she would not allow anybody near him, let alone touch him. The tactile defensiveness of some children came up in this study too. For Alex, Robert and Nathan establishing proximity could be sometimes difficult to implement (especially when they were upset) but overall it was considered an effective principle.

Showing availability was another crucial feature of AISI which staff found effective and easy to understand and implement. The advice Nind and Hewett (1994) give is that the adult's body should be slightly turned towards the child, with shoulders and legs relaxed, head slightly leant to one side or back, eyes wide but with a mild and questioning face. Some interpersonal rules of Studio III's low arousal approach to manage CB can be adapted to foster children's spontaneous communication (Woodcock and Page, 2010). These are avoiding tensing muscles such as folding arms or clenching fists, keeping hands relaxed, open and visible, avoiding staring at the child as this could be perceived as aggressive behaviour and maintaining regular intermittent eye contact. Prizant et al. (2006) maintain that showing availability is more crucial when an activity challenges the child's skills. When the adult thinks that the child is not going to ask for help they can hold out a hand with palm vertical (i.e. hand signalling) and if the child does not respond to that within ten seconds, then they guide the child to do so (Potter and Whittaker, 2001). Carter and Hotchkis (2002), in their continuum model of spontaneity, ask adults to show availability by overly emphasised questioning eyes and extending hands, at least initially, in an effort to transfer the control from the most intrusive cue (e.g. language prompts) to least intrusive ones (e.g. highlighting stimuli by exaggerated actions).

Literature suggests that when adults show availability children may increase their eye contact. Hwang and Hughes (2000) found that when adults put on an expectant look, children in their sample increased their eye contact. In the current study, increase in eye contact was seen in three of the six children (i.e. Alex, Robert and Nathan) when adults changed their interactive style. Possibly the principle of showing availability has played a role in this increase. Hwang and Hughes (2000) also found that adapting an available face expression resulted in an increase in children's joint attention. This was not seen in the children of this study apart from David, although the sample was similar to Hwang and Hughes's sample (i.e. non-verbal preschool children with autism).

Staff thought that waiting was a very effective principle which was often overlooked pre intervention. Encouraging adults to wait for initiations and not intervening unless it becomes obvious that the child is not going to initiate is highly recommended (Prizant et al. (2006). Pausing and waiting are of particular value in Intensive Interaction (Nind and Powell, 2000). Manolson (1992) delineates the difficulty adults often have with waiting, feeling that a silent moment is an empty moment. This was also found in the present study. Staff, especially the TAs, were very worried about waiting and whether this would be perceived by other staff as laziness or lack of creativity. This difficulty with waiting is illustrated in Gillett and LeBlanc's (2007) study. They trained the mothers of three children with autism and little or no speech in a naturalistic approach and the results revealed that the component of the intervention mothers found most difficult to apply was waiting for initiations. However, the participants of the current study were teaching staff and the expectation was that they would wait more than parents, as this could have been part of their training.

The impact of adults' waiting on children's communication has been explored in a number of studies. McAteer and Wilkinson (2009) trained staff in a facilitative style of interaction, part of which was to wait for the child to start the communication. The results showed that the pupils initiated interaction more frequently post intervention. Waiting was one of the principles used by Drew et al. (2007) to train the parents of young children with autism. The study showed that some of the children made progress in communication skills and language. In this study it felt hard for the researcher to code waiting, because there were no obvious signs of the staff waiting. Waiting is something people do in their minds and many times it was difficult for the researcher to distinguish when staff were waiting.

Responding to the child's signals for communication worked very well for David, the only verbal child, who decreased his 'disruptive' behaviours when staff started responding to them. This principle is highly recommended in the literature as in doing so the child feels that their communication gets results (Greenspan and Wieder, 1998; Rogers and Dawson, 2010). Nind and Hewett (2001) highlight the importance of celebrating and acknowledging other than speech attempts the child makes to communicate. Staff, in this study, were asked to respond to all the child's communicative attempts (e.g. hand manipulation, running away) without trying to model a more 'appropriate' communicative method (e.g. symbols or speech). This is the main point AISI differs from EIBI interventions in which adults' modelling of more advanced methods of communication is an integral part (Cooper et al., 2007).

The use of minimal speech was considered very effective by the staff and was widely used in this study. The fact that the use of this principle increased a lot post intervention

(from 68 times pre intervention to 95 times post intervention) but the percentage dropped from 32% pre intervention to 27% post intervention suggest that the staff incorporated other AISI principles in their practice post intervention. Literature highlights that too much speech is likely to confuse and possibly disengage children from the social environment (Klin, 1991). It is also advisable for the adults to repeat their words a couple of times in a natural way (Christie et al., 2009). One common mistake that people working with children with autism make is to overestimate how much speech they understand (Potter and Whittaker, 2001). Children with autism tend to use situational cues to make sense of the environment and this can mask their difficulties with language. Even people with extensive expressive vocabularies might have very limited ability to process other people's speech (Mesibov, 2007). Portage (Willis and Robinson, 2011) employs a rule of thumb to remind practitioners and parents to use clear language; it asks them to speak only about things which can be seen or heard. The connection between minimal speech and spontaneous communication has been explored in previous studies. Potter and Whittaker (2001) found that when staff adopted a minimal speech approach which consisted of no more than two relevant concrete words, the children increased their spontaneous communication. Ingersoll (2011) trained adults to use simplified language and this spurred more initiations and more precisely comments by the children.

Giving children time to process the information which is given to them was considered a very effective principle which staff widely used. However, this was not coded in the videos possibly because staff used it in other activities which were not filmed, the researcher could not code these behaviours, or staff used a different definition for this principle. The researcher felt that this was a difficult principle to observe. Providing

time is a process people do in their minds and cannot be easily distinguished from behaviours such as thinking, day dreaming or just sitting and standing. Nind and Hewett (2001) highlight the importance of adults slowing down and giving children time to process the given information. This is very important when working with autistic children as many of them have different perceptual and cognitive styles (Bogdashina, 2005). For instance, they may not distinguish between foreground and background information or they may process information from one sensory channel at a time (e.g. vision, hearing). They might also pay attention only to one area of stimuli with high focus-tunnel attention and they may remember whole chunks of events without being able to filter out irrelevant details (i.e. gestalt memory). Woodcock and Page (2010) estimate that there is an average ten second delay in the processing skills of children with autism and this is in agreement with Potter and Whittaker (2001). The children who seemed to benefit the most from this principle in the current study were Robert, Oliver and Molly. All of them had a CARS score above 50, profound or severe learning difficulties and a 0 or 1 score on the SPT (Lowe and Costello, 1988). This might mean that providing time is more crucial for children of lower ability but more research is needed to draw safe conclusions.

Staff used non-verbal cues to a great extent even pre intervention. They considered this principle very effective and they kept using it post intervention while enhancing their repertoire with other principles as well. This study made staff more aware of the importance of using gestures and signs receptively. Christie et al. (2009) advise adults to use gestures such as '*come here'*, miming drinking while saying '*Do you want a drink?'*, Makaton signs, physically guide the child through the action that is expected from them. Likewise, the child has more time to take in the information and it is more

likely for the adult to speak slowly emphasising key words. The importance of this principle is also reflected in a study conducted by Doussard-Roosevelt et al. (2003). They examined the interactions of nine mothers with their autistic children and noticed that the children were more engaged when non-verbal behaviours were employed.

Gaining the child's attention before communicating was also considered effective and was used a lot by the staff. The only concern staff expressed about it was the difficulty of implementing this in practice with children who might not be particularly interested in interactions with other people, especially in noisy environments full of interesting objects. Christie et al. (2009) advise adults to call the child's first name before addressing them. However, this might not be enough and the adults may need to touch the child too (Prizant et al., 2006). In that case, Christie et al. (2009) suggest holding the child's hand or even blow gently on their cheek if they do not respond to the adults and cutting down distractions such as turning off the radio, and getting them to put down the toy they are playing with. Christie et al. (2009) also suggest pausing for a while after addressing the child.

Staff had some concerns about the effectiveness of assigning meaning to the child's random actions and sounds. They also found this principle of limited implementation as it could be only used in out of the classroom activities. Literature advocates the use of this principle with children with autism (Flack et al., 1996; Christie et al., 2009). Assigning meaning to child's random sounds and actions bears many similarities with what the Hanen approach calls interpretation. Manolson (1992) claims that even if parents get children's message wrong, their response lets the children know that they are listening. Bruner (1981) maintains that this is exactly what mothers do with their

toddlers to teach them language; they constantly assume intentionality in their children's utterances until they finally verbalise with intent. However, Milton (2012), an adult with autism, expressed his concerns about this principle and said that it should be used with caution. He claimed that:

> *'Assigning meaning to unintentional communications and always reacting to them, can be internalised as invasive and overbearing'.*

The association between acknowledging all children's attempts as communicative and increase in the use of spontaneous speech is highlighted by Ingersoll et al. (2005).

Imitation was the principle which had the largest effect size meaning that the three staff increased its use post intervention. However, it arose that staff were still not feeling very comfortable with using this principle. SCERTS (Prizant et al., 2006) advises imitation of the child's verbal and non-verbal behaviour and then pausing in anticipation of further response. Flack et al. (1996) maintain that by imitating, a turn-taking pattern is created and the child understands that their behaviour may have an influence on others. The Department for Children, Schools and Families (DCSF, 2009) claims that mirroring the child's actions and sounds can lead to the child making connection with adults. Caldwell (2006) considers imitation important as it is something the child can make sense of in a sensory overloaded world. Christie et al. (2009) state that by being imitated many children become more aware of themselves. Manolson (1992) highlights that by imitating the child a connection is developed which might later turn into a conversation. Sonders (2003) suggests that the adult's turn should be a similar length of time as the child's to keep their interest. If the adult imitates the child but the child does not notice them, Christie et al. (2009) provide some

helpful ideas such as to vocalise through a cardboard, plastic tube or use a plastic echo mike, a drum or another simple sound-maker.

Mirroring a child's movements is widely criticised by EIBI therapists (Richman, 2001; James and Fletcher, 2011) who think that this may encourage 'inappropriate' behaviours. This might be the reason for staff's hesitancy in imitating the children. However, this fear looks unrealistic and of secondary importance when compared to teaching a child to become an independent communicator. According to staff, Robert and Molly responded best to being imitated and Robert increased a lot his eye contact as a result of being imitated. This is in agreement with Hwang and Hughes (2000) who used contigent imitation in their intervention and children increased the use of eye contact. Both Robert and Molly had CARS scores above 50, SPT scores 0 and were assessed as having profound or severe learning difficulties. This might mean that imitation has better results with autistic children being on the lower end of the spectrum.

Following the child's lead and focus of attention was seen as an effective principle but it was not widely used by the staff. A possible reason for this might be different definitions given by staff and the researcher on this principle. This difference in definitions used came up in one of the focus groups where Emma was not clear about the differences of following the child's lead and imitating the child. Nind and Hewett (1994) encourage adults to follow the child's lead by providing a commentary of what the child is doing. Manolson (1992) thinks that by commenting on what children are doing, adults show them that they are interested in communicating with them. Alternatively, this commentary can be chanted or sung (Christie et al., 2009). It is

interesting to note here that Emma was the only person who sang what the child was doing. This might give a hint that the extent to which each staff use the different AISI principles is related to their personality and maybe professional status. For example, Lorna, the teacher, was the more hesitant from the three staff to sing. Research in language development in TD infants has shown the importance of following the child's focus of attention and its links to joint attention and spontaneous speech (Siller and Sigman, 2002; Ingersoll et al., 2005; Jones et al., 2006). Tomasello and Farrar (1986) found that words referred to objects which are within the child's focus of attention are learned better than words presented outside the child's focus of attention.

The use of speech with variation in pitch, exaggerated facial expressions and body language was seen as an effective principle but was not very widely used. This might be because of staff's reservations about being animated, which may be viewed as a lack of professionalism or cause embarrassment and because this principle was mainly used in half of the activities (i.e. sensory room and soft play area). Emma was the only staff who had doubts about its effectiveness. This is quite strange given that she used it a lot. An explanation for this might be that she was not aware of being animated and lively as this was part of her personality. Nind and Hewett (2001) and Potter and Whittaker (2001) claim that this principle can encourage children's spontaneous communication. As Julie Andrews said as Mary Poppins '*in every job that must be done, there is an element of fun. You find the fun, and -SNAP- the job's a game*' (cited in Griffin and Sandler, 2010, p. 8). Greenspan and Wieder (1998) advise people who might feel embarrassed to be animated to use puppets pretending that it is the puppet's voice which is animated. Attention should be drawn to children who are sound hyper or hypo-sensitive. Milton (2012) raised his concerns about using extensively this principle as it

can be invasive. Prizant et al. (2006) propose the use of differentiation according to the child's sensitivities; they advise adults to use exaggerated intonation for alerting under aroused children and a soothing vocal tone for highly aroused children.

The findings on expanding on the child's communicative attempts were quite debatable. Emma reported having used this principle many times but this was not captured in the videos. This might be due to the fact that she was not using it when filmed, which is likely given the limited video data which were coded for adults (i.e. forty minutes per research phase). Amber had difficulties with implementing this principle and Lorna doubted its effectiveness. A possible explanation for Amber's difficulties might be that she was not very clear about the definition of this principle and a reason for Lorna's doubts might be that she did not work a lot with David and this principle worked best with him, the only verbal child. Manolson (1992) notes that adults should speak as the children would if they could.

Previous studies showed that expanding on the child's communication is likely to increase joint attention and commenting. In Kasari's et al. (2006) study young children with autism (aged 3 and 4 years old) went through an intervention in which adults, among other principles, expanded on what the children said. The results showed that children initiated more joint attention compared to the control group. Ingersoll (2011) tried different interventions with two pre-schoolers with autism. The adults who were trained in RT had among others to expand on any language used by the child. Children who went through RT initiated more comments post intervention than the children of other interventions. In the current study, the only child who increased joint attention functions (i.e. commenting and seeking information) was David. More research is

needed to explore whether this increase is related to the staff expanding on his communicative attempts.

Offering children choices was the communicative opportunity which was used the most by the staff. It was a principle they were already using and after the introduction of AISI they increased its use a great deal. Although the three staff considered stopping part-way an activity easy to understand, they had some difficulties with implementing it. This was due to the children's limited concentration span which resulted in losing them sometimes as they walked away as soon as the adult stopped part-way an activity. However, according to this study's definitions, walking away can have communicative intent (Greenspan and Wieder, 1998). Despite the concerns voiced about children's limited concentration span, staff considered it an effective principle. Giving children small portions of food or drinks was also considered very effective but it was not used a lot by the staff post intervention. This was expected as it is a principle which could mainly be used during one of the four activities (i.e. snack). Making items inaccessible was considered effective but difficult to implement. This is possibly because staff were afraid of children's negative reactions such as anger or upset. Children did not have the level of understanding that if they asked for their toy they could have it back. This might be the reason staff did not use this principle as much as they wanted. Making items inaccessible worked more effectively when the adult put away a toy the child was playing with instead of a child's favourite toy which was out of their focus of attention the specific moment. Staff had to be quick and give the toy back to the child as soon as they asked for it to prevent upset.

Giving children materials they would need help with to elicit communication, contradicting their expectations, giving non-preferred items and forgetting something vital were not widely used. The main argument against giving children materials they would need help with was the importance to keep the balance between encouraging spontaneous communication and independence. This is a very important point as many individuals with autism are prompt dependent (Blackburn, 2011) and using widely this principle may increase their dependency. This is why adults should use this principle with different objects and in different activities. Otherwise, asking for help might become part of the process and not spontaneous communication. The need to be creative and find new situations to implement this principle might be the main reason two of the three staff did not consider it effective. Staff also found difficult to understand the principle of contradicting the child's expectations. Possibly the definition given was too broad. Overall, these four principles seemed too difficult for children at such an early stage of their communication development and their effectiveness was questioned by the staff. Lorna's line of argument explains very clearly the reason:

> *'Most of AISI principles are enabling the children to communicate and those four ones actually put a barrier, don't they?[…]. It feels too soon to do that sort of things. I think they are very good ideas perhaps later on down the line but I think that at the moment there are less opportunities to do that. Because if you got them to ask for something, it is an achievement in itself. If you then forget parts of it, it seems a bit cruel. They 've got to ask for parts of it again and most of our children do not have this understanding.[…] For more able children that are well established in their communication skills it might be appropriate but I don't think it's very appropriate in this room'.*

8.5 Summary

This chapter showed that staff were very eager to reflect on and try out all AISI principles proposed by the researcher. The three staff increased, by at least 100, the times they used AISI principles post intervention. However, staff concluded that some principles were more effective than others for the specific sample. For example, contradicting the child's expectations, giving non-preferred items and setting up situations where the adults 'forget' something vital, were difficult to implement with these children, possibly due to their limited communication skills. Giving them materials they would need help with should also have been used with caution as it could have increased children's dependency on adults' prompts.

Another important finding was that there were several discrepancies across the different sources of data (i.e. the videos, the self-evaluation checklist and the focus group interviews). The most common discrepancy was that staff often reported on the self-evaluation checklist or at the focus group interviews that they used some AISI principles (e.g. imitation, following the child's focus of attention, expanding on the child's communicative attempts) more often than they were seen in the videos. This is likely to be the case because the videos were a snapshot and so they could not capture every instance of a principle being used. The next chapter presents the follow-up data (twelve months after the end of the main study) for three of the six children and the three members of staff.

CHAPTER NINE
FINDINGS: FOLLOW-UP DATA TWELVE MONTHS LATER

9.1 Introduction

Follow-up data were collected twelve months after the main study to check whether the differences measured in children's spontaneous communication and in staff's interactive style were maintained. This is of great importance as few studies have explored whether changes are maintained when an intervention ends (Kovshoff et al., 2007). In this study, adults were not told to stop using AISI, but it was expected that after twelve months, they might not use it with the same frequency as post intervention. It is well known that once support or advice ceases, practitioners often gradually revert to their usual practices. This phenomenon has been referred to as *model drift* (Kelly and Campbell-Sadler, 2012).

The follow-up sample consisted of three children and two staff who moved to a different class group (i.e. from nursery to reception) but stayed within the same classroom. The other children and one staff member moved into different classes with different staff and so were not followed up. The three children were Robert, Nathan and Oliver and the two staff were Lorna, the teacher, and Emma, one of the TAs. It should be mentioned here that the researcher also gained a part-time job at the school as a TA and was placed in the same classroom. Although officially the research had ceased, I continued using the AISI principles with the children and discussed AISI with the staff occasionally. So my presence might have served to prevent staff regression to old practices.

The children were video recorded in the same four activities (i.e. sensory room, snack, soft play and 1:1 work) but only for an hour this time (i.e. fifteen minutes per activity, see Table 6 in Chapter Five for more details) as a result of time and staffing restrictions. The same amount of video data were coded for the two staff as pre and post intervention (i.e. ten minutes per activity, see Table 7 in Chapter Five for more details). The teacher filled in once again the QDSCC to get her views on the frequency children initiated communication, their communicative functions and methods as well as the activities which elicited more spontaneous communication. A focus group interview was conducted and all three staff from the main study participated (see Appendix 9, focus group 3 for the interview schedule). The three staff were asked to comment on the extent to which they were still using the AISI principles and Lorna and Emma were also asked about children's progress on spontaneous communication over the last twelve months. All staff were asked about their experience of being part of the study.

Data obtained from the video recordings, the QDSCC and the focus group interview are presented in two sections. The first section discusses the differences in children's spontaneous communication (frequency, activities, functions and methods) and the second reports on the staff's implementation of AISI (frequency, views and examples).

9.2 Data on the children

This section discusses data collected for the three children through video recordings, the QDSCC and the focus group interview. The data are presented in themes addressing the research questions of this study. The total frequency of spontaneous communication

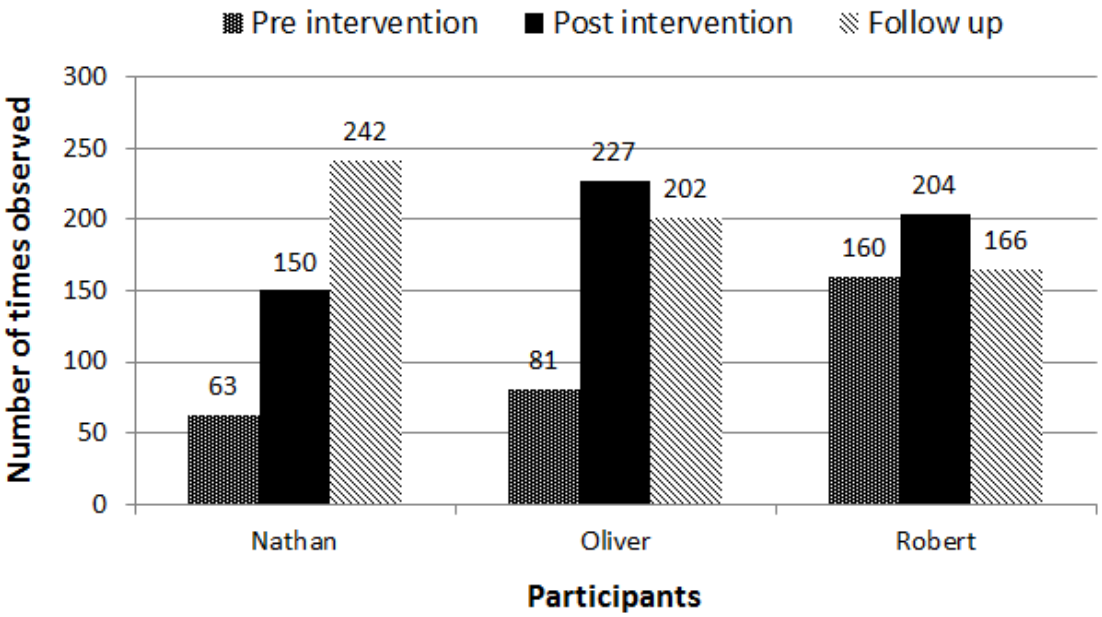
is presented first followed by data on the activity effect and the communicative functions and methods. At follow-up, the length of the video recordings were half that for the pre and post intervention recordings (i.e. one hour instead of two hours). So, the follow-up video data were doubled to allow comparison with the pre and post intervention video data. This is acknowledged as a limitation and it might have had an effect on the findings (i.e. a child, who initiated communication 25 times an hour, may not necessarily initiate 50 times in two hours). However, this was the best way to compare the data with that of the previous research phases given the time related constraints. To address this limitation, the video data were compared to data from the QDSCC and the focus group interview.

9.2.1 Total frequencies

9.2.1.1 Results

Follow-up video data showed that all three children initiated communication to adults more often than pre intervention (see Figure 39). Nathan increased the times he initiated communication almost 4 times since pre intervention. Both Oliver and Robert initiated more than pre intervention but less than post intervention. For Oliver the difference was quite subtle as he initiated at follow-up only 25 times less than post intervention. This is not the case for Robert, who initiated at follow-up only 6 times more than pre intervention and 40 times less than post intervention. Video data showed no initiations to peers.

Figure 39: Total number of times the three children initiated contact with adults pre, post intervention and follow-up across all four activities



With regard to initiations with adults, the QDSCC data reflected the video data for the three children. According to the teacher, Nathan and Oliver had more initiations with adults than Robert which is exactly what the video data showed (see Table 28).

Table 28: Initiations with adults

Children	**Pre intervention**	**Post intervention**	**Follow-up**
Robert	1	2	2
Nathan	1	2	3
Oliver	1	2	3

0=not at all, 1= not often, 2= often, 3=very often

With regard to initiations to peers, QDSCC and video data did not agree. Lorna reported on QDSCC that Nathan and Oliver initiated only a few times to peers and

Robert did so many times (see Table 29). However, none of these were recorded in the videos.

Table 29: Initiations with peers

Children	**Pre intervention**	**Post intervention**	**Follow-up**
Robert	0	1	2
Nathan	1	1	1
Oliver	0	1	1

0= not at all, 1= not often, 2= often, 3= very often

During the focus group interview, the children's frequency of spontaneous communication was further explored. When Lorna and Emma were asked about the child they thought initiated more communication over the past year, they were in between Oliver and Nathan.

Emma*:* *'I think Oliver shows a great improvement this year, isn't he?'*

Lorna*:* *'I actually think Nathan […]. Nathan initiates an awful lot more than he used to. In all situations, he actually takes your hand to either shove you out of the way or help him with something or says 'go go go'. And I actually think he does an awful lot more than he used to'.*

Robert's uneven communication profile was highlighted in the focus group interview. Lorna said:

> *'I think Robert goes up and down. There are some days that he has come with an awful lot. The fact that he picked the picture of a toy he wanted, totally unprompted and found an adult to give it to them to ask for this toy was brilliant. But things like that don't happen every day. Some days he is really cued into people and other days he actually gets very irritated by people. I think he is quite self-directed. […] I think he is more self-directed now than he used to be'.*

Emma agreed with this by saying:

> *'There was a time with Robert that you were getting something new from him every time you were working with him. And it doesn't feel so much like that now'.*

Staff were also asked about children's initiations with peers. The focus group data on this topic agree with the QDSCC. Oliver, the child who increased his initiations the most post intervention according to the video data, was reported to initiate communication twice towards his peers at the follow-up focus group. Once in the playground, he pulled a peer towards the roundabout and said '*more'* to ask him to push it and another time during changing clothes for PE, he gave the help symbol to a peer to ask for help with putting on his sweatshirt. However, in both cases the peers did not respond to Oliver's initiation and staff had to step in to facilitate the interaction. The first incidence was described in detail by Lorna:

> *'That morning, Tim was being quite difficult on the roundabout. He kept getting off and pushing the roundabout round really fast and he was quite dangerous because the pedals could hurt if they catch your leg. So we had to stop him doing that. But Oliver [sitting on the roundabout] was obviously getting a buzz out of the fact that Tim was making the roundabout go round faster. But it wasn't just that the roundabout was going round faster, he was very aware that Tim was doing it. And I was watching him and he was looking at Tim as he was doing this and smiling. But then Tim gets off, walks off to the climbing frame and Oliver just started to shout at him. And then, he got off the roundabout and went over to the climbing frame and grabbed Tim's hand and tried to drag him back to the roundabout. But Tim ran off. And Oliver just stood there shouting at him and looking at him. Tim was oblivious really to Oliver. So I got Tim off the climbing frame and I told him 'Tim look, Oliver wants you to ride the roundabout' and put Tim on the roundabout and then they both went round and Oliver was back on and he was happy'.*

Staff were highly delighted that at follow-up Oliver made more contact with his peers. Lorna made the following comment:

> *'And it wasn't an adult he was asking, it was Tim! Normally, he comes and gets one of us. So it wasn't just that he wanted the roundabout to go round because he would have come and get one of us to get the roundabout to go round. He wanted Tim to do it because Tim was giving him a buzz'.*

The focus group interview also showed that Robert increased his initiations with peers. However, most of his initiations were lashing out at them. Lorna said:

> *'Now in the circle Robert has an adult sitting next to him to stop him hurting other children and we didn't use to have to do that. The incidence of him hurting other children has probably increased'.*

9.2.1.2 Discussion

Overall, the increase in children's spontaneous communication was maintained twelve months later, at least for two of the three children (i.e. Nathan and Oliver). Robert's uneven communication profile (i.e. great variations from one day to the other) is possibly the reason for his limited increase and maintenance of spontaneous communication. Interestingly, video data showed no initiations to peers. The reason for this might be that an hour of video recordings was not enough to capture initiations to peers, given the very limited number that such interactions were recorded in the previous research phases. When the three children were video recorded for two hours, they initiated communication to peers 7 times, post intervention (Nathan: twice, Oliver: twice and Robert: three times) and twice, pre intervention (both by Oliver).

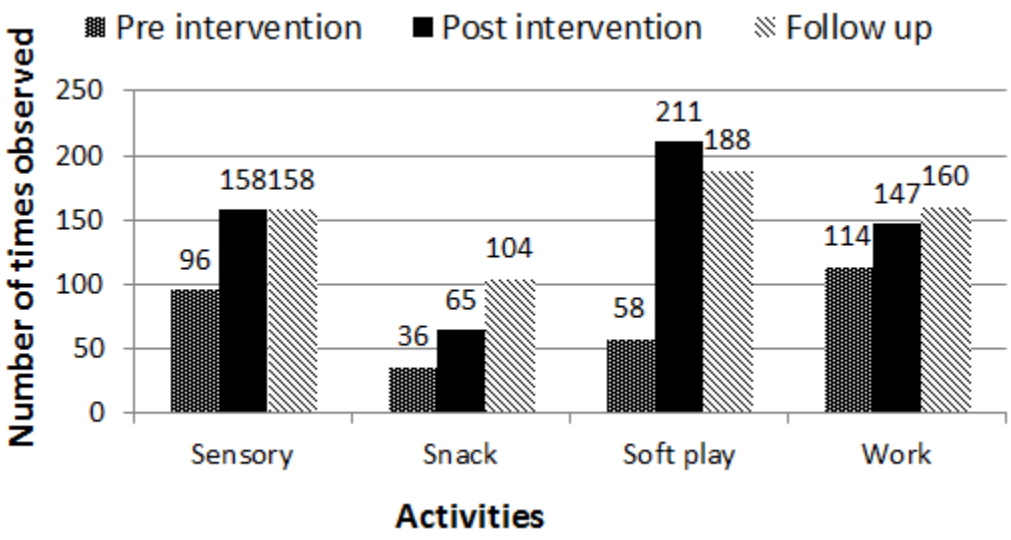
The findings from the follow-up study suggest that when adults change their interactive style children maintain these changes. However, to the researcher's knowledge, the extent to which changes in adult style may have long term effects on children's spontaneous communication has not been researched. In this study, sample and maturation effects cannot be excluded and more research is needed to explore whether the changes were specific to the children in the sample or a result of them growing older.

9.2.2 Activity effect

9.2.2.1 Results

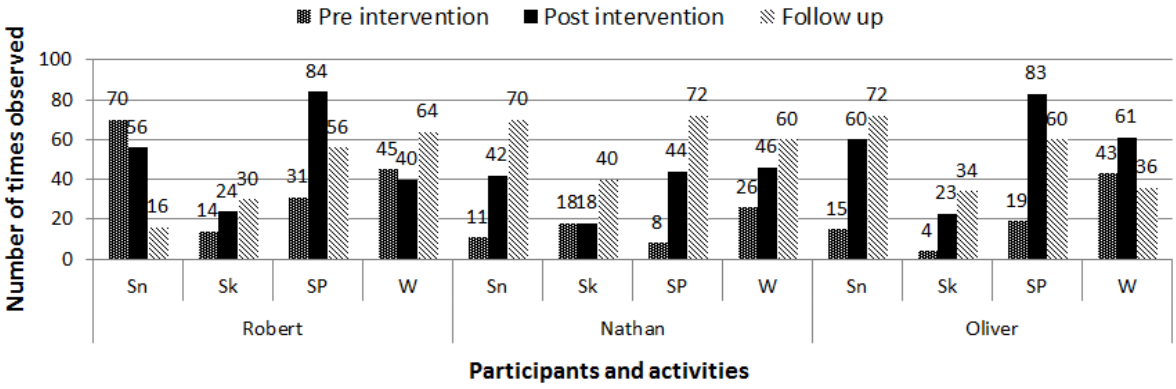
The video data showed that soft play was the activity where the most initiations took place at follow-up (see Figure 40). This reflects the post intervention video data when total initiations were considered. Initiations in the other three activities were either more often or at the same frequency as post intervention.

Figure 40: Number of times the three children initiated with adults pre, post intervention and follow-up in each of the four activities



When the initiations of each child across activities were compared (see Figure 41), video data showed two patterns. The three children mainly increased their initiations at follow-up or their initiations were fewer than post intervention, but more than pre intervention. Nathan increased his initiations in all four activities at follow-up. Oliver increased his initiations in sensory and snack time while Robert did so in snack and 1:1 work time.

Figure 41: Number of times each of the three children initiated contact with adults pre, post intervention and follow-up in each of the four activities



*Sn= sensory room, Sk= snack time, SP= soft play and W= 1:1 work

With regard to the activity effect, the data from the QDSCC were very much in agreement with the video data (see Table 30). The teacher reported that Robert increased his initiations most in snack time and during choosing activities. Offering choices was one of the main principles used in work time. Nathan's increase in all four activities and Oliver's increase in sensory and snack time were also reported on the QDSCC.

Table 30: Activities likely to elicit spontaneous communication according to the QDSCC

Children	Activities
Robert	Snack time, choose toys/activities, structured routines
Nathan	Snack time, soft play, sensory room, familiar routines
Oliver	Snack time, soft play, sensory room, choosing activities/toys

During the focus group, the two staff were asked about the activity where they thought children initiated communication the most at follow-up. This seemed a difficult question to answer as staff were not sure about it. The following extract is indicative:

Researcher: *'In which one of the four activities, you think, initiations increased the most'?*
Emma: *'I think in soft play'.*
Lorna: *'Mmm, I am not sure. I would say probably in sensory'.*
Emma: *'Work. I've changed my mind, work'.*

9.2.2.2 Discussion

Overall, video data showed that all children initiated at follow-up either more often or with the same frequency as post intervention across the four activities. Staff could see an increase in children's spontaneous communication but they could not say with certainty which activity elicited more spontaneous communication at follow-up. This suggests that more than one activity elicited a lot of spontaneous communication and AISI is not activity-specific.

Follow-up data agreed with post intervention data and previous studies in the field. Several studies found that spontaneous communication is more likely to occur during

structured times (O'Reilly et al., 2005, Chiang, 2008b; Chiang, 2009) and others showed the exact opposite (Potter and Whitaker, 2001; Chiang and Carter, 2008). Therefore, other factors such as adult style or the child's fondness for specific activities (e.g. the fonder they are, the more they initiate) may account for their initiations and not the activities per se. An issue which is worth further research is the extent to which the activity structure affects children's communication. Studies have to describe in detail the activities involved to draw comparable conclusions. For example, snack time can range from a completely unstructured to a highly structured activity in different school settings and this might affect children's communication. This has not been done in most of the studies conducted so far (O'Reilly et al., 2005; Chiang, 2008b; Chiang, 2009).

9.2.3 Communicative functions

9.2.3.1 Results

The functions which were coded most in the video data are presented here in order of frequency from the most to the least frequently coded. These are supplemented by data from the QDSCC and the focus group interview. The video data showed that requesting, rejecting or protesting, expressing feelings, initiating social games and commenting were the only coded functions at follow-up (see Figure 42). Requesting was the function which was coded the most for the three children. Especially for Oliver and Nathan, requesting was coded even more often than post intervention. Rejecting or protesting was also often observed in the video data. For Nathan and Robert, rejecting or protesting was coded more often than pre or post intervention. Expressing feelings was also observed many times. Nathan expressed more feelings in follow-up than pre and post intervention together. Most of the feelings were positive (e.g. joy, excitement, pleasure, satisfaction from interaction with staff) reflecting the data of the main study.

Initiating social games also appeared a few times at follow-up (see Figure 43). Nathan did so 10 times and Oliver 12 times. Robert did not initiate social games at follow-up. Comment was the least coded function in the videos. Oliver was the only child seen to comment twice.

Figure 42: Total number of the three most frequent communicative functions at follow-up

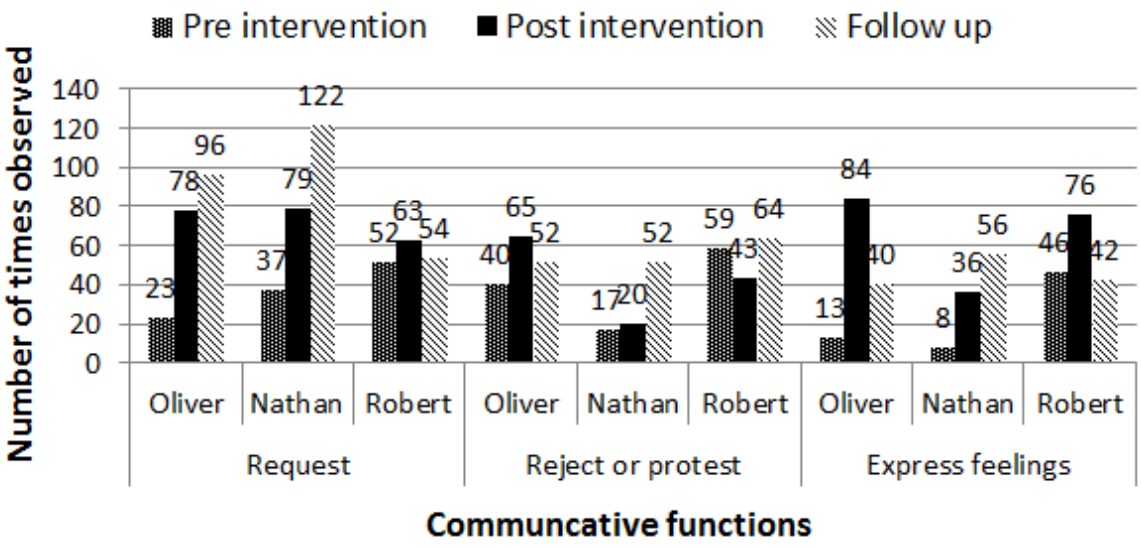
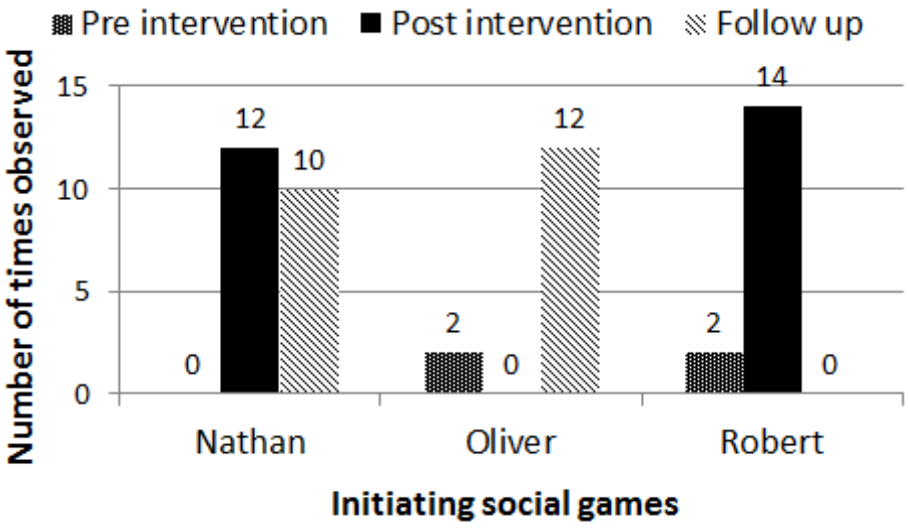


Figure 43: Number of times each of the three children initiated social games pre, post intervention and follow-up



QDSCC and video data agree on behaviour regulation (request and reject or protest) and joint attention functions (comment or give information) but not on social interaction functions (express feelings, initiating social routines). The teacher reported on the QDSCC that the three children initiated more requests and rejects or protests at follow-up than in the other research phases (see Table 31). This is more or less what the video data showed as well. The teacher rated the three children as 0 in both joint attention skills (i.e. comment and seek information) which agrees with the video data.

Table 31: Behaviour regulation functions pre, post intervention and follow-up for the three children as reported by the teacher on the QSDCC

Child	Function	Pre intervention	Post intervention	Follow-up
Robert	Request	0	2	3
	Reject	1	0	3
Nathan	Request	2	3	3
	Reject	2	0	3
Oliver	Request	1	2	3
	Reject	1	1	3

0= not at all, 1= not often, 2= often, 3= very often

With regard to the social interaction functions, video and QDSCC data are slightly different. The teacher reported that none of the children expressed feelings (see Table 32) while the video data showed that they were doing so, quite often (on average 23 times per hour). Another social interaction function, where video and QDSCC data disagreed, is that of initiating social routines. None of the children was seen in the videos initiating social routines while the teacher reported that two of them did so. All three children were reported to initiate social games often. Although, these were not coded with high frequency in the videos, Nathan and Oliver were seen to initiate social games.

Table 32: Social interaction functions pre, post intervention and follow-up for the three children as reported by the teacher on the QSDCC

Child	Function	Pre intervention	Post intervention	Follow-up
Robert	Express feelings	0	0	0
	Seek attention	0	2	0
	Seek approval	0	0	0
	Social routines	0	2	1
	Social games	0	3	2
Nathan	Express feelings	0	0	0
	Seek attention	0	1	0
	Seek approval	0	0	0
	Social routines	0	2	0
	Social games	1	3	2
Oliver	Express feelings	0	0	0
	Seek attention	0	0	0
	Seek approval	0	0	0
	Social routines	0	1	2
	Social games	0	1	2

0= not at all, 1= not often, 2= often, 3= very often

Emma's disagreement with Lorna's ratings on the QDSCC (i.e. none of the children share their feelings) came up during the focus group interview:

Emma*:* *'Oliver also asks for a kiss, doesn't he'?*
Lorna: *'I've not heard kiss (the word). I've seen him plant his face on people's cheeks'.*

In the focus group interview, Lorna also recalled a few times when Nathan initiated social routines with her but these were not captured in the videos. She said:

> *'Nathan will greet you when you sit with him or if you haven't seen him. If I haven't been in the classroom and then he sees me walking at the path, quite often, he will come to me and look round at me'.*

9.2.3.2 Discussion

On the whole, follow-up data reflected the data of the main study. This means that the three children initiated more for behaviour regulation, than for social interaction and the least for joint attention. Requesting was the function which was coded the most for the three children. This was also the function coded the most both pre and post intervention in this study and in a number of similar studies (Chiang and Lin, 2008; Chiang, 2009). Rejecting or protesting was also often coded in the video data. Rejecting or protesting was the most frequently seen communicative function alongside requesting in Potter and Whittaker's (2001) and Agius's (2009) study. Both these findings reflect Wetherby's (1986) point that behaviour regulation functions (i.e. requesting and rejecting or protesting) are often the first to be acquired in children with autism. Oliver was the only child coded in the videos to comment twice, further reflecting Wetherby's (1986) point that joint attention functions (i.e. comment and ask for information) are often the latest to emerge in children with autism.

Another important finding was the discrepancies between video, QDSCC and focus group data. The teacher reported on the QDSCC that none of the children expressed feelings while the video data showed that this was not true. This exact data discrepancy appeared post intervention as well. The reasons which may account for this are the same as post intervention. The teacher was likely to be influenced by some past literature suggesting that children with autism have difficulty in understanding and expressing their emotions (Dawson et al., 1990; Ozonoff et al., 1990) and may have a different definition from the researcher on expressing feelings. Literature suggests that autistic children are likely to display unusual emotional expressions (Mesibov et al., 1997; Freeman et al., 2002). For example, Blackburn (2007) argued that she might

have the same reaction both in extreme fear (e.g. dogs) and extreme happiness (e.g. trampoline). This was taken into consideration when defining express feelings in this study (i.e. children share likes or dislikes instead of expressing more complicated feelings such as pride, embarrassment etc). Video and QDSCC data also disagreed on initiating social routines. No child was coded to initiate social routines whereas the teacher reported that two of them did so. Different definitions given to this function by the teacher and the researcher, the likelihood that this function took place outside of the filming activities or that the teacher fell for the Hawthorne effect (i.e. since staff changed their interactive style, this should have an impact on the children) might be reasons which account for this discrepancy. In conclusion, these discrepancies between data could form the basis of future research questions.

9.2.4 Communicative methods

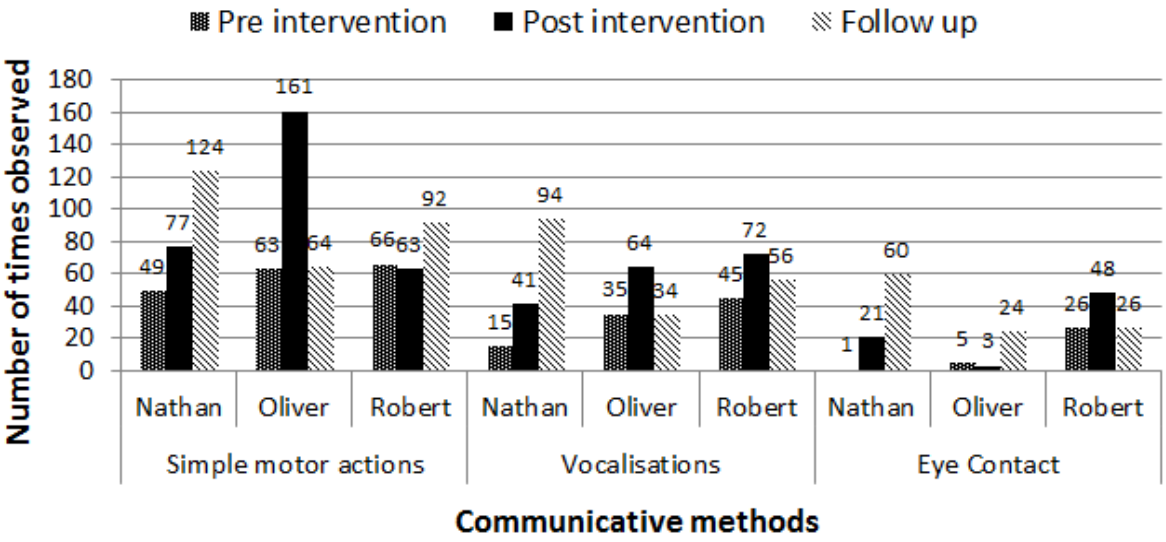
9.2.4.1 Results

The methods coded the most in the video data are presented here in order of frequency from the most to the least frequently coded. Then these data are compared with data from the QDSCC and the focus group interview. According to the video data, simple motor actions, vocalisations, eye contact, smiles and CB were the most commonly coded pre-symbolic methods, and symbols or photos and single words were the most frequently coded symbolic methods.

Video data showed that Nathan and Robert used simple motor actions more at follow-up than at pre or post intervention (see Figure 44). This was not the case for Oliver who used this method as much at follow-up as he did pre intervention. Similar were the findings with regard to vocalisations. Oliver used these as much at follow-up as pre

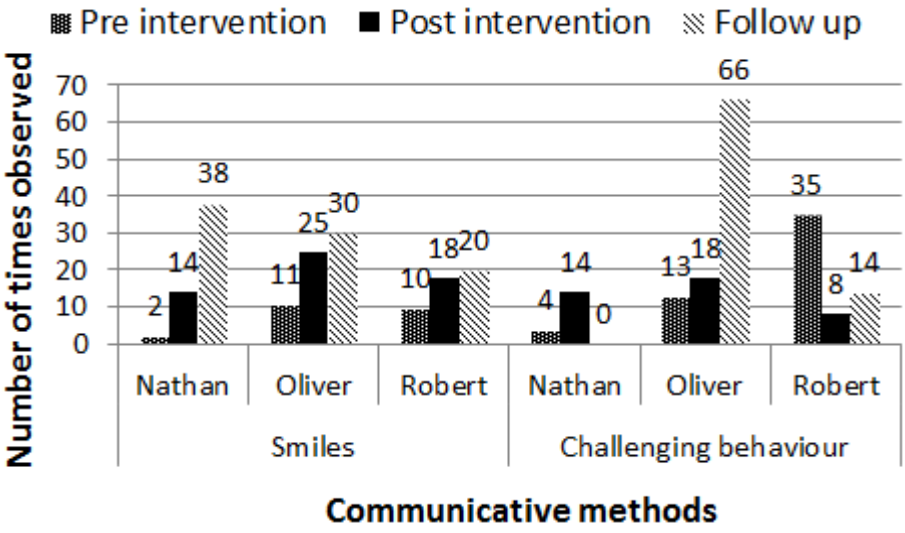
intervention, while Nathan more than doubled the times at follow-up from post intervention. Robert used vocalisations more at follow-up than pre intervention, but less than at post intervention. As far as eye contact is concerned, Nathan and Oliver used it much more at follow-up than at pre and post intervention together. Robert, on the other hand, used his eye contact to initiate communication with the same frequency at follow-up as pre intervention.

Figure 44: Number of times each of the three children used simple motor actions, vocalisations and eye contact pre, post intervention and follow-up



Smiling increased for all three children according to the video data (see Figure 45). Oliver also greatly increased the times he used CB to initiate communication while Robert used CB less frequently than at pre intervention but a little more frequently than post intervention. Nathan was not coded to use CB at follow-up.

Figure 45: Number of times each of the three children used smiles and challenging behaviour pre, post intervention and follow-up



The QDSCC data reflected some of the video findings. According to the QDSCC, all three children used pre symbolic methods at follow-up either often or very often (see Table 33). QDSCC and video data agreed that Nathan and Robert increased simple motor actions, Nathan and Oliver increased eye contact, Oliver increased his CB and Nathan his vocalisations. On the other hand, video and QDSCC data on proximity or touch were discrepant. According to the videos, these greatly decreased post intervention (i.e. the three children used proximity or touch 24 times at follow-up as opposed to 66 times post intervention). However, the teacher reported that Nathan and Oliver increased them at follow-up and Robert used them with the same frequency as post intervention.

Table 33: Pre symbolic communicative methods for the three children pre, post intervention and follow-up as reported by the teacher on the QDSCC

Child	Method	Pre intervention	Post intervention	Follow-up
Robert	CB	0	1	3
	Eye contact	1	2	2
	Proximity/touch	1	2	2
	Simple motor actions	1	2	3
	Vocalisations/babbling	0	2	2
Nathan	CB	2	2	3
	Eye contact	2	2	3
	Proximity/touch	2	2	3
	Simple motor actions	1	2	3
	Vocalisations/babbling	0	2	3
Oliver	CB	0	1	2
	Eye contact	0	2	3
	Proximity/touch	1	2	3
	Simple motor actions	1	2	3
	Vocalisations/babbling	0	0	3

0= not at all, 1= not often, 2= often, 3= very often

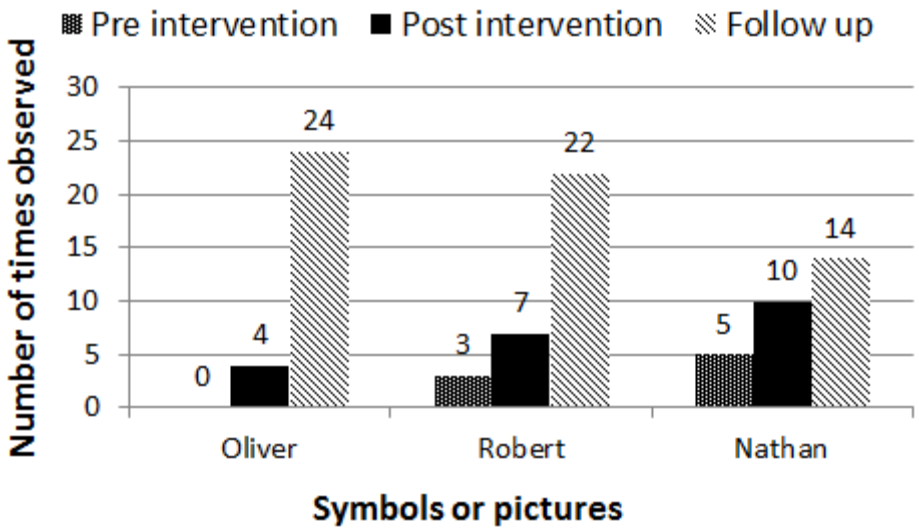
In the focus group interview, staff mainly commented on Oliver's behaviour. The two staff who were at the same class with him were very concerned with a new form of CB (i.e. climbing and jumping off furniture) he developed over the past year and were surprised by the increased amount of eye contact he made with them. Emma was very pleased with his great increase in eye contact. She said:

> *'Oliver…so much eye contact. He recognises you, you come in and he looks at you, comes up to you …'*

Symbols or pictures were the symbolic method coded the most at follow-up (see Figure 46). The three children used it more than at both pre and post intervention. Especially for Oliver and Robert, the increase was great (i.e. Oliver used symbols or pictures 20 times more than post intervention and Robert did so 15 times more than post intervention). The use of single words also increased a lot but this was only down to

Oliver who used single words 40 times at follow-up. It should be mentioned here that Oliver was not coded to use any word pre or post intervention.

Figure 46: Number of times each of the three children used symbols or pictures pre, post intervention and follow-up



The QDSCC data showed that children at follow-up either increased the times they used the different symbolic methods or used them with the same frequency as post intervention (see Table 34). Robert and Oliver were reported to use all the symbolic methods and Nathan was reported not to use only echolalia and 1-2 words.

Table 34: Symbolic communicative methods for the three children pre, post intervention and follow-up as reported by the teacher on the QDSCC

Child	Method	Pre intervention	Post intervention	Follow-up
Robert	Objects of reference	0	0	1
	Symbols/pictures	0	2	2
	Echolalia	0	1	1
	1-2 words	0	0	1
Nathan	Objects of reference	0	1	1
	Symbols/pictures	1	3	3
	Echolalia	0	0	0
	1-2 words	0	0	0
Oliver	Objects of reference	0	0	1
	Symbols/pictures	0	2	3
	Echolalia	0	0	2
	1-2 words	0	0	2

0= not at all, 1= not often, 2= often, 3= very often

The focus group interview generated a very interesting discussion regarding the way Oliver started using words and extended this learnt skill in different contexts. Lorna said:

> *'I think we see a lot of improvements generally in the children in using spoken words. I mean Oliver is now saying 'orange' and 'banana' when he wants an orange or a banana. He did it in the snack but he also did it in the circle this morning. He picked up an orange and I said 'what's that?' and he went 'orange'. How brilliant is that? He says 'orange', 'banana', 'finish' and 'postman pat'. What else do you need? And 'more'. He will ask for more. He constantly asks for more. Every time you stop something he goes 'more''.*

Emma gave her explanation as to why this happened:

> *'I think with Oliver we've given him some tools to communicate. He now knows that instead of just shouting at you he can do something to get what he wants, giving in pictures or trying to say the words'.*

Lorna underlined the importance of using favourite objects or activities to make children communicate. However, she argued that some autistic children do not really

have favourite objects and to make them initiate communication might be more challenging. She explained the difference between Oliver and Robert:

> *'I think Oliver got stuff he really wants while Robert is more than 'oh, ok' and just wanders off. So maybe we need to look Robert in terms of finding out what he really wants and develop opportunities like that. I mean the breakthrough with the more thing came because Oliver really wanted the fan on in the sensory room. And if you've got something they really want you are gonna get somewhere with communication. If you have somebody who is fairly easy going, who actually would be happy with a whole variety of stuff […], if the child doesn't really want anything, there is no need to communicate. They will just go with the flow, won't they? Robert quite a lot of times can amuse himself with a tiny piece of fluff on the floor. So if he's happy with the fluff on the floor why would he want to ask for something else?'*

9.2.4.2 Discussion

Follow-up data showed that children continued to use the same methods to initiate communication as pre and post intervention. The frequency with which they used these methods was, in most cases, either the same as post intervention or increased. Discrepancies between data from different sources were an interesting finding. Differences in definitions between the researcher and the staff and the limited amount of video data coded may account for these discrepancies. Especially for the symbolic communicative methods, it would be risky to compare the QDSCC data with the video data mainly because of the limited amount of the video coded at follow-up and the infrequency with which the symbolic methods were used by the three children.

A finding which is worth further discussion is the fact that Oliver decreased the times he used simple motor actions and vocalisations. This can perhaps be explained by his increase in the use of symbols and single words. Staff's discussions in the focus group

brought up a significant point. This is the importance of using activities and objects which motivate the child and turn them into turn-taking games. Gaining access to a favourite activity (i.e. fan in the sensory room) was the reason which made Oliver say his first word (i.e. more). This finding adds to the existing literature that adults should build on the special interests of the autistic children (Clements and Zarkowska, 2000; Clements, 2005) and confronts EIBI points that special interests should be replaced with more 'appropriate' behaviours (James and Fletcher, 2011). For children who did not have favourite objects and were happy with a range of objects and activities AISI suggested starting from what the child was engaged with. In the case of a child playing happily by themselves and a piece of fluff, staff were encouraged to playfully make the fluff inaccessible or set up a routine with it and then stop part-way to elicit the child's request for more. More examples on how AISI was used at follow-up are presented in the next section.

9.3 Data on staff

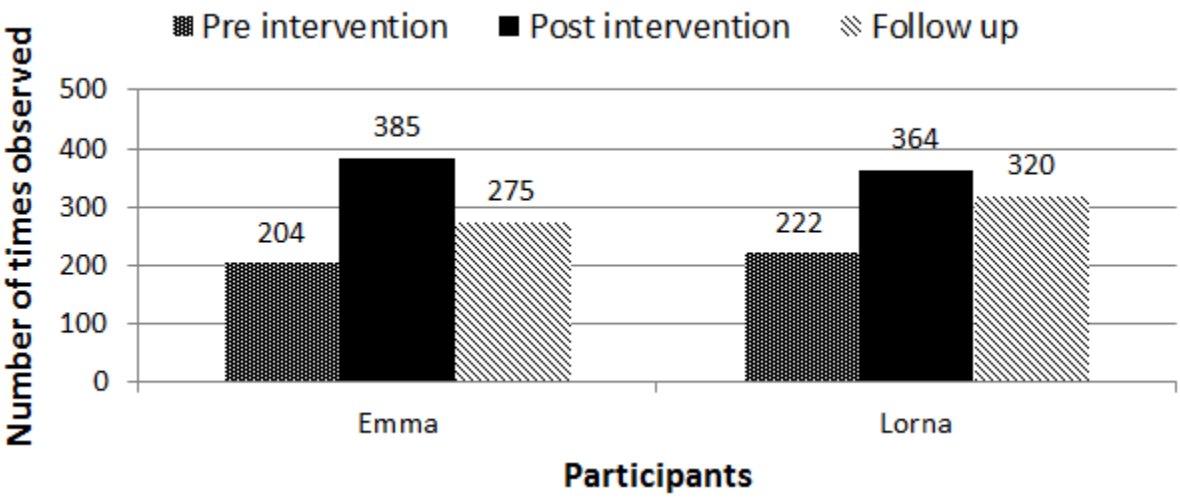
Data on adult style are presented in two sub-sections. The first describes the use of the whole AISI and the second explores in more detail the specific AISI principles, which were still in use at follow-up. Video data for the two staff are supported with data from the focus group interview where the three staff participated.

9.3.1 Use of AISI as a whole

9.3.1.1 Results

Video data showed that both Lorna and Emma used the AISI principles more at follow-up than at pre intervention, but less than at post intervention (see Figure 47).

Figure 47: Total number of times the two staff used AISI principles as a whole pre, post intervention and follow-up



In the focus group interview, staff were first asked to write on plain paper the AISI principles they remembered from memory without any verbal or visual prompt. The three of them remembered using minimal speech, non-verbal cues and offering choices. Emma and Lorna remembered another eight principles as well (see Table 35). Staff were then given a checklist with all the principles to tick the frequency with which they were using each one. The options were ‘very often’, ‘quite often’, ‘not often’ and ‘not at all’. Table 36 presents the principles the three staff reported as using quite often or often. Staff ticked as using often all the general principles (thirteen) and four of the eight communicative opportunities.

Table 35: AISI principles staff remembered from memory, without being prompted

The three staff
1.Minimal speech
2. Non-verbal cues
3. Give choices
The two staff (Emma and Lorna)
1.Show availability
2. Waiting
3. Imitation
4. Give time to process
5.Imitation
6. Give choices
7.Stop-part way
8.Small portions

Table 36: AISI principles staff used often according to the frequency checklist

General Principles
1.Gain attention
2.Establish appropriate proximity
3.Show availability
4.Wait for initiations
5.Responds to communicative attempts
6.Assign meaning to random actions or sounds
7.Follow children's focus of attention
8.Imitation
9.Use exaggerated pitch, facial expression, gestures and body language
10.Use minimal speech
11.Provide time
12.Expand on communicative attempts
13.Use non-verbal cues
Communicative opportunities
13.Offer choices
15.Stop part way
16.Give small portions
17.Make items inaccessible

The focus group interview data reflected the video data with regard to the extent staff used AISI. Staff reported in the focus group that they were not using AISI as often at follow-up, as at post intervention. The main reason they mentioned was the arrival of new staff in the classroom, who were not introduced to AISI and new children. Additionally, they referred to some difficult behaviours developed by the children, which needed increased staff-pupil ratio to ensure the safety of both. Oliver, for example, was climbing on furniture and throwing himself off from high points while Nathan enjoyed throwing objects over the fence when playing outside or off the table when in the classroom. It was such an intense interest for Nathan that he would refuse to do anything else if such a routine was established. As a result, staff concluded that there was not enough time and support to work on AISI as much as they wanted. Lorna commented on this:

> *'The need to keep people safe overrides all other things. I think this year has been quite frustrating in that respect. We haven't been able to do some stuff just because of trying to organise things in order to keep people safe and keep some children on task. And because they've soaked a lot of energy and time of adults, it does have an effect on other children in the group definitely'.*

9.3.1.2 Discussion

Twelve months after the end of the main study, staff were still using AISI to a certain extent. The video data showed a certain *model drift* effect (Kelly and Campbell-Sadler, 2012) but this was expected given that at follow-up staff knew the principles but they did not have the constant support of the researcher (e.g. self-evaluation checklists, focus group interviews). Although the researcher stayed in the specific classroom as a part-time TA and continued working on the AISI principles with the children, the

interactions with the staff about further implementation of AISI were very limited due to time constraints. The focus group brought up staff's desire to have used AISI more and gave some explanations as to why this did not happen. The arrival of new staff and children and the change of the dynamics in the class as well as the lack of the researcher's support were most probably the main reasons for this small regression. Interestingly, the two staff who worked in the same classroom remembered much more principles from memory possibly because they were using AISI more.

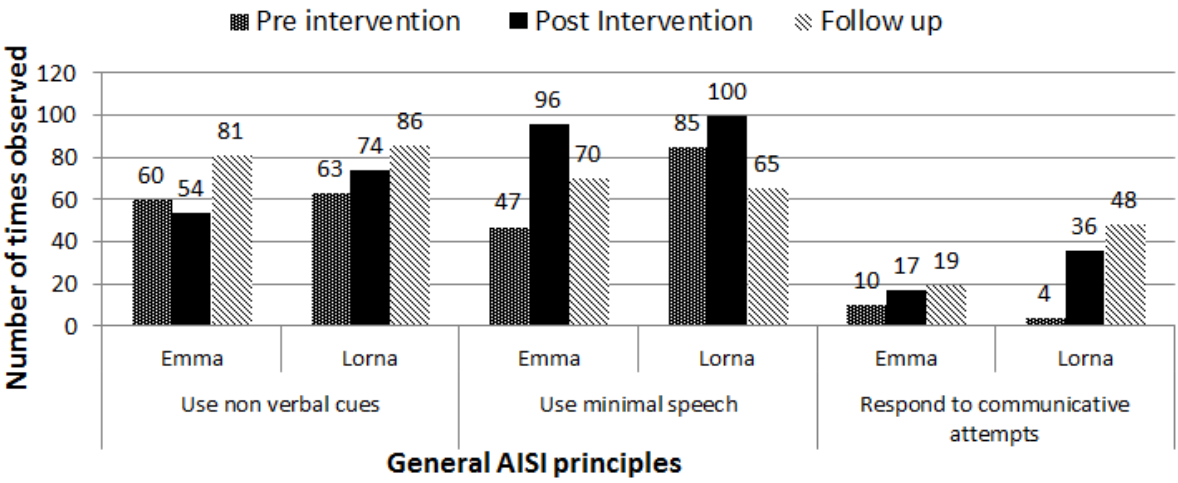
9.3.2 Use of each AISI principle

9.3.2.1 Results

The AISI principles, which were used the most by the two staff from the video data, are presented here in order of frequency from higher to lower. These findings are supplemented by data from the focus group interview to further explore their effectiveness and use. Video data showed that the general principles coded the most at follow-up were using non-verbal cues and minimal speech, responding to the child's communicative attempts, waiting for initiations, establishing appropriate proximity or touch and gaining the child's attention. The communicative opportunities which were coded the most were stopping part-way and offering choices.

Both staff used non-verbal cues and responded to the children's communicative attempts more often at follow-up than at pre or post intervention (see Figure 48). With regard to minimal speech, Emma used it less at follow-up than post intervention but more than pre intervention while Lorna used it less often at follow-up than both pre and post intervention.

Figure 48: Total number of times the two staff used non-verbal cues, minimal speech and responded to the child's communicative attempts pre, post intervention and follow-up



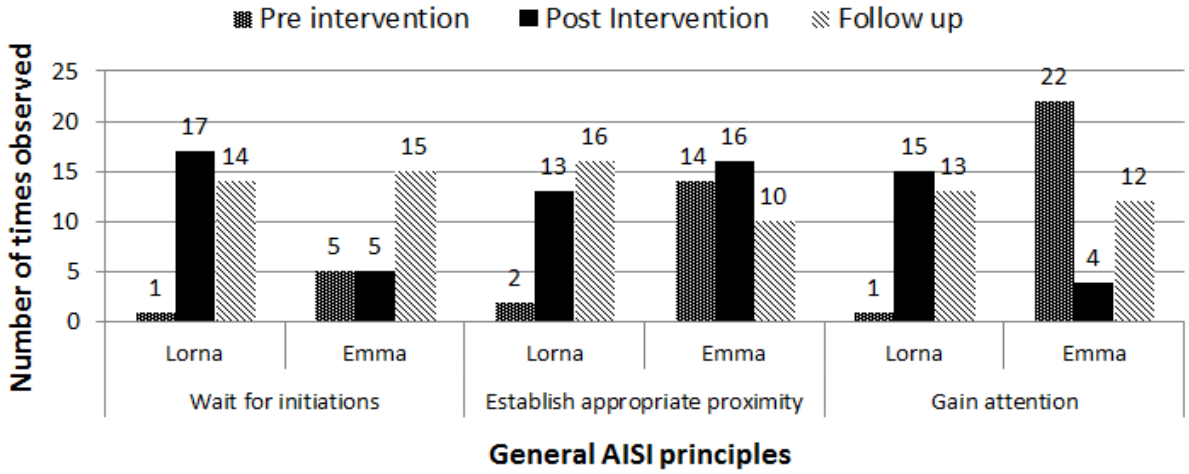
These data agreed with focus group data. When the three staff were asked to name the AISI principles from memory, both the use of non-verbal cues and minimal speech came to the mind of all three of them (see Table 35). When they were later given a list with all the principles to tick those they still used often, the three staff ticked responding to the child's communicative attempts (see Table 36). Emma was very supportive of the effectiveness of this principle. She said:

> *'I think that responding to any communication really worked. I've changed this, a lot […]. When the answer was no sometimes you wouldn't think to respond to it. Yeah I've realised the importance of responding to the communication attempt whether it was a yes or a no'.*

Waiting for initiations was, according to the video data, one of the most frequently used principles. Emma used it much more at follow-up than at pre or post intervention and Lorna almost the same number of times as post intervention (see Figure 49).

Establishing appropriate proximity and gaining the child's attention was used by Lorna a similar number of times at follow-up as at post intervention. Emma used both these principles fewer times at follow-up than at pre intervention.

Figure 49: Total number of times the two staff waited for initiations, established proximity and gained the child's attention pre, post intervention and follow-up



Waiting for initiations was mentioned by Lorna and Emma when asked to name the principles they still used (see Table 35). The three staff rated establishing appropriate proximity and gaining the child's attention as an often used principle (see Table 36). Amber described how she changed her attitude towards waiting after she was introduced to AISI. She said:

> *'I suddenly realised that I was doing things for the children because I was thinking 'oh they need that or they want this'. So I was just jumping in before I gave them a chance to actually express themselves. After you prompted me, I realised that I am leading this child around instead of letting him communicate and I am giving him what I think he wants…'*

Another two general principles staff commented on in the focus group interview were imitation and the use of exaggerated pitch, facial expressions and body language. Emma said about imitation that she felt much more confident using this but, twelve months later, she still had some concerns about using it extensively. She said, '*you realise it's OK to imitate the children sometimes'*. Lorna, on the other hand, continued to be concerned about using animation. She said:

> *'I am still not good with exaggerated pitch, facial expressions and things like that because I think that if you are not careful you jump into children's entertainer mode'.*

It is interesting to mention here that these two staff had concerns about these two principles post intervention too. However, they were still using them at follow-up.

Following the child's focus of attention is a principle which was not widely coded in the videos in any of the research phases. At follow-up, Lorna proposed further use of it in the Physical Education (PE). She said:

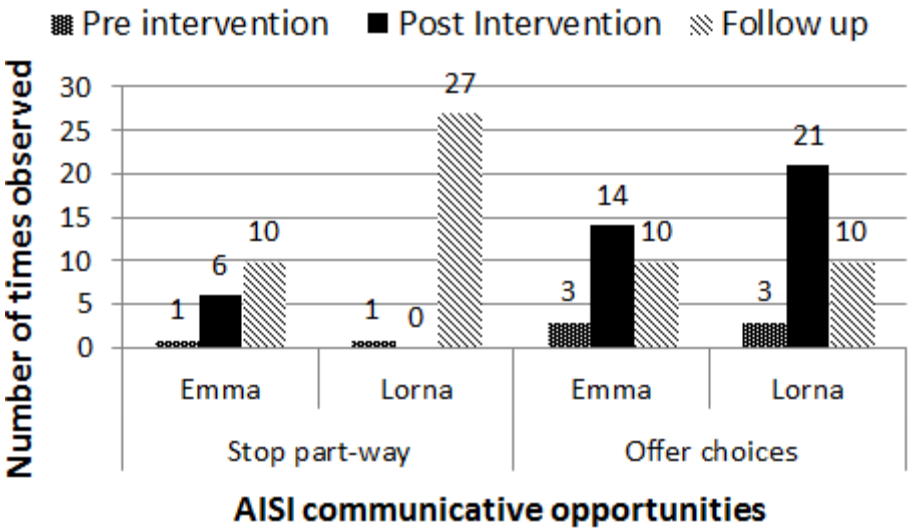
> *'There is more to be done on PE. To look how we can make comments on what they are doing […]. There's so much more communication and language work that we can do in PE in a really practical sense'.*

She also commented on the effectiveness of this principle with Robert. She said:

> *'I think Robert copies a lot of what he sees and hears and if people join in with what he wants to do at the time, he is very happy to do that. Despite the fact that his tolerance of people, both adults and children, is reduced, I think he likes doing this'.*

According to the video data, stopping part-way was used by both staff at follow-up, more than pre and post intervention together (see Figure 50). Offering choices was used by both at follow-up more than pre intervention but less than post intervention.

Figure 50: Total number of times the two staff stopped part-way and offered choices pre, post intervention and follow-up



In the focus group interview, staff claimed that they thought they offered choices more often than they stopped part-way through an activity. The explanation Emma gave for this was that giving choices '*cuts across everything throughout the day while other principles such as stopping part-way might be more activity specific'*. Lorna gave some examples on how staff extended offering choices in a number of activities:

> *'We are giving choices now as part of directed activities. So they can choose what piece of work they do. We weren't really doing that before. So it's a directed activity but they are choosing within the directed activity. They choose during the art activity in the afternoon which picture they do or which colours they do. They got a limited things that they could do after art in the afternoon but we give them choice; they could stay in or they could go outside (e.g. put different pictures on the red choice board and the children choose what they want to do). Before we would probably say 'it's*

> *time for them to go outside'. We actually now say he doesn't want to go outside, he wants to stay in, that's fine he can stay in. So we've probably increased the opportunities for them to make choices by giving them choice within a kind of narrow framework of direction. So it's not that we give them more opportunities to choose toys, or to choose their activities. It's choosing stuff within a structured thing that they were going to do anyway'.*

Emma added an example of how they used offering choices in the PE. She said:

> *'We get them to choose what to do on the benches. 'Do they want to walk, crawl or push backwards?' You can see they make definite choices'.*

It is interesting to note here some different patterns showed by Amber, the staff who moved to another classroom after the end of the main study. Amber moved to Year 1 mainstream curriculum and she admitted that '*some things are very different this year*'. When asked to write by heart the principles she was still using, she wrote only three (i.e. using minimal speech, giving the children time to process the information and offering choices). When given the checklist to tick the frequency with which she used the AISI principles, she ticked as using often principles that she was barely using the previous year (i.e. giving the children materials they will need help with and non-prefer items to elicit protests or comments).

An interesting point to close this section is a word of caution raised by Lorna on the balance which should be kept between keeping things consistent and introducing change. This is an issue of crucial importance for AISI. When staff implement AISI, they are likely to fall in the trap of repeating the exact same routine when they come up with something which works. However, there are children as Nathan who get very rigid with routines and do not easily accept change. For example, Lorna explained:

> *'As soon as you build a pattern out of something Nathan is interested in and you repeat it about 3 or 4 times he thinks 'oh I've got this'. The first few times he will get really annoyed with you and then once you fill in some elements of something he is interested in (something falling, moving, swinging) he is 'oh I've got this' and then he will get your hand to do it again and again and he starts to smile'.*

However, she mentioned that:

> *'It's important to keep changing things. You have to get balance between keeping things the same so he can learn it and keep changing it so that he accepts the changes'.*

For Lorna, the staff should be very attentive not to overdo it with change:

> *'You don't want to make things so different so there is no structure. So you have to keep your structure, your predictability and your routine but you've got to get variation in it as well'.*

9.3.2.2 Discussion

To sum up, staff still used a number of AISI general principles and communicative opportunities at follow-up. They also acknowledged that they would like to use AISI more extensively but the new dynamics of the classroom did not permit that. Even Amber who moved to another classroom remembered by memory some of the principles and she mentioned that she was using principles that she had not used the year before (e.g. giving the children materials they will need help with and non-preferred items). The reason for this is that she had to work with more cognitively able children and these principles were effective with them. This reinforces Lorna's argument that some of the principles put a barrier to communication that children have to overcome and they should be used with children with some communication skills.

An interesting finding coming from the video data was that the two staff used less minimal speech at follow-up than at post intervention. The fact that all three children who participated in the follow-up were non-verbal might be a reason as to why both staff used minimal speech less often.

It is interesting to mention here that Emma still had concerns about imitating the children and Lorna about using animated voice and exaggerated body language. These two staff had concerns about the same two principles post intervention as well. However, they were still using them at follow-up. This may suggest that the principles each staff decides to use depend not only on their views of the effectiveness of each principle but also on their personality. A less confident staff member may not use imitation a lot and a shy staff member may not use animation in their pitch and body language. This should be borne in mind when training staff on AISI. Asking them to use principles they do not feel confident with might work against the effectiveness of the intervention and should be avoided when first introduced, but ways of increasing staff confidence in their use need to be found. The fact that some principles can have a wider implementation was also raised by the staff. They argued that some principles could be implemented in more activities than others and, as a result, be used more often without this meaning that the other principles were not equally if not more effective.

Keeping the balance between predictability and variation is an issue of crucial importance for AISI. Accepting change is a common difficulty among people with autism (Jordan, 1999; Bogdashina, 2005) and it should be handled with caution. AISI should be used to enhance children's spontaneous communication in natural ways. Developing inflexible routines in which the child will increase the times they request

for more does not increase the likelihood of them using this skill in other activities or with other communicative partners. On the contrary, the child is more likely to get upset when working with adults who are not familiar with the specific routine. For example, adults were encouraged to drop different words of the child's favourite song (i.e. AISI principle: stop part-way) or put on high shelves different toys (i.e. AISI principle: make items inaccessible).

9.4 Summary

The follow-up data reflected to a great extent the post intervention data for both children and staff. At follow-up, the video data showed that all three children initiated more than at pre intervention and the two staff used the AISI principles more often than at pre intervention. With regard to the activity effect, the data were similar to that of the main study. Children initiated more in soft play but not all children initiated the most in there. This adds to previous literature that there is no conclusive evidence on the link between activity effect and children's spontaneous communication. Requesting and expressing feelings continued to be the functions which were coded the most, at follow-up. Rejecting or protesting were also coded a lot. Simple motor actions and vocalisations were the communicative methods which were coded the most repeating the post intervention data. With regard to the AISI principles, video data showed that the use of non-verbal cues and minimal speech continued to be coded the most. Additionally staff increased the times they waited, responded to the child's communicative attempts, offered choices and stopped part-way through the child's favourite activity.

After presenting the findings for each research question and exploring their effects twelve months after the end of the main study, the final chapter summarises the findings into a coherent whole. Chapter Ten also discusses the limitations of this study and gives the implications for future practice and further research.

CHAPTER TEN

CONCLUSIONS AND IMPLICATIONS

10.1 Introduction

This chapter pulls together all the key findings to give a summary of the whole thesis. It also considers what this study contributes to the field. It reviews the limitations and proposes ideas for further research and future practice. Ways in which the work undertaken and the findings of this study have been disseminated are also presented.

10.2 Development of the summary

The order in which the findings are presented follows the order of the research questions. So, the first four parts of this section discuss the main findings on the children's spontaneous communication (i.e. frequency, activity effect, communicative functions and methods) while the last part summarises the key findings with regard to the implementation of AISI.

10.2.1 Frequency of spontaneous communication

According to the video data, all children considerably increased the frequency of their spontaneous communication, post intervention. Total number of initiations for the six children almost doubled post intervention (from 631 initiations pre intervention to 1097 initiations post intervention). The effect size (Cohen's d) was 1.6 exceeding the 0.8 cut off for large effect size and suggesting clinical significance. The findings from the video data were reflected in the focus group interviews with the staff and the questionnaire the teacher completed (QDSCC).

The finding that when adults change their interactive style, children with autism increase their spontaneous communication concurs with findings of previous studies (Ingersoll et al., 2005; Ruble et al., 2008; McAteer and Wilkinson, 2009) which had a similar research design (e.g. naturalistic settings, pre and post intervention conditions). The number of initiations found in the present study was higher than in some studies (Stone and Caro-Martinez, 1990; Chiang, 2009) and lower than in others (Clifford et al., 2010). The use of different definitions for spontaneity (e.g. conservative versus liberal definitions), different methods of data collection (e.g. video recordings versus observations), the age and the abilities of the children in each study may account for these discrepancies.

The video data showed that all children increased their initiations with adults. In contrast, the number of times the children initiated contact with their peers was much lower both pre and post intervention, with no peer initiation coded at follow-up. This limited amount of peer to peer interaction reflects previous studies (Hauck et al., 1995; Potter and Whittaker, 2001; Chiang and Lin, 2008). However, the design of the present study (e.g. focus on adult style with adults working with children 1:1 or in small groups) did not permit safe conclusions to be drawn about peer to peer interaction. Additionally, an autism specialist school might not be the ideal setting to research the frequency with which children initiate contact with peers as most children there struggle with social communication and interaction. This reflects Chiang and Lin's (2008) finding that children with autism who initiated the most contact with peers were in mainstream schools. However, when staff in the present study were asked about children's initiations with peers (QDSCC and focus group interviews), they mentioned

greater changes than those seen in the video data, further suggesting that a different research design might have yielded higher peer to peer initiations.

Twelve months later, the changes were maintained for two of the three children studied at follow-up. These were the two children who made the most gain post intervention, Nathan and Oliver. This finding was corroborated by all three sources of data (i.e. video recordings, QDSCC and focus group interviews). Staff were not using the AISI principles as often at follow up as they were post intervention, but nevertheless, two of the three children continued to increase their initiations. This suggests that even doing AISI in a partial way is likely to be beneficial.

10.2.2 Effect of type of activity

It is difficult to draw valid conclusions on which activities elicited more spontaneous communication. In terms of group means, snack time and 1:1 work had the largest effect size post intervention, followed by sensory room and soft play. When the total number of initiations was considered the picture was the opposite with most contacts initiated in soft play, followed by 1:1 work, sensory room and snack time. This probably resulted from the fact that the children increased their initiations as a group more in snack time and 1:1 work whilst there were some children who increased a great deal their initiations in soft play. In addition, only five of the six children were video recorded in the sensory room, which resulted in fewer total initiations during this activity.

The QDSCC and the focus group interviews showed that staff thought that sensory room and soft play had the greatest increase in spontaneous communication, post

intervention. Possible reasons for this might be that staff were able to see the great increase in the total number of initiations for some children in the sensory room and soft play, but they were not able to judge which activities elicited more initiations in the group as a whole (snack time and 1:1 work). At follow-up, twelve months later, staff found it hard to answer which activity or activities triggered more initiations. This finding, in addition to the contradictory findings at post intervention, suggests that children's spontaneous communication might not be related to the type of activity but to what happens in the sessions and the way the activities are delivered by the adults. The effect of type of activity on the frequency of contact initiated requires further research.

There is also a lack of clarity on the effect of type of activity reported on other studies. Some studies suggest that highly structured activities elicit more communication (O' Reilly et al., 2005; Chiang, 2009) whilst others claim the opposite (Potter and Whittaker, 2001). An important point is that future studies need to give full details of the way the activities are delivered to produce comparable data for research. Snack time, for example, might be run in a very different way from one school to the other (ranging from a highly structured adult-led to an unstructured child-led activity).

10.2.3 Communicative functions

Communicative functions were classified into three categories with several subcategories in each one. These were behaviour regulation (i.e. requesting and rejecting), joint attention (i.e. commenting and seeking information) and social interaction (i.e. expressing feelings, seeking attention, seeking approval, initiating social routines and social games).

Requesting, initiating social games, seeking attention and expressing feelings were the functions in which the increase was clinically significant post intervention (i.e. Cohen's $d \geq 0.80$). Requesting was observed the most both pre and post intervention. This is in line with previous studies of autistic children with similar characteristics to the present sample (Potter and Whittaker, 2001; Chiang and Lin, 2008; Agius, 2009; Chiang, 2009).

Expressing feelings was observed many times both pre and post intervention. Most of the children's emotions were positive (e.g. happiness, excitement, affection, satisfaction) and these increased post intervention, perhaps because children enjoyed the change in adults' interactive style. This contradicts some literature which argues that children with autism rarely express their feelings (Dawson et al., 1990; Ozonoff et al., 1990) and when they do so, these feelings are mainly negative (e.g. sadness, fear and anxiety) (Capps et al., 1993; Bieberich and Morgan, 1998). Only a few naturalistic studies have included the function of expressing feelings (Stone and Caro-Martinez, 1990; Agius, 2009) and these found that expressing feelings was coded very rarely. This might have happened for two reasons. Firstly, the fact that the observations were not video recorded (e.g. Stone and Caro-Martinez, 1990) could have led to occurrences being missed. Secondly, the activities in which the children were observed might not have been ideal for eliciting expression of feelings (e.g. Agius, 2009, observed her sample during meal times). However, there are other studies which found that expression of feelings is a common communicative function among autistic people. Freeman et al. (2002) filmed thirty-six students with autism (aged from 6 to 24 years) while interacting with a familiar instructor and then their communicative functions

were identified by the instructors. The findings showed that expressing feelings was the most frequent function.

Initiating social games and seeking attention also increased for most of the children post intervention but the total number of times these functions were coded was quite low. Initiating social games belonged to the category of requesting in most previous studies (Chiang and Lin, 2008; Chiang 2009). So initiating social games should be considered together with requesting when comparing the findings of the current study to that of previous studies. The increase in seeking attention, although limited, does not come as a surprise as this was the most commonly coded function in Stone and Caro-Martinez's (1990) study. Joint attention functions (i.e. commenting and seeking information) were coded only a few times in this study and mainly for David, the only verbal child. At follow-up, twelve months later, the video data showed that children were communicating for the same reasons, mainly for behaviour regulation and social interaction. This finding suggests that changing adults' interactive style may increase the frequency of functions children already use, rather than giving rise to new functions.

The QDSCC data did not always agree with the video data. There were two functions observed in the videos that were not reported in the QSDCC. The teacher rated all children in both research phases as not expressing feelings and not showing joint attention. However, the video data showed that all six children expressed feelings and three of them (i.e. David, Molly and Alex) either commented or sought information (joint attention). Possible reasons for this discrepancy might be the different definitions used by the teacher and the researcher and the former's difficulty in having a full

picture of all children's spontaneous communication in a busy classroom environment. Additionally, the teacher might have been influenced by previous studies showing that children with autism tend not to express their feelings (Dawson et al., 1990; Ozonoff et al., 1990) and are likely to experience joint attention difficulties (Baron-Cohen et al., 1992; Charman et al., 1997; Murdock et al., 2007). Extracts from the post intervention and follow-up focus group interviews confirmed to a certain extent this point as staff described occurrences of children expressing feelings or initiating joint attention but they did not define them as such (e.g. the teacher considered Oliver's expressing of affection as '*planting his face on people's cheeks*'). At follow-up, the teacher once again rated all the children as 0 on both expressing feelings and joint attention.

These findings were viewed from the perspective of a number of theories in an effort to explain why some functions appeared more than others. According to Wetherby (1986) and the theory of social communication development, children with autism first develop the behaviour regulation functions, then the social interaction functions and lastly the joint attention functions. In this study, Wetherby's theory was confirmed as post intervention 60% of children's communication was for behaviour regulation, 32% for social interaction and 8% for joint attention.

The social motivation theory as described by Mundy (1995) may also explain why behaviour regulation was more common than the other two functions in this study. He maintains that behaviour regulation results in non-social rewards (e.g. the child gets the toy they want) whereas social interaction and joint attention functions give rise to social behaviours (e.g. eye contact, sharing of affect) which autistic children tend not to be very motivated for. The neuropsychology of social development (Mundy, 1995) is

another theory which attempts to throw light on this topic. According to this, the neurological system which controls behaviour regulation (i.e. a partially independent system of neuroexecutive regulation and endogenous reward) works more effectively than the systems which are responsible for social interaction and joint attention (i.e. the left frontal lobe activity, the neuropeptide system and the mid brain system). However, this research is limited and not recent and future Magnetic Resonance Imaging (MRI) and ElectroEncephaloGraph (EEG) studies may provide new insights into this area.

10.2.4 Communicative methods

Communicative methods were grouped into two broad categories, the pre-symbolic and the symbolic. Video data were presented as group means (Cohen's d) and as total number of initiations to compare the differences between the group and each individual child. Proximity/touch, re-enactments, simple motor actions, smiling and vocalisations were the pre-symbolic methods with a large effect size. Objects of reference and symbols/pictures were the symbolic methods which showed the greatest clinical significance.

When the total number of initiations was considered, simple motor actions increased the most post intervention, followed by vocalisations. These findings are in line with Stone and Caro-Martinez's (1990) and Agius's (2009) studies. It should be noted here that all children, with the exception of David, increased the times they used symbols or pictures post intervention. This is likely to be a direct effect of the change in adults' interactive style. Pre intervention, adults were many more times seen to get the symbols from the child's hand before the latter exchanged them. Post intervention, staff were aware of what the basic elements of communication are (e.g. intent, communicative

partner) as well as what they should do to facilitate communication (e.g. create communicative opportunities, wait for initiations, show availability). As a result, the times the children exchanged the symbols for the objects they wanted doubled. David, the only verbal child, decreased the use of symbols but he increased the use of single words. Robert and Alex also increased their use of single words post intervention. This finding suggests that AISI may promote the development of speech in children with limited speech. However, more research needs to be conducted with verbal children to explore this further.

At follow-up, children continued to use the same communicative methods as post intervention. They considerably increased the use of symbols, eye contact and CB. Although the increase in the use of symbols was probably due to the change in adults' interactive style, the increase in the use of eye contact and CB might be attributed to the fact that children were more aware of the adults' presence.

Fewer discrepancies were found between the video, QDSCC and focus group data than the discrepancies seen in the communicative functions. This was expected as the methods children used to initiate communication could be easily seen or heard (e.g. use of symbols, words, pulling an adult's hand) and coded. On the contrary, in order to decide which function a behaviour serves, the researcher and the staff had to infer intentions, and, as a result, there was not always total agreement. For example, a child crying in response to a favourite toy being removed might be coded by one researcher as expressing feelings and by another as requesting their toy.

The findings with regard to the communicative methods cannot be directly compared to that of other studies in the field. The reason is that most other studies classified communicative methods in broader categories than those used here. Chiang and Lin (2008) and Chiang (2009) classified them into unaided AAC, aided AAC and speech, whereas Stone and Caro-Martinez (1990) grouped them into motoric acts, speech, vocalisations and gestures. Other studies (Potter and Whittaker, 2001) did not provide a list with all the communicative methods which were studied but presented the methods which were most frequently observed. Therefore, there is need for future research to define more specifically the communicative methods studied, even if these were not observed.

10.2.5 Implementation of AISI

Data from all sources (i.e. videos, self-evaluation checklists and focus group interviews) showed that staff changed their interactive style post intervention and maintained these changes to a certain extent, twelve months after the end of the main study. There was only a slight regression to old practices – a phenomenon which has been termed *model drift* (Kelly and Campbell-Sadler, 2012). However, the fact that the intervention was based on existing good practice and that the researcher also worked as a part-time TA in the class concerned prevented further regression. The videos coded for the staff were of limited length (i.e. forty minutes per research phase) and this is why the use of other methods of data collection such as self-evaluation checklists and focus group interviews were of crucial importance with regard to adult style. Video data were presented for the whole AISI and then for each principle separately to show why some principles were used more than others. For each AISI principle, video data

gave the clinical significance (Cohen's d) and the total number of times this was used in each research phase.

All three staff had a high starting point pre intervention regarding the use of AISI as the researcher developed the intervention based on their existing good practice following the VIG (Kennedy, 2011). The fact that I used their own videos to show them the AISI principles was a very positive and empowering experience. Lorna said about it:

> *'It's good to see stuff like this (clips of good practice). Because sometimes you get so wrapped up in the difficult behaviours that you lose track of the good things that happen'.*

An important point to mention here is the power of AISI as a product created by the researcher with the collaboration of staff. Probably AISI would not have been so widely used if it was developed by the researcher in the university setting and then imposed on the staff. Due to the staff's great contribution in its development, there was a feeling of shared ownership (Reed, 2005) and a sense of equality in the research relationship (Hall and Hall, 1996). Staff also felt that they benefitted from the team work this study involved (Koshy, 2005) and they developed professionally from the training and supervision they received (Denscombe, 2010).

When the total number of times staff used AISI was considered, the three staff increased the times they used AISI by at least 100. The clinical significance of the difference between pre and post intervention data was very high (Cohen's d= 6.5) as all three staff increased the times they used AISI post intervention.

AISI consists of twenty-one principles, thirteen general principles and eight communicative opportunities. When effect size was calculated for each principle, fourteen of the twenty-one principles had a large effect size (i.e. ten general principles and four communicative opportunities). Imitation, use of minimal speech, responding to the child's communicative attempts, establishing appropriate proximity, assigning meaning to the child's random actions and sounds, expanding on the child's communicative attempts, providing time for the child to process the given information, using exaggerated pitch, facial expressions and body language, showing availability and waiting for initiations were the general principles which had a large effect size. Offering choices, stopping part-way through an activity, giving small portions of food and drinks and making items inaccessible were the communicative opportunities with large effect size. A possible reason why staff used these principles more than the others was that these were more effective with the specific children (i.e. young, non-verbal or with limited speech and at very early stages of their communication development). The extent to which staff used each of the principles was also probably influenced by other factors such as their personality, professional status, years of experience and self-confidence. For example, Lorna, the teacher, felt embarrassed to use exaggerated pitch, body language and facial expression possibly because this was going against the serious profile she had to keep as the leader of the classroom. Emma, one of the TAs, was reluctant to use imitation although she considered this very effective. The reason for this might be that she was less self-confident than the teacher and with fewer years of experience.

Using minimal speech and offering choices were reported in all methods of data collection as being widely used. These two principles were already core elements of

staff's practice but they acknowledged that AISI reminded them of their importance and gave them ideas for further practice. Additionally, staff thought that participating in the development of AISI made them more aware of their practice. Indicative is the example of Amber, who after being introduced to AISI, realised how much she was anticipating children's desires and how much language she was using. However, the staff considered some principles quite difficult for the specific children. These principles were contradicting children's expectation, giving them non-preferred items and setting up situations where adults '*forget*' something vital. Although these principles were not very effective with the specific children, staff thought that they would work well with children with more developed communication skills.

Another interesting finding was the difficulties posed by the fact that the study was conducted in a real world setting. Staff mentioned many times the inability to implement several principles due to safety reasons or lack of time. For example, when a child was upset, there were cases where the staff could not keep appropriate proximity and wait to give them the chance to communicate their feelings. They had to intervene physically to ensure the safety of the child and their classmates. Similarly, sometimes they had to rush through snack time which meant that they could not give small portions of food and drink to encourage the children to ask for more or wait for them to communicate their choices.

10.3 Contribution of the study to the field

The study attempted to cover a number of research gaps as highlighted in the literature. There are relatively few studies which focus on adult style and its role in developing communication. Some researchers develop an intervention or ask staff to use an

existing intervention without much consultation with practitioners (Hwang and Hughes, 2000; Ingersoll et al., 2005; McAteer and Wilkinson, 2009). Some others observe or interview participants to see what they do in practice or get their views on what they think they do (Potter and Whittaker, 2001). However, there is often a discrepancy between researchers and practitioners in terms of priorities and the implications for practice arising from research (Zeuli, 1994) and this should be taken into consideration. In the current study, the researcher actively involved staff in the development of the intervention and engaged with them throughout the whole research process. Enabling staff to contribute to this study was a very empowering and positive experience. Lorna, the teacher said in the first focus group:

> *'I thought [the study] strengthened us as a team […] but it also gave us room to look for how we can get better within a supportive environment'.*

And Amber added to this:

> *'I found it very useful. I think it mainly looked at my practice and it did help me to improve'.*

The study also produced ecologically valid data and findings which can be potentially transferred for use with children in other classes or schools.

Establishing good relationships between the researcher and the researched is a real challenge in real world research. The researcher is wholly dependent on the goodwill and cooperation of the staff to gain data and yet is often asking them to do more and placing demands on their time without any obvious gain. The researcher tried to make the experience as positive as possible for the staff and children involved and felt that a

very good working relationship was established. This is reflected in the fact that all the data required was collected over the eighteen month period and the researcher was appointed as a part-time TA within the classroom studied, at the end of the post intervention stage.

Although social communication in children with autism has been extensively researched, there are still some gaps that this study attempted to fill. Chiang and Lin (2008) and Chiang (2009) report on the limited research carried out on the spontaneous communication of autistic children with limited or no speech. Many more studies on communication have been carried out in laboratory or clinical settings and there is a need for more research in real world settings such as schools and homes (Ogletree et al., 2002), as effects found in the former often do not translate into the real world (Kingstone et al., 2003). This study contributed to the understanding of how children's spontaneous communication can be affected when staff change their interactive style. It showed that staff by incorporating a small number of adult style principles in their practice can enable autistic children to communicate twice as much as they did, for a great number of reasons and while using a variety of communicative methods.

10.4 Limitations of the study

There are a number of limitations related to the design of this study. The small sample size makes it impossible to draw conclusions about the general population of children with autism. However, the generalisability of the findings was not the aim of this action research study. The aim was to develop an intervention and explore its effect on the children in the sample and the staff's ability to use it. The nature of the study meant that

I had to use the children in a given class and so they were quite diverse in terms of ability and communicative competence.

The lack of a control or comparison group can be considered a limitation. It would have been useful to have recruited another group of similar children as a 'waiting list control' to receive the intervention and have taken the same measures at pre, post intervention and follow-up. Given the design of the study, the likelihood that some changes seen in the children occurred due to maturation, history or other factors cannot be excluded. RCTs are the ideal research design to establish causality and generalisability (Cohen et al., 2007). In RCTs participants are randomly allocated to either the treatment or the control group. Then it can be said that changes in children's behaviour are due to the intervention and not to other uncontrolled factors. However, an RCT could not happen at this stage as there was no intervention to test. This was an exploratory study to develop through practice an adult style intervention. Since AISI is now developed and it is found to have an effect on children's spontaneous communication, the next step would be to test this in a RCT research design. Another limitation is that due to time restrictions, longitudinal data (beyond the twelve months of the follow-up) could not be collected to measure the longer term effects of the intervention.

10.5 Reflections on the research process

While writing up the thesis and reflecting on the whole research process, I came up with two issues which I would have dealt with differently if I had the chance to repeat this study. The first is the manual coding of the videos and the second the use of the self-evaluation checklist by the staff. Although coding the videos manually appeared to

be the best option at the time of data analysis, only after I worked as a researcher in the ECHOES II project (Guldberg et al., 2010) a year ago, I found out a more accurate and robust way of doing video coding. In the project, the video coding was conducted on ELAN. ELAN (2012) is a free audio and video annotation software. Its documentation is poor and most information on it can be found in forums. The researcher has to download ELAN on their computer and then open it to import the template (i.e. coding scheme) and the video segment they wish to code. Its main advantage over the manual coding is that the researcher can note the starting and ending point of each behaviour, getting information about its duration. Additionally, since the annotations are time aligned with the videos (they appear below the video as it runs), multiple coding is possible which increases the accuracy of the data.

If I had the chance to do the research again another thing that I would probably change, apart from the coding, would be the use of the self-evaluation checklist. This initially was used as a method to check fidelity of implementation for AISI (Jones and Jordan, 2008; O'Donnell, 2008). However, the busy school environment did not allow staff to keep a detailed record of the times they implemented AISI throughout the day. For this reason, the data coming from the self-evaluation checklist was used to corroborate video and focus group data instead of checking fidelity of implementation for AISI. If I did the research again in a school setting, I would probably ask researchers, blind to the purpose of the study, to code some videos to check fidelity. This was done in this study to a certain extent with the videos which were subjected for inter-rater reliability check.

10.6 Implications for further research and practice

10.6.1 Research

There are many ways of conducting further research on the impact of adult interactive style on children's spontaneous communication. Future research could expand on these very promising initial findings by trying to establish causality between these two variables. To achieve this, a RCT should be conducted with a larger sample of participants as What Works Clearinghouse (WWC, 2003b cited in Odom et al., 2005) propose for all effective practices. It would also be very interesting to try AISI with children of an older age and of higher cognitive ability as well as with staff of special and mainstream settings. The effectiveness of AISI with verbal children, its use in a setting where staff are not as trained in autism as in a specialist setting and the nature of the support staff in such a setting need are some of the issues which would be worth further exploration. Training TD peers in AISI might be another idea. Additionally, AISI can be tried with adults or peers beyond the school environment. Parents at home, friends or other members of the community, after school or sports clubs might be some populations to explore.

Apart from trying AISI in different settings, with different people and in different research designs, it might also be interesting to further research several aspects of the study, which were not covered here due to time limitations. Future studies could seek staff's views on the discrepancies seen on data coming from different sources (e.g. videos, questionnaire, focus group interviews), investigate ways to prevent *model drift* or to empower staff to be more confident in using principles they feel shy and embarrassed about (e.g. use of exaggerated pitch and body language, imitation).

If a practitioner or researcher would like to train staff in AISI, I would recommend going through the whole process (i.e. collecting pre intervention data, editing the videos, training the staff using their videos, collecting post intervention data). I would suggest this even if the focus of the research was only on adult style and not on children's communication. The reason for this is that staff's involvement in the development of AISI was the most powerful tool of this study. The study showed that if staff are praised for their good practice they are more likely to actively participate. The use of their own videos taken pre intervention, is another crucial point here. I believe that using videos of other people implementing AISI or a researcher presenting its principles in a power point format would not be as effective as using videos of themselves.

10.6.2 Practice

The study also suggested some ideas for future practice. The need for team work in the class and the use of video cameras are two of the most important conclusions. The study showed that staff are often busy with their everyday work and they forget to share knowledge, concerns and ideas. However, this study reminded them of the importance of running meetings at least once per week to discuss their practice. Principles which work for a member of staff should be known to all staff and difficulties faced by one person should be shared to get support from the others. This should be followed by all schools. At the moment, staff tend to run meetings with regard to children's progress, but not on staff's practice. The use of video cameras to record not only the children and their achievements but also the staff is another idea which schools could take on board. Staff, in this study, were often not aware of their behaviour in the classroom and watching themselves interacting with the children was a very informative experience. A

word of caution here is that these videos should be used for staff development and not for the assessment of staff's competence, as this would increase their stress levels and probably alter their natural style. A final implication for practice is the need for senior staff to involve classroom staff, parents and children themselves, when they are verbal, in developing interventions and educational programmes.

10.7 Dissemination

There are a number of ways this research has been and will continue to be disseminated. A paper summarising the early findings is about to be published in the British Journal of Special Education (Kossyvaki et al., 2012). Aspects of this research have been presented in conferences as papers and posters. Papers have been presented at the following conferences:

- 9th research student conference (Birmingham/UK, 2010),
- 3rd Conference on Autism Spectrum Disorders (Messologi/Greece, 2011),
- 10th research student conference (Birmingham/UK 2011), and
- European Conference on Educational Research (Cadiz/Spain, 2012).

Posters have been presented at the following conferences:

- Communication: the key to success - addressing autism and AS (Ormskirk/UK, 2011), and
- The National Autistic Society Professional Conference (Manchester/UK, 2012).

I also run a few workshops within the School of Education, University of Birmingham, to train other Masters and PhD students in AISI.

Work on another three papers is in progress. These will be sent for review in practitioner and academic peer reviewed journals, after submitting my thesis. One of these papers is an adapted version of Chapter Three, a literature review on the advice each intervention gives for adult interactive style. Another paper is an adapted version of Chapter Eight, the components of AISI with examples and implications from the study. The third paper is about the importance and complexities of doing action research in a specialist school. I also plan to prepare an illustrated book about AISI which would be addressed to parents, teachers and other people living and working with autistic children. Last but not least, I will translate and publish most of this work in Greek.

Apart from disseminating my work in writing, I will also train more people in AISI. I have been contacted by a generic special school in Cambridgeshire which is interested in implementing AISI. I am still working as a part-time TA in the school where the study took place. There I am working with staff from different classrooms on further implementing AISI. Research-wise, a PhD student has already started doing research on how AISI can be transferred into the schools in Saudi Arabia.

10.8 Summary

This chapter gave an overview of the key findings of the study. It showed that AISI is relatively easily learnt and implemented by staff in a school setting. It also concluded that the change in adult style had a great impact on children's spontaneous communication as they considerably increased the times they initiated communication, post intervention. Findings on the functions of children's communication and the

methods they used showed that, overall, the children increased the functions and methods they were already using pre intervention instead of employing new. Most of these changes were maintained at follow-up twelve months later. The study failed to establish a connection between the effect of activities and children's communication. The chapter finally discussed the research gaps which the current study attempted to cover, its limitations, ideas for future research and practice and ways in which the work reported in the thesis has been and will be disseminated.

REFERENCES

Adelman, C. (1989) "The practical ethic takes priority over methodology". In: Carr, W. (ed.) **Quality in teaching: arguments for a reflective profession**. London: Falmer, pp. 173-182.

Agius, K. (2009) **A Maltese study in patterns of spontaneous and intentional nonverbal communication in young nonverbal children with autistic spectrum disorders**. MEd Thesis, University of Birmingham.

Aldred, C., Green, J. and Adams, C. (2004) A new social communication intervention for children with autism: pilot randomised controlled treatment study suggesting effectiveness. **Journal of Child Psychology and Psychiatry**, 45 (8): 1420-1430.

Aldred, C., Pollard, C., Phillips, R. and Adams, C. (2001) Multidisciplinary social communication intervention for children with autism and pervasive developmental disorder: the child's talk project. **Educational and Child Psychology**, 18 (2): 76-87.

Allen, B. and Matthews, G. (2008) **Team-teach workbook**. East Sussex: Steaming Publishing.

American Psychiatric Association (1994) **Diagnostic and Statistical Manual of Mental Disorders (DSM-IV)**. 4th ed. Washington, DC: American Psychiatric Association.

Arnold, L. (2012) Autism, its relationship to science and to people with the condition. **Autonomy, the Critical Journal of Interdisciplinary Autism Studies**, 1 (1): 1-6.

Autism Treatment Center of America (2008) **Autism solution: getting started with the Son-Rise program** [DVD). Sheffield, MA: The Option Institute.

Baird, G., Simonoff, E., Pickles, A., Chandler, S., Loucas, T., Meldrum, D. and 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). **Lancet**, 368 (9531): 210-215.

Baron-Cohen, S. (1995) **Mindblidness: an essay on autism and Theory of Mind**. Cambridge, MA: MIT Press.

Baron-Cohen, S., Allen, J. and Gillberg, C. (1992) Can autism be detected at 18 months? The needle, the haystack, and the CHAT. **The British Journal of Psychiatry**, 161 (6): 839-843.

Barry, T., Grofer Klinger, L., Lee, J., Palardy, N., Gilmore, T. and Bodin, D. (2003) Examining the effectiveness of an outpatient clinic-based social skills group for high functioning children with autism. **Journal of Autism and Developmental Disorders**, 33 (6): 685-701.

Bauminger, N., Shulman, C. and Agam, G. (2003) Peer interaction and loneliness in high-functioning children with autism. **Journal of Autism and Developmental Disorders**, 33 (5): 489-507.

Bettelheim, B. (1967) **The empty fortress: infantile autism and the birth of the self**. London: Collier-Macmillan.

Bieberich, A. and Morgan, S.B. (1998) Brief report: affective expression in children with autism or Down syndrome. **Journal of Autism and Developmental Disorders**, 28 (4): 333-338.

Blackburn, R. (2007) "Logically Illogical: the perspective of an adult with autism". In: lectures for Masters students (M.Ed. autism). Birmingham, 6th of February 2007.

Blackburn, R. (2011) " Logically Illogical: the perspective of an adult with autism ". In: Autism residential weekend, University of Birmingham. Birmingham, 23th -25th September 2011.

Blaxter, L., Hughes, C. and Tight, M. (1996) **How to research**. Buckingham: Open University Press.

Bloor, M., Frankland, J., Thomas, M. and Robson, K. (2001) **Focus group in social research**. London: SAGE Publications.

Bogdashina, O. (2003) **Sensory perceptual issues in autism and Asperger syndrome**. London: Jessica Kingsley Publishers.

Bogdashina, O. (2005) **Communication issues in autism and Asperger syndrome**. London: Jessica Kingsley Publishers.

Bondy, A. and Frost, L. (2002) **A picture's worth: PECS and other visual communication strategies in autism**. Bethesda, MD: Woodbine House.

Borg, M. and Gall, M. (1989) **Educational research: an introduction**. 5th ed. London: Longman.

Bradshaw, J. (1998) Assessing and intervening in the communication environment. **British Journal of Learning Disabilities**, 26 (2): 62-66.

British Education Research Association- BERA (2011) **Ethical guidelines for educational research** [on-line]. Available from: http://www.bera.ac.uk/files/2011/08/BERA-Ethical-Guidelines-2011.pdf [Accessed 9th April 2012].

Bristol, M.M. (1984) "Family resources and successful adaptation to autistic children". In: Schopler, E. and Mesibov, G.B. (eds.) **The Effects of autism on the family**. New York: Plenum, pp. 289-310.

British Association For Music Therapy-BAMT (2012) [online] Available at: http://www.bamt.org/ [accessed 12th of February 2012].

Bruner, J. (1981) The social context of language acquisition. **Language and Communication**, 1 (2-3): 155-178.

Brunner D.L. and 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.

Bryman, A. (2008) **Social research methods**. 3rd ed. Oxford: Oxford University Press.

Buckley, B. (2003) **Children's communication skills: from birth to five years**. London: Routledge.

Burns, R. (2000) **Introduction to research methods**. London: SAGE Publication.

Burrell, G. and Morgan, G. (2005) **Sociological paradigms and organisational analysis**. Burlington: Ashgate Publishing Company.

Caldwell, P. (2006) Speaking the other's language: imitation as a gateway to relationship. **Infant and Child Development**, 15 (3): 275-282.

Caldwell, P. (2008) **Using intensive interaction and sensory integration: a handbook for those who support people with severe autistic spectrum disorder**. London: Jessica Kingsley Publishers.

Camaioni, L., Perucchini, P., Muratori, F., Parrinini, B., and Cesari, A. (2003) The communicative use of pointing in autism: developmental profile and factors related to change. **European Psychiatry**, 18 (1): 6-12.

Capps, L., Kasari, C., Yirmiya, N. and Sigman, M. (1993) Parental perception of emotional expressiveness in children with autism. **Journal of Consulting and Clinical Psychology**, 61 (3): 475-484.

Carr, E. (1982) "Sign Language". In: Koegel, R.L, Rincover, A. and Egel, A.L. (eds.) **Educating and understanding autistic children**. New York: College Hill Press, pp. 142-157.

Carter, M. and Hotchkis, G.D. (2002) A conceptual analysis of communicative spontaneity. **Journal of Intellectual and Developmental Disability**, 27 (3): 168-190.

Carter, M. (2003) Communicative spontaneity of children with high support needs who use Augmentative and Alternative Communication systems I: classroom spontaneity, mode, and function. **Augmentative and Alternative Communication**, 19 (3): 141–154.

Chambers, W. and R. Ltd (1998) **The Chambers Dictionary**. Edinburgh: Chambers Harrap Publishers Ltd.

Chan, A.S., Cheung, J., Leung, W.W., Cheung, R. and Cheung, M.C. (2005) Verbal expression and comprehension deficits in young children with autism. **Focus on Autism and other Developmental Disabilities**, 20 (2):117-124.

Chandler, S., Christie, P., Newson, E. and Prevezer, W. (2002) Developing a diagnostic and intervention package for 2- to 3-year-olds with autism: outcomes of the frameworks for communication approach. **Autism**, 6 (1): 47-69.

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

Charlop, M.H. and Trasowech, J.E. (1991) Increasing autistic children's daily spontaneous speech. **Journal of Applied Behavior Analysis**, 24 (4): 747-761.

Charman, T., Baron-Cohen, S., Swettenham, J. Baird, G., Drew, A. and Cox, A. (1997) Infants with autism: an investigation of empathy, pretend play, joint attention and imitation. **Developmental Psychology**, 33 (5): 781-789.

Chevallier, C., Kohls, G., Troiani, V., Brodkin, E.S. and Schultz, R.T. (2012) The social motivation theory of autism. **Trends in Cognitive Sciences**, 16 (4): 231-239.

Chiang, C.H., Soong, W.T., Lin, T.L. and Rogers, S. (2008) Nonverbal communication skills in young children with autism. **Journal of Autism and Developmental Disorders**, 38 (10): 1898-1906.

Chiang, H.M. (2008a) Communicative spontaneity of children with autism: a preliminary analysis. **Autism**, 12 (1): 9-21.

Chiang, H.M. (2008b) Expressive communication of children with autism: the use of challenging behaviour. **Journal of Intellectual Disability Research**, 52 (11): 966-972.

Chiang, H.M. (2009a) Differences between spontaneous and elicited expressive communication in children with autism. **Research in Autism Spectrum Disorders**, 3 (1): 214-222.

Chiang, H.M. and Carter, M. (2008) Spontaneity of communication in individuals with autism. **Journal of Autism and Developmental Disorders**, 38 (4): 693-705.

Chiang, H.M. and Lin, W.T. (2008) Expressive communication of children with autism. **Journal of Autism and Developmental Disorders**, 38 (3): 538-545.

Christie, P., Newson, E., Prevezer, W. and Chandler, S. (2009) **First steps in intervention with your child with autism: frameworks for communication**. London: Jessica Kingsley Publishers.

Clements, J. (2005) **People with autism behave badly: helping people with ASD move on from behavioral and emotional challenges**. London: Jessica Kingsley Publishers.

Clements, J. and Zarkowska, E. (2000) **Behavioural concerns and autistic spectrum disorders: explanations and strategies for change**. London: Jessica Kingsley Publishers.

Clifford, S., Hudry, K., Brown, L., Pasco, G., Charman, T. and the PACT Consortium (2010) The Modified-Classroom Observations Schedule to Measure Intentional Communication (M-COSMIC): evaluation of reliability and validity. **Research in Autism Spectrum Disorders**, 4 (3): 509-525.

Cohen, J. (1988) **Statistical power analysis for the behavioral sciences**. London: Academic Press.

Cohen, L., Manion, L. and Morrison, K. (2007) **Research methods in education**. 6th ed. London: Routledge/Falmer.

Coolican, H. (2006) **Introduction to research methods in psychology**. 3rd ed. London: Hodder Arnold.

Cooper, J.O., Heron, T.E. and Heward, W.L. (2007) **Applied Behavior Analysis**. 2nd ed. Upper Saddle River, NJ*:* Pearson Education.

Couper, J.J. and Sampson, A.J. (2003) Children with autism deserve evidence-based intervention: the evidence for behavioural therapy. **The Medical Journal of Australia**, 178 (9): 424-425.

Courchesne, E., Townsend, J., Akshoomoff, N.A., Saitoh, O., Yeung-Courchesne, R., Lincoln, A.J., James, H.E., Haas, R.H., Schreibman, L. and Lau, L. (1994) Impairment in shifting attention in autistic and cerebellar patients. **Behavioral Neuroscience**, 108 (5): 848-865.

Creswell, J. (2003) **Research design: qualitative, quantitative and mixed methods approaches**. 2nd ed. London: SAGE Publications.

Creswell, J. and Plano Clark, V. (2007) **Designing and conducting mixed methods research**. London: SAGE Publications.

Dahlgren, S.O. and Trillingsgaard, A. (1996) Theory of Mind in non-retarded children with autism and Asperger's syndrome: a research note. **Journal of Child Psychology and Psychiatry**, 37 (6): 759–763.

Dancey, C. and Reidy, J. (2002) **Statistics without maths for psychology**. 2nd ed. Harlow, England: Pearson.

DARL (Development in Areas Related to Learning) assessment (unpublished). Provided by the school.

Dawson, G. Hill, D., Spencer, A., Galpert, L. and Watson, L. (1990) Affective exchanges between young autistic children and their mothers. **Journal of Abnormal Child Psychology**, 18 (3): 335-345.

Dawson, M. (2004) **The Misbehaviour of Behaviourists: Ethical Challenges to the Autism-ABA Industry** [online]. Available online from: http://www.sentex.net/~nexus23/naa_aba.html [Accessed 9th October 2012].

Denscombe, M. (2010) **The good research guide for small-scale research projects**. 4th ed. Berkshire: Open University Press.

Department for Children, Schools and Families - DCSF (2008a) **Early Support Developmental Journal** [online]. Available from: https://www.education.gov.uk/publications/eOrderingDownload/ES54.pdf [Accessed 8th February 2012].

Department for Children, Schools and Families - DCSF (2008b) **Early Years Foundation Stage (EYFS) pack** [online]. Available from: https://www.education.gov.uk/publications/eOrderingDownload/eyfs_practiceguid_0026608.pdf [Accessed 8th February 2012].

Department for Children, Schools and Families (DCSF, 2009) **Inclusion development programme/supporting children on the autism spectrum: guidance for practitioners in the Early Years Foundation Stage**. London: DCSF.

Dewart, H. and Summers, S. (1988) **The pragmatics profile of early communication**. Windsor, Berkshire: NFER-NELSON.

Doussard-Roosevelt, J., Joe, C., Bazhenova, O. and Porges, S. (2003) Mother-child interaction in autistic and nonautistic children: characteristics of maternal approach behaviors and child social responses. **Development and Psychopathology**, 15 (2): 277-295.

Drew, A., Baird, G., Taylor, E., Milne, E. and Charman, T. (2007) The Social Communication Assessment for Toddlers with Autism (SCATA): an instrument to measure the frequency, form and function of communication in toddlers with autism spectrum disorder. **Journal of Autism and Developmental Disorders**, 37 (4): 648-666.

Dunn, W., Saiter, J. and Rinner, L. (2002) Asperger syndrome and sensory processing: a conceptual model and guidance for intervention planning. **Focus on Autism and Other Developmental Disabilities**, 17 (3): 172-185.

Eikeseth, S., Smith, T., Jahr, E. and Eldevik, S. (2007) Outcome for children with autism who began intensive behavioral treatment between ages 4 and 7: a comparison control study. **Behavior Modification**, 31 (3): 264-278.

ELAN (2012) **The language archive** [online]. Available from: http://tla.mpi.nl/tools/tla-tools/elan/ [Accessed 12th October 2012].

Elliot, J. (1991) **Action research for educational change**. Milton Keynes: Open University Press.

Emerson, E. (2001) **Challenging behaviour: analysis and intervention in people with severe intellectual disabilities**. 2nd ed. Cambridge: Cambridge University Press.

Emshoff, J.G., Blakely, C., Gottschalk, R., Mayer, J., Davidson, W.S., and Erickson, S. (1987) Innovation in education and criminal justice: measuring fidelity of implementation and program effectiveness. **Educational Evaluation and Policy Analysis**, 9 (4): 300–311.

Escalona, A., Field, T., Singer-Strunck, R., Cullen, C. and Hartshorn, K. (2001) Brief report: improvements of children with autism following massage therapy. **Journal of Autism and Developmental Disorders**, 31 (5): 513-516.

Fey, M.E. (1986) **Language intervention with young children**. Needham Height, MA: Allyn and Bacon.

Field, A. (2005) **Discovering statistics using SPSS**. 2nd ed. London: SAGE Publication Ltd.

Fisher, C. (2006) "Interventions in general education classrooms: one boy's story as seen by his mother". In: Koegel, R.L. and Koegel, L.K (eds.) **Pivotal response treatments for autism: communication, social and academic development**. London: Paul Brookes Publishing Co. pp. 53-79.

Flack, R., Harris, J., Jordan, R. and Wimpory D. (1996) **The special educational needs of children with autism**. Unit: 3: Communication. Distance Education: Autism Children. Birmingham: The University of Birmingham.

Floeter, M.K. and Greenough, W.T. (1979) Cerebellar plasticity: modification of purkinje cell structure by differential rearing in monkeys. **Science**, 206 (4415): 227-229.

Freeman, N.L., Perry, A. and Bebko, J.M. (2002) Behaviour is communication: nonverbal communicative behaviour in students with autism and instructors' responsivity**. Journal on Developmental Disabilities,** 9 (2): 145-155.

Frith, U. (2003) **Autism: explaining the enigma**. 2nd ed. Oxford: Blackwell.

Frost L. and Bondy A. (2002) **PECS: The Picture Exchange Communication System: training manual**. Newark, DE: Pyramid Educational Consultants Inc.

Gerland, G. (2000) **Finding out about Asperger syndrome, high functioning autism and PDD**. London: Jessica Kingsley Publishers.

Gernsbacher, M.A., Stevenson, J.L., Khandakar, S. and Hill Goldsmith, H. (2008) Why does joint attention look atypical in autism? **Child Development Perspectives,** 2 (1): 38-45.

Gillett, J.N. and LeBlanc, L.A. (2007) Parent-implemented Natural Language Paradigm to increase language and play in children with autism. **Research in Autism Spectrum Disorders**, 1 (3): 247-255.

Gillham, B. (2007) **Developing a questionnaire**. 2nd ed. London: Continuum.

Golan, O., and Baron-Cohen, S. (2006) Systemizing empathy: teaching adults with Asperger syndrome or high-functioning autism to recognize complex emotions using interactive multimedia. **Development and Psychopathology**, 18 (2): 591–617.

Grandin, T. (1984) My experiences as an autistic child. **Journal of Orthomolecular Psychiatry**, 13 (3): 144-174.

Grandin, T. (2006) **Thinking in pictures**. London: Bloomsbury.

Gray, C. (2000) "From both sides now: how to teach social understanding". In: **6th Autism Europe Congress. Glasgow, 19th-21 May 2000**.

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. and the PACT Consortium (2010) Parent-mediated Communication-focused Treatment in Children with Autism (PACT): a randomised controlled trial. **Lancet**, 375 (9732): 2152-2160.

Green, J. and Aldred, C. (2012) "On the right track: can early intervention change the trajectory of communication development for children who have autism?" In: **3rd Professional Conference National Autistic Society. Manchester, 28th-29th February, 2012**.

Greenspan, S. and Wieder, S. (1998) **The child with special needs**. Reading, Mass: Perseus.

Greenspan, S. and Wieder, S. (1999) A functional developmental approach to autism spectrum disorders. **Journal of the Association for Persons with Severe Handicaps**, 24 (3): 147-161.

Griffin, S. and Sandler, D. (2010) **Motivate to communicate! 300 games and activities for your child with autism.** London: Jessica Kingsley Publishers.

Guba, E.G. and Lincoln, Y.S. (1994) "Competing paradigms in qualitative research". In: Denzin, N.K and Lincoln, Y.S (eds.) **Handbook of qualitative research**. Thousand Oaks, CA: Sage. pp. 105-117.

Guldberg, K., Good, J., Porayska-Pomsta, K. and Keay-Bright, W. (2010) ECHOES II: the creation of a technology enhanced learning environment for typically developing children and children on the autism spectrum. **Journal of Assistive Technologies**, 4 (1): 49-53.

Hall, D. and Hall, I. (1996) **Practical social research: project work in the community**. London: Macmillan.

Halle, J.W. (1987) Teaching language in the natural environment: an analysis of spontaneity. **Journal of the Association for Persons with Severe Handicaps**, 12 (1): 28-37.

Happe, F.G.E. (1997) Central Coherence and Theory of Mind in autism: reading homographs in context. **British Journal of Developmental Psychology**, 15 (1): 1-12.

Harding, C.G. (1982) Development of the intention to communicate. **Human Development**, 25: 140-151.

Hauck, M., Fein, D., Waterhouse, L. and Feinstein, C. (1995) Social initiations by autistic children to adults and other children. Journal of Autism and Developmental Disorders, 25 (6): 579-595.

Heath, C., Hindmarsh, J. and Luff, P. (2010) **Video in qualitative research: analysing social interaction in everyday life**. London: SAGE.

Hill, E. (2004) Executive dysfunction in autism. **Trends in Cognitive Sciences**, 8 (1): 26-32.

Hobson, P. (1993) **Autism and the development of mind**. Hove, East Sussex: Lawrence Erlbaum Associates Ltd.

Hobson, P. (2002) **The cradle of thought: exploring the origins of thinking**. London: Macmillan.

Hodge, N. and Chantler, S. (2010) It's not what you do; it's the way that you question: that's what gets results. **Support for Learning**, 25 (1): 11-14.

Hopkins, D. (2002) **A teacher's guide to classroom research**. 3rd ed. Buckingham: Open University Press.

Howlin, P., Baron-Cohen S. and Hadwin, J. (1999) **Teaching children with autism to mind-read: a practical guide**. Chisester: John Wiley and Sons Ltd.

Hwang, B. and Hughes, C. (2000) Increasing early social-communicative skills of preverbal preschool children with autism through social interactive training. **The Association of Persons with Severe Handicaps**, 25 (1): 18-28.

Iacono, T.A. (1999) Language intervention in early childhood. **International Journal of Disability, Development and Education**, 46 (3): 383-420.

Ingersoll, B. (2010a) Teaching social communication: a comparison of naturalistic behavioral and development, social pragmatic approach for children with autism spectrum disorders. **Journal of Positive Behavior Interventions**, 12 (1): 33-43.

Ingersoll, B. (2010b) Brief report: pilot randomized controlled trial of Reciprocal Imitation Training for teaching elicited and spontaneous imitation to children with autism. **Journal of Autism and Developmental Disorders**, 40 (9): 1154-1160.

Ingersoll, B. (2011) The differential effect of three Naturalistic Language interventions on language use in children with autism. **Journal of Positive Behavior Interventions**, 13 (2): 109-118.

Ingersoll, B. and Dvortcsak, A. (2006) Including parent training in early childhood special education curriculum for children with autism spectrum disorders. **Journal of Positive Behavior Intervention**, 8 (2): 79-87.

Ingersoll, B. and Schreibman, L. (2006) Teaching reciprocal imitation skills to young children with autism using a naturalistic behavioral approach: effects on language, pretend play and joint attention. **Journal of Autism and Developmental Disorders**, 36 (4): 487-505.

Ingersoll, B., Dvortcsak, A., Whalen, C. and Sikora, D. (2005) The effects of a developmental, social-pragmatic language intervention on rate of expressive language production in young children with autistic spectrum disorders. **Focus on Autism and Other Developmental Disabilities**, 20 (4): 213-222.

Jackson, L. (2002) **Freaks, geeks and Asperger syndrome: a user guide to adolescence**. London: Jessica Kingsley Publishers.

James, K. and Fletcher, R. (2011) **Initial Tutor Training on ABA**. Manchester, 30th -31st March 2011. Peach.

Jarrold, C. and Russell, J. (1997) Counting abilities in autism: possible implications for Central Coherence theory. **Journal of Autism and Developmental Disorders**, 27 (1): 25-37.

Jarvis, J. and Lamb, S. (2001) Interaction and development of communication in the under twos: issues for practitioners working with young children in groups. **Early Years**, 21 (2): 129-138.

Johnson. B., Onwuegbuzie, A. and Turner, L. (2007) Toward a definition of mixed methods research. **Journal of Mixed Methods Research**, 1 (2): 112-133.

Jones, E.A., Carr, E.G and Feeley, K.M. (2006) Multiple effects of joint attention intervention for children with autism. **Behavior Modification**, 30 (6): 782-834.

Jones, G. (2002) **Educational provision for children with autism and Asperger syndrome**. London: David Fulton.

Jones, G. and Jordan R. (2008) "Research base for intervention in autism spectrum disorders". In: McGregor, E., Nunez, M., Cebula, K. and Gomez, J.C. (eds.) **Autism: an integrated view from neurocognitive, clinical and intervention research**. Oxford: Blackwell Publishing, pp.281-302.

Jones, K. (2006) A biographic researcher in pursuit of an aesthetic: The use of arts-based (re)presentations in “performative” dissemination of life stories. **Qualitative Sociology Review**, 2 (1): 66-85.

Jordan, R. (1993) "The nature of linguistic and communication difficulties of children with autism". In: Messer, D.J. and Turner, G.J. (eds.) **Critical influences on child language acquisition and development**. London: Macmillan, pp. 229-249.

Jordan, R. (1999) **Autistic spectrum disorders: an introductory handbook for practitioners**. London: David Fulton Publishers.

Jordan, R. (2001) **Autism with severe learning difficulties**. London: Souvenir Press (EandA) Ltd.

Jordan, R., Jones, G. and Murray, D. (1998) **Educational interventions for children with autism: a literature review of recent and current research**. London: DfEE.

Kaczmareck, L.A. (1990) Teaching spontaneous language to individuals with severe handicaps: a matrix model. **Journal of the Association for Persons with Severe Handicaps**, 15 (3): 160-169.

Kaiser, A.P., Yoder, P.J. and Keetz, A. (1992) "Evaluating milieu teaching". In: Warren, S.F. and Reichle, J. (eds.) **Causes and effects in communication and language intervention**. Baltimore: Brooks, pp. 9-48.

Kalyva, E. (2011) **Autism: educational and therapeutic approaches**. London: SAGE Publications.

Kanner, L. (1943) Autistic disturbances of affective contact. **Nervous Child**, 2: 217-250.

Kanner, L. (1946) Irrelevant and metaphorical language in early infantile autism. **American Journal of Psychiatry**, 103: 242-245.

Kasari, C. (2002) Assessing change in early intervention programs for children with autism. **Journal of Autism and Developmental Disorders**, 32 (5): 447-461.

Kasari, C., Freeman, S. and Paparella, T. (2006) Joint attention and symbolic play in young children with autism: a randomized controlled intervention study. **Journal of Child Psychology and Psychiatry**, 47 (6): 611-620.

Kashinath, S., Woods, J. and Goldstein, H. (2006) Enhancing generalized teaching strategy use in daily routines by parents of children with autism. **Journal of Speech, Language, and Hearing Research**, 49 (3): 466-485.

Kaufman, B.N. (1994) **Son-rise: the miracle continues**. Novato, CA: New World Library.

Kaufman, R.K. (2002) "Building the bridges: strategies for reaching our children". In: Jones, G. (Ed.) **Autism early intervention: a supplement for Good Autism Practice Journal**. Kidderminster, Worcestershire: Bild Publications, pp. 10-16.

Keen, D., Woodyatt, G. and Sigafoos, J. (2002) Verifying teacher perceptions of the potential communicative acts of children with autism. **Communication Disorders Quarterly**, 23 (3): 131-140.

Keen, S. and Todres, L. (2007) Strategies for disseminating qualitative research findings: three exemplars. **Forum: Qualitative Social Research**, 8 (3): Art. 17.

Kelly, M. and Campbell-Sadler, A. (in press) (2012) Essex Approaches to Autism and their 'Enemy': Model Drift. **Good Autism Practice**.

Kemmis, K. and McTaggart, R. (1992) **The action research planner**. 3rd ed. Geelong,Vic: Deakin University Press.

Kemmis, K. and McTaggart, R. (2000) "Participatory action research". In: Denzin, N. and Lincoln, Y. (eds.) **Handbook of qualitative research**. London: SAGE Publications.

Kennedy, H. (2011) What is Video Interaction Guidance (VIG)? In: Kennedy, H., Landor, M. and Todd, L. (eds.) **Video Interaction Guidance: a relationship-based intervention to promote attunement, empathy and wellbeing**. London: Jessica Kingsley, pp. 20-42.

Kitahara, K. (1984) **Daily Life Therapy: a method of educating autistic children. record of actual education at Musashino Higashi Gakuen School, Japan.** Volume I. Boston, Mass: Nimrod Press.

Kingstone, A., Smilek, D., Ristic, J., Kelland Friesen, C. and Eastwood, J.D. (2003) Attention, researchers! It is time to take a look at the real world. **Current Directions in Psychological Science**, 12 (5): 176-180.

Klin, A. (1991) Young autistic children's listening preferences in regard to speech: a possible characterization of the symptom of social withdraw. **Journal of Autism and Developmental Disorders**, 21 (1): 29-42.

Klin, A., Jones, W., Schultz, R., and Volkmar, F. (2003) The enactive mind, or from actions to cognition: lessons from autism. **Philosophical Transactions of the Royal Society B: Biological Sciences**, 358: (1430) 345–360.

Koegel, L.K. (2000) Interventions to facilitate communication in autism. **Journal of Autism and Developmental Disorders**, 30 (5): 383-391.

Koegel, R.L., Openden, D., Fredeen, R. and Koegel, L.K. (2006) "The basics of Pivotal Response Treatment". In: Koegel, R.L. and Koegel, L.K. (eds.) **Pivotal Response Treatments for autism: communication, social and academic development**. London: Paul Brookes Publishing Co., pp. 4-30.

Koshy, V. (2005) **Action research for improving practice: a practical guide**. London: Paul Chapman Publishing.

Kossyvaki, L. (2010) "The effect of adult style on the communication of young children on the autism spectrum". In: **9th research student conference: education researchers - research for change. Birmingham, 19th November 2011**.

Kossyvaki, L. Jones, G. and Guldberg, K. (in press) (2012) The effect of adult interactive style on the spontaneous communication of young children with autism at school, **British Journal of Special Education**.

Kovshoff, H., Hastings, R.P. and Remington, B. (2007) Two-year outcomes for children with autism after the cessation of Early Intensive Behavioral Intervention. **Behavior Modification**, 35 (5): 427-450.

Kozleski, E. (1991) Expectant delay procedure for teaching request. **Augmentative and Alternative Communication**, 7 (1): 11-19.

Kroeger, K. and Nelson, W. (2006) A language programme to increase the verbal production of a child dually diagnosed with Down syndrome and autism. **Journal of Intellectual Disability Research**, 50 (2): 101-108.

Kuhn, T.S. (1962) **The structure of scientific revolutions**. Chicago: University of Chicago Press.

Lankshear, C. and Knobel, M. (2004) **A handbook for teacher research: from design to implementation**. Maidenhead, Berkshire: Open University Press.

Lawson, W. (1998) **Life behind glass: a personal account of autism spectrum disorder**. London: Jessica Kingsley Publishers.

Lawson, W. (2001) **Understanding and working with the spectrum of autism: an insider's view**. London: Jessica Kingsley Publishers.

Lawson, W. (2011) **The passionate mind: how people with autism learn**. London: Jessica Kingsley Publishers.

Leech, N. and Onwuegbuzie, A. (2009) A typology of mixed methods research designs. **Quality and Quantity**, 43 (2): 265-275.

Lewin, K. (1946) Action research and minority problems. **Journal of Social Issues**, 2 (4): 34-46.

Lewis, A. (2009) "Small and medium scale questionnaires". In: **PhD research modules training. Birmingham, 9th of May 2009**.

Litosseliti, L. (2003) **Using focus groups in research**. London: Continuum.

Llaneza, D.C., DeLuke, S.V., Batista, M., Crawley, J.N., Christodulu, K.V. and Frye, C.A. (2010) Communication, interventions, and scientific advances in autism: a commentary. **Physiology and Behavior**, 100 (3): 268-276.

Lonergan, J. (1990) **Technology in language learning: making the most of your video camera**. London: CiLT.

Lord, C. (2010) "Towards DSMV: new trends in diagnosis and classification of ASD". In: **9th International Congress Autism-Europe: a future for autism. Catania, 8th-10th October 2010**.

Lord, C. and Schopler, E. (1994) "TEACCH services for preschool children". In: Harris, S.L. and Handleman, J.S. (eds.) **Preschool education programs for children with autism**. Austin TX: Pro-Ed., pp. 87–106.

Lovaas, O.I. (1981) **Teaching developmentally disabled children: the me book**. Baltimore, MD: University Park Press.

Lowe, M. and Costello, A. (1988) **Symbolic Play Test**. 2nd ed. Windsor, Berkshire: NFER-NELSON.

Mahoney, G. and MacDonald, J. (2007) **ASD and developmental delays in young children: the responsive teaching curriculum for parents and professionals**. Austin, TX: PRO-ED.

Mahoney, G. and Perales, F. (2003) Using relationship-focused intervention to enhance the social emotional functioning of young children with autism spectrum disorders. **Topics in Early Childhood Special Education**, 23 (2): 74-86.

Mahoney, G. and Wheeden, A. (1999) The effect of teacher style on interactive engagement of preschool-aged children with special learning needs. **Early Childhood Research Quarterly**, 14 (1): 51-68.

Manolson, A. (1992) **It takes two to talk: a parent's guide to helping children communicate**. Toronto, Canada: The Hanen Centre

Matson, J.L., Sevin, J.A., Box, M.L. and Francis, K.L. (1993) An evaluation of two methods for increasing self-initiated verbalizations in autistic children. **Journal of Applied Behavior Analysis**, 26 (3): 389-398.

McAteer, M. and Wilkinson, M. (2009) Adult style: what helps to facilitate interaction and communication with children on the autism spectrum. **Good Autism Practice**, 10 (2): 57-63.

McGee, G.G., Daly, T. and Jacobs, H.A. (1994) "The Walden Preschool". In: Harris, S.L. and Handleman, J.S. (eds.) **Preschool education programs for children with autism**. Austin, TX: Pro-Ed., pp. 126-162.

McGee, G.G., Feldman, R.S. and Morrier, M.J. (1997) Benchmarks of social treatment for children with autism. **Journal of Autism and Developmental Disorders**, 27 (4): 353-364.

McNiff, J. and Whitehead, J. (2006) **All you need to know about action research**. London: SAGE Publications.

Meadan, H., Halle, J., Ostrosky, M.M. and DeStefano, L. (2008) Communicative behavior in the natural environment: case studies of two young children with autism and limited expressive language. **Focus on Autism and Other Developmental Disorders**, 23 (1): 37-48.

Medical Research Council- MRC (2001) **Review of autism research epidemiology and causes**. London: MRC.

Merriam-Webster (1988) **Webster Collegiate Dictionary**. Springfield, Mass: Merriam-Webster.

Mertens, D. (1998) **Research methods in education and psychology: integrating diversity with quantitative and qualitative approaches**. London: SAGE Publications.

Mesibov, G. (2007) **Three day T.E.A.C.C.H training course**. Kettering, 6th- 8th June 2007. Autism Independent UK.

Mesibov, G., Adams, L. and Klinger, L. (1997) **Autism: understanding the disorder**. New York: Plenum Press.

Messer, D.J. (1994) **The development of communication: from social interaction to language**. Chichester, West Sussex: John Wiley and Sons.

Methley, A. and Wimpory, D. (2010) Music interaction therapy for children with autism. [DVD]. Bangor: Bangor University.

Milton, D. and Lyte (2012) The normalisation agenda and the psycho-educational disablement of autistic people. **Autonomy, the Critical Journal of Interdisciplinary Autism Studies**, 1 (1): 1-12.

Milton, D. (2012) Personal communication via email on the 17th May 2012.

Mirenda, P. (2003) Toward functional Augmentative and Alternative Communication for students with autism: manual signs, graphic symbols, and voice output communication aids. **Language, Speech, and Hearing Services in Schools**, 34 (3): 203-216.

Mundy, P. (1995) Joint attention and social emotional approach behaviour in children with autism. **Development and Psychopathology**, 7 (1): 63-82.

Munn, P. and Drever, E. (1990) **Using questionnaires in small-scale research: a teacher's guide**. Edinburgh: SCRE publication.

Murdock, L.C., Cost, H.C. and Tieso, C. (2007) Measurement of social communication skills of children with autism spectrum disorders during interactions with typical peers. **Focus on Autism and Other Developmental Disabilities**, 22 (3): 160-172.

Myles, B.S., Cook, K.T., Miller, N.E., Rinner, L. and Robbins, L.A. (2000) **Asperger syndrome and sensory issues: practical solutions for making sense of the world**. Shawnee Mission, KS: Autism Asperger Publishing Company.

Naoi, N., Tsuchiya, R., Yamamoto, J.I. and Nakamura, K. (2008) Functional training for initiating joint attention in children with autism. **Research in Developmental Disabilities**, 29 (6): 595-606.

National Institute for Health and Clinical Excellence (NICE) Guidelines (2012) [online]. Clinical Guideline 128. Available at: http://nice.org.uk [accessed at 17th October 2012].

National Research Council, Division of Behavioral and Social Sciences and Education, Committee on Educational Interventions for Children with Autism-NRC (2001) **Educating children with autism**. Washington, DC: National Academies Press.

Nind, M. (1999) Intensive interaction and autism: a useful approach? **British Journal of Special Education**, 26 (2): 96-102.

Nind, M. and Hewett, D. (1994) **Access to communication**. London: David Fulton

Nind, M. and Hewett, D. (2001) **A Practical guide to intensive interaction**. Kidderminster, Worcestershire: BILD Publications.

Nind, M. and Powell, S. (2000) Intensive interaction and autism. **Children and Society**, 14 (2): 98-109.

Noens, I. and Van Berckelaer-Onnes, I. (2004) Making sense in a fragmentary world: communication in people with autism and learning disability. **Autism**, 8 (2): 197-218.

Nordoff, P. and Robbins, C. (1977) **Creative Music Therapy**. New York: John Day.

NVivo (2012) **Qualitative data analysis software**. QSR International Pty Ltd. Version 10.

O' Donnell, C.L. (2008) Defining, conceptualizing, and measuring fidelity of implementation and its relationship to outcomes in K–12 curriculum intervention research. **Review of Educational Research**, 78 (1): 33-84.

O' Reilly, M., Sigafoos, J., Lancioni, G., Edrisinha, C. and Andrews, A. (2005) An examination of the effects of a classroom activity schedule on levels of self-injury and engagement for a child with severe autism. **Journal of Autism and Developmental Disorders**, 35 (3): 305-311.

Odom, S.L., Brantlinger, E., Gerstein, R., Horner, R.H., Thompson, B. and Harris, K.R. (2005) Research in special education: scientific methods and evidence-based practices, **Council for Exceptional Children**, 71 (2): 137-148.

Ofsted Reports (2007, 2010)

Ogletree, B.T., Pierce, K., Harn, W.E. and Fischer, M.A. (2002) Assessment of communication and language in classical autism: issues and practices assessment for effective intervention. **Assessment for Effective Intervention**, 27 (1): 61-71.

Ollerton, M. (2008) "Moving from reflective practitioner to practitioner research". In: Elton-Chalcraft, S., Hansen, A. and Twiselton, S. (eds.) **Doing classroom research: a step by step guide for student teachers**. New York: Open University Press, pp. 11-24.

Olson, S., Bayles, K. and Bates, J. (1986) Mother-child interaction and children's speech progress: a longitudinal study of the first two years. **Merrill-Palmer Quarterly**, 32 (1): 1-20.

Onwuegbuzie, A. and Leech, N. (2005) On becoming a pragmatic researcher: the importance of combining quantitative and qualitative research methodologies. **International Journal of Social Research Methodology**, 8 (5): 375-387.

Oppenheim, A.N. (1992) **Questionnaire design, interviewing and attitude measurement**. London: Pinter Publishers.

Ospina, M.B., Seida, J.K., Clark, B., Karkhaneh, M., Hartling, L., Tjosvold, L., Vandermeer, B. and Smith, V. (2008) Behavioural and developmental interventions for autism spectrum disorder: a clinical systematic review, **PLoS one**, 3 (11): e3755.

Ozonoff, S., Pennington, B. and Rogers, S. (1990) Are there emotion perception deficits in young autistic children? **Journal of Child Psychology and Psychiatry**, 31 (3): 343-361.

Ozonoff, S. Pennington, B.F. and Rogers, S. (1991) Executive Function deficits in high-functioning autistic individuals: relationship to Theory of Mind. **Journal of Child Psychology and Psychiatry**, 32 (7): 1081-1105.

Parsons, S., Guldberg, K, MacLeod, A, Jones, G, Prunty, A and Balfe, T. (2011) International review of the evidence on best practice in educational provision for children on the autism spectrum. **European Journal of Special Needs Education**, 26 (1): 47-63.

Pelios, L.V. and Lund, S.K. (2001) A selective overview on issues on classification, causation, and Early Intensive Behavioral Intervention for autism. **Behavior Modification**, 25 (5): 678-697.

Pellicano, E. (2011) "The development of core cognitive functions in children with autism spectrum conditions". In: **Autism residential weekend, University of Birmingham. Birmingham, 23th -25th September 2011**.

Pelphrey, K.A., Morris, J.P and McCarthy, G. (2005) Neural basis for eye gaze processing deficits in autism. **Brain**, 128 (5): 1038-1048.

Pennington, B.F. and Ozonoff, S. (1996) Executive Functions and developmental psychopathology. **Journal of Child Psychology and Psychiatry**, 37 (1): 51-87.

Pennington, L. and Thomson, K. (2007) It takes two to talk:- the Hanen program and families of children with motor disorders: a UK perspective. **Child Care Health Development**, 33 (6): 691-702.

Peterson, R.A. (2000) **Constructing effective questionnaires**. London: SAGE Publications.

Pittman, M. (2007) **Helping pupils with autistic spectrum disorders to learn**. London: Paul Chapman Publishing.

Pituch, K.A., Green, V.A., Didden, R., Lang, R., O'Reilly, M.F., Lancioni, G.E. and Sigafoos, J. (2011) Parent reported treatment priorities for children with autism spectrum disorders. **Research in Autism Spectrum Disorders**, 5 (1): 135-143.

Potter, C. and C. Whittaker (2001) **Enabling communication in children with autism**. London: Jessica Kingsley Publishers.

Powell, S. and Jordan, R. (1997) **Autism and learning: a guide to good practice**. London: David Fulton.

Prizant, B.M. and Duchan, J. (1981) The functions of immediate echolalia in autistic children. **Journal of Speech and Hearing Disorders**, 46 (3): 241-249.

Prizant, B.M. and Rydell, P.J. (1984) Analysis of functions of delayed echolalia in autistic children. **Journal of Speech and Hearing Research**, 27 (2): 183-192.

Prizant, B. and Wetherby, A. (2005) "Critical issues in enhancing communication abilities for persons with autism spectrum disorders". In: Volkmar, F., Paul, R., Klin, A. and Cohen, D. (eds.) **Handbook of autism and pervasive developmental disorders**. Volume 2. New Jersey: Willey, pp. 925-945.

Prizant, B.M, Wetherby, A.M. and Rydell, P.J. (2000) "Communication intervention issues for children with autism spectrum disorders". In: Wetherby, A.M. and Prizant, B.M. (eds.) **Autism spectrum disorders: a transactional developmental perspective**. Volume 9. London: Paul Brookes Publishing, pp. 1993-224.

Prizant, B., Wetherby, A., Rubin, E., Laurent, A. and Rydell, P. (2006) **The SCERTS model: a comprehensive educational approach for children with autism spectrum disorders**. Volume I: Assessment. Baltimore, Maryland: Paul H. Brookes Publishing.

Reason, P. and Bradbury, H. (2001) "Introduction: inquiry and participation in search of a world worthy of human aspiration". In: Reason, P. and Bradbury, H. (eds.) **Handbook of action research: participative enquiry and practice**. London: SAGE Publications. pp. 1-14.

Reed, J. (2005) Using action research in nursing practice with older people: democratizing knowledge. **Journal of Clinical Nursing**, 14 (5): 594-600.

Reichow, B., Volkmar, F. and Cicchetti, D. (2008) Development of the evaluative method for evaluating and determining evidence-based practices in autism. **Journal of Autism and Developmental Disorders**, 38 (7): 1311-1319.

Remington, B., Hastings, R., Kovshoff, H., Espinosa, F., Jahr, E., Brown, T., Alsford, P., Lemaic, M. and Ward, N. (2007) Early Intensive Behavioral Intervention: outcomes for children with autism and their parents after two years. **American Journal of Mental Retardation**, 112 (6): 418-438.

Richman, S. (2001) **Raising a child with autism: a guide to Applied Behavior Analysis for parents**. London: Jessica Kingsley Publishers.

Rickinson, M. (2005) Tool-kit 1: Planning your Research Project. **Topic Practical Applications of Research in Education**, 34 (1): 4-11.

Riege, A. (2003) Validity and reliability tests in case study research: a literature review with 'hands-on' applications for each research phase. **Qualitative Market Research: An International Journal**, 6 (2): 75-86.

Rieser, R. and Mason, M. (1990) **Disability equality in the classroom: a human rights issue**. London: Disability Equality in Education

Roberts, J. (1989) Echolalia and comprehension in autistic children. **Journal of Autism and Developmental Disorders,** 19 (2): 271-281.

Robison, J.E. (2007) **Look me in the eye**. New York: Three Rivers Press.

Robson, C. (2002) **Real word research**. 2nd ed. Oxford: Blackwell.

Roeyers, H., Buysse, A., Ponnet, K. and Pichal, B. (2001) Advancing advanced mind-reading tests: empathetic accuracy in adults with pervasive developmental disorder. **Journal of Child Psychology and Psychiatry**, 42 (2): 271-278.

Rogers, S.J. and Dawson, G. (2010) **Early Start Denver Model for young children with autism: promoting language, learning and engagement**. London: The Guilford Press.

Rogers, S.J., Hepburn, S.L., Stackhouse, T. and Wehner, E. (2003) Imitation performance in toddlers with autism and those with other developmental disorders. **Journal of Child Psychology and Psychiatry**, 44 (5): 763-781.

Roos, E., McDuffie, A., Ellis Weismer, S., Gernsbacher, M.A., and Eisenband, L. (2008) A comparison of contexts for assessing joint attention in toddlers on the autism spectrum. **Autism**, 12 (3): 275-291.

Ruble, L., McDuffie, A., King, A. and Lorenz, D. (2008) Caregiver responsiveness and social interaction behaviors of young children with autism. **Topics in Early Childhood Special Education**, 28 (3): 158-170.

Runswick-Cole, K. and Hodge, N. (2009) Needs or rights? A challenge to the discourse of special education. **British Journal of Special Education**, 36 (4): 198-203.

Rutter, M., Andersen-Wood, L., Beckett, C., Bredencamp, D., Castle, J., Groothues, C. Kreppner, J., Keaveney, L., Lord, C., O' Connor, G.T. and the English and Romanian Adoptee (ERA) Study Team (1999) Quasi-autistic patterns following severe early global privation. **Journal of Child Psychology and Psychiatry**, 40 (4): 537-549.

Rydell, P.J. and Mirenda, P. (1994) Effects of high and low constraint utterances on the production of immediate and delayed echolalia in young children with autism. **Journal of Autism and Developmental Disorders**, 24: 112-149.

Sacks, O. (1995) **An Anthropologist on Mars**. London: Picador.

Sainsbury, C. (2009) **Martian in the Playground**. London: SAGE publications.

Salmon, C.M., Rowan, L.E. and Mitchell, P.R. (1998) Facilitating prelinguistic communication: impact of adult prompting. **Infant-Toddler Intervention**, 8 (1): 11-27.

Salter-Ainsworth, M.D.S. and Bell, S.M. (1974) "Mother-infant interaction and the development of competence". In: Connolly, K.J. and Bruner, J. (eds.) **The growth of competence**. London: Academic Press, pp. 97-118.

Salvin, A., Routh, D., Foster, R., and Lovejoy, K. (1977) Acquisition of modified American sign language by a mute autistic child. **Journal of Autism and Childhood Schizophrenia**, **7**: 359-371.

Scherer, N. and Olswang, L. (1984) Role of mothers' expansions in stimulating children's language production. **Journal of Speech and Hearing Research**, 27 (3): 387-396.

Schertz, H.H. and Odom, S.L. (2004) Joint attention and early intervention with autism: a conceptual framework and promising approaches. **Journal of Early Intervention**, 27 (1): 42-54.

Schlosser, R.W., Arvidson, H.H. and Lloyd, L.L. (2003) **The efficacy of Alternative and Augmentative Communication: toward evidence-based practice**. Boston: Academic Press.

Schopler, E., Reichler, R. and Rochen Renner, B. (1988*)* **The Childhood Autism Rating Scale (CARS)**. Los Angeles: Western Psychological Services.

Scott Van Zeeland, A.A., Dapretto, M., Ghahremani, D.G., Poldrack, R.A. and Bookheimer, S.Y. (2010) Reward processing in autism. **Autism Research**, 3 (1): 53-67.

Scott, D. and Usher, R. (1999) **Researching education: data, methods and theory in educational enquiry**. London: Cassell.

Shaw, J. (2002) **I'm not naughty - I'm autistic: Jodi's journey**. London: Jessica Kingsley Publishers.

Sheridan, M. (2008) **From birth to five years: children's developmental progress**. 3rd ed. London: Routledge.

Siegel, B. (1996) **The world of the autistic child: understanding and treating autistic spectrum disorders**. Oxford: Oxford University Press.

Sigafoos, J. (2000) Communication development and aberrant behavior in children with developmental disabilities. **Education and Training in Mental Retardation and Developmental Disabilities**, 35 (2): 168-176.

Siller, M. and Sigman, M. (2002) The behaviors of parents of children with autism predict the subsequent development of their children's communication. **Journal of Autism and Developmental Disorders**, 32 (2): 77-89.

Simpson, R.L. (2005) **Autism spectrum disorders: interventions and treatments for children and youth**. Thousand Oaks, CA: Corwin Press.

Sinclair, J. (1992) "Bridging the gaps: an inside-out view of autism". In: Schopler, E. and Mesibov, G.B. (eds.) **High-functioning individuals with autism**. New York: Plenum Press, pp. 294-302.

Smith, C. (1999) **The development and evaluation of additional training for Portage Workers in addressing the needs of children with complex social and communication difficulties/autistic spectrum disorders**. EdD thesis, University of East London.

Somekh, B. (1995) The contribution of action research to development in social endeavours: a position paper on action research methodology. **British Educational Research Journal**, 21 (3): 339-355.

Sonders, S. (2003) **Giggle time: establishing the social connection**. London: Jessica Kingsley Publishers.

Special Educational Needs statements (2009) (unpublished).

Speech and Language Therapist's definitions (2009) (unpublished).

Stigler, J.W., Gallimore, R. and Hierber, J. (2000) Using video surveys to compare classrooms and teaching across cultures: examples and lessons from the TIMSS video studies. **Educational Psychologist**, 35 (2): 87-100.

Stone, W., Ousley, O., Yoder, P., Hogan, K. and Hepburn, S. (1997) Nonverbal communication in two- and three-year-old children with autism. **Journal of Autism and Developmental Disorders**, 27 (6): 677-696.

Stone, W.L. and Caro-Martinez, L.M. (1990) Naturalistic observations of spontaneous communication in autistic children. **Journal of Autism and Developmental Disorders**, 20 (4): 437-453.

Sussman, F. (1999) **More than words: helping parents promote communication and social skills in children with autism spectrum disorder**. Toronto: Hanen Centre.

Sylva, K., Roy, C. and Painter, M. (1980) **Childwatching at playgroup and nursery school**. London: Grant McIntyre.

Teddlie, C. and Tashakkori, A. (2003) "Major issues and controversies in the use of mixed methods in the social and behavioral sciences". In: Tashakkori, A. and Teddlie, C. (eds.) **Handbook of mixed methods in social and behavioural research**. Thousand Oaks, California: Sage Publications, pp. 3-50.

The Makaton charity http://www.makaton.org/ [Accessed 17th of March 2012].

The Waldon Association http://www.waldonassociation.org.uk [Accessed 25th of January 2009].

Thiemann, K. and Goldstein, H. (2004) Effects of peer training and written text cueing on social communication of school-age children with pervasive developmental disorder. **Journal of Speech, Language, and Hearing Research**, 47 (1): 126-144.

Thurman, S. (2009) **BILD guide: communication is a human right**. Kidderminster, Worcestershire: British Institute of Learning Disabilities.

Tomasello, M. and Farrar, M.J. (1986) Joint attention and early language. **Child Development**, 57 (6): 1454-1463.

Tregaskis, C. (2002) Social model theory: the story so far… **Disability and Society,** 17 (24): 457-470.

Trevarthen, C., Aitken, K., Papoudi, D. and Robarts, J. (1996) **Children with autism: diagnosis and interventions to meet their needs**. London: Jessica Kingsley Publishers.

Tsao, L. and Odom, S. (2006) Sibling-mediated social interaction intervention for young children with autism. **Topics in Early Childhood Special Education**, 26 (2): 106-123.

Vanvuchelen, M., Roeyers, H. and De Weerdt, W. (2011) Do imitation problems reflect a core characteristic in autism? Evidence from a literature review. **Research in Autism Spectrum Disorders**, 5 (1): 89-95.

Walker, M. (1976) **Manual of language programmes for use with the revised Makaton vocabulary**. Camberley, Surrey: Makaton Vocabulary Development Project.

Wall, K. (2004) **Autism and early years practice: a guide for early years professionals, teachers and parents**. London: Paul Chapman Publishing.

Warwick, A. (2001) "I have a song-let me sing: relating part of a journey through Music Therapy with an autistic boy". In: Richer, J. and Coates, S. (eds.) **Autism: the search for coherence**. London: Jessica Kingsley Publishers, pp. 199-204.

Watkins, M.W. and Pacheco, M. (2000) Interoberver agreement in behavioural research. **Journal of Behavioral Education**, 10 (4): 205-212.

Watson, L. (1998) Following the child's lead: mothers' interactions with children with autism. **Journal of Autism and Developmental Disorders**, 28 (1): 51-59.

Watson, L.R., Lord, C., Schaffer, B. and Schopler, E. (1989) **Teaching spontaneous communication to autistic and developmentally handicapped children**. New York: Irvington.

Watters, R., Wheeler, L., and Watters, W. (1981) The relative efficiency of two orders for training autistic children in the expressive and receptive use of manual signs. **Journal of Communication Disorders**, 11 (4): 273-287.

Wellington, J.J. (2000) **Educational research: contemporary issues and practical approaches**. London: Continuum.

Wetherby, A. (1986) Ontogeny of communicative functions in autism. **Journal of Autism and Developmental Disorders**, 16 (3): 295-316.

Wetherby, A. and Prizant, B. (2000) "Introduction to autism spectrum disorders". In: Wetherby, A. and Prizant, B. (eds.) **Autism spectrum disorders: a transactional developmental perspective**. Volume 9. London: Paul Brookes Publishing Co., pp. 1-7.

Wetherby, A. and Prizant, B. (2002) **Communication and Symbolic Behaviour Scales-developmental profile**. Baltimore, MD: Paul H Brookes Publishing.

Wetherby, A. and Woods, J. (2006) Early social interaction project for children with autism spectrum disorders beginning in the second year: a preliminary study. **Topics in Early Childhood Special Education**, 26 (2): 67-82.

Wetherby, A.M., Prizant, B.M. and Schuler, A.L (2000) "Understanding the nature and language impairments". In: Wetherby, A.M. and Prizant, B.M. (eds.) **Autism spectrum disorders: a transactional developmental perspective.** Baltimore, MD: Brookes, pp. 109-141.

Wetherby, A., Watt, N., Morgan, L. and Shumway, S. (2007) Social communication profiles of children with autism spectrum disorders late in the second year of life. **Journal of Autism and Developmental Disorders**, 37 (5): 960-975.

Whitaker, P., Joy, H., Edwards, D., and Harley, D. (2001) **Challenging behaviour and autism: making sense – making progress: a guide to preventing and managing challenging behaviour for parent and teachers**. London: The National Autistic Society.

White, M. and Cameron, R.J. (1987) **Portage early education programme: a practical manual**. Windsor, Berkshire: NFER-NELSON.

Whitehead, J. (1989) Creating a living educational theory from questions of the kind, 'how do I improve my practice?' **Cambridge Journal of Education**, 19 (1): 137-153.

Whitehead, J. and McNiff, J. (2006) **Action research living theory**. London: SAGE Publications.

Wieder, S. and Greenspan, S. (2003) Climbing the symbolic ladder in the DIR model through Floor time/interactive play. **Autism**, 7 (4): 425-435.

Wilcox, M. and Shannon, M. (1998) "Facilitating the transition from prelinguistic to linguistic communication". In: Warren, S., Reichle, J. and Wetherby, A. (eds.) **Communication and language series**. Volume 5: Prelinguistic communication. Baltimore: Paul H. Brookes, pp. 385-416.

Williams, D. (1994) **Somebody somewhere**. Moorebank, NSW: Transworld.

Williams, D. (1996) **Autism: an inside-out approach**. London: Jessica Kingsley Publishers.

Williams, J.H., Whitten, A. and Singh, T. (2004) A systematic review of action imitation in autistic spectrum disorder. **Journal of Autism and Developmental Disorders**, 34 (3): 285-299.

Willis, J. and Robinson, J. (2011) **Portage basic workshop**. Redditch 7th to 10th February 2011. Worcestershire Portage Service.

Woodcock, L. and Page, A. (2010) **Managing family meltdown: the low arousal approach and autism**. London: Jessica Kingsley Publishers.

World Health Organisation - WHO (1993) **Mental Disorders: a glossary and guide to their classification in accordance with the 10th revision of the International Classification of Diseases (ICD-10)**. Geneva: WHO.

Yin, R. (2003a) **Case study research: design and methods**. 3rd ed. London: SAGE Publications.

Yin, R. (2003b) **Applications of case study research**. London: Sage Publications

Yoder, P. and 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.J. and McDuffie, A.S. (2006) "Treatment of responding to and initiating joint attention". In: Charman, T. and Stone. W. (eds.) **Social and communication development in autism spectrum disorders**. London: The Guilford Press. pp. 117-142.

Yoder, P.J., Kaiser, A.P., Goldstein, H., Alpert, C., Mousetis, L. and Kaczmareck, L. (1995) An exploratory comparison of milieu teaching and responsive interaction in classroom applications. **Journal of Early Intervention**, 19 (3): 218-242.

Zanolli, K., Daggett, J. and Adams, T. (1996) Teaching preschool autistic children to make spontaneous initiations to peers using priming. **Journal of Autism and Developmental disorders**, 26 (4): 406-422.

Zeichner, K. (2001) "Educational action research". In: Reason, P. and Bradbury, H. (eds.) **Handbook of action research: participative inquiry and practice**. London: SAGE Publication, pp. 273-283.

Zeuli, J.S. (1994) How do teachers understand research when they read it? **Teaching and Teacher Education**, 10 (1): 39-55.

Zuber-Skerritt, O. (1996) **New directions in action research**. London: Falmer.

APPENDICES

APPENDIX 1: Parents' consent form

UNIVERSITY OF BIRMINGHAM



STUDY ON COMMUNICATION

Dear parent(s),

My name is Lila Kossyvaki and I am a research student studying for my PhD. I am a qualified teacher specialising in autism and I am interested in how children communicate at school. Since last May I have been visiting xxxxxxxx School and researching how children initiate communication and how staff enhance their efforts. This year I am planning to work with the staff on an approach which is believed to help children's communication. The study will not affect what happens to your child, as the school's timetable and curriculum will be followed as before.

In order to observe how each child communicates and how their communication might be developed, I would like to video record some lessons in your child's class. I will be writing my observations and findings up for my PhD degree.

All names of children will be changed in the report and the videos will be only used for my research.

You can stop taking part in my study at any point if you wish. If you withdraw, you can still be informed about the findings when the research is completed.

Please tick the box below to say whether you are happy for your child to be involved in the study.

I am/we are happy for my/our child to be in the study ☐

I/we would prefer my/our child not to be part of the study ☐

Name of child: _____

Signed: _____ mother/father/carer

Date: _____

You can contact me by email on xxxxxx@bham.ac.uk or talk to xxxxxx xxxxxxx at the school if you want any more information

APPENDIX 2: Children's CARS scores on each item

(Pre intervention assessment, January 2010)

Items	**Molly***	**Alex**	**Robert**	**Nathan**	**David**	**Oliver**
I. Relating to people	4	2.5	3	3	3	3.5
II. Imitation	4	4	3.5	3.5	2	4
III. Emotional response	3	4	3.5	2.5	2	3.5
IV. Body use	2	4	3	3	1.5	2
V. Object use	4	3	4	3	2	3
VI. Adaptation to change	2.5	4	4	3	2	3.5
VII. Visual response	3	2.5	4	2.5	2.5	3.5
VII. Listening response	3.5	2	3	2.5	3	3.5
IX. Taste, smell and touch response and use	3.5	2.5	4	3	1.5	2.5
X. Fear or nervousness	3.5	3.5	3.5	2	4	3.5
XI. Verbal communication	4	4	4	4	3.5	4
XII. Nonverbal communication	4	4	4	4	2.5	4
XIII. Activity level	3	3.5	3	2.5	4	3
XIV. Level and consistency of intellectual response	4	4	4	4	4	4
XV. General impressions	3.5	4	3.5	3.5	3	4
OVERALL SCORE	**51.5**	**51.5**	**54**	**46**	**40.5**	**51.5**

***** children's names have been changed

APPENDIX 3: Children's SPT scores on each play situation

(Pre intervention assessment, January 2010)

Play situations	**Molly**	**Alex**	**Robert**	**Nathan**	**David**	**Oliver**
I	0	1	0	0	2	0
II	0	0	0	1	3	0
III	0	0	0	1	3	0
IV	0	1	0	1	4	1
TOTAL SCORE	**0**	**2**	**0**	**3**	**12**	**1**
Age equivalent in months	**< 12**	**< 12**	**< 12**	**< 12**	**21.9**	**< 12**

Toys of each play situation:

Situation I: large girl doll, saucer, spoon, cup, brush and comb.

Situation II: bed, pillow, blanket and small girl doll

Situation III: chair, table, tablecloth, fork, small boy doll, knife and plate.

Situation IV: trailer, man doll, tractor and logs.

APPENDIX 4: Questionnaire for Determining Spontaneous Communication in Children (QDSCC)- devised by the author

Please complete the following questionnaire by ticking (√) the relevant box/es or writing where appropriate

*Note that you are asked about the communication that the child **INITIATES**.*

Initiation of communication is defined as *'every child's attempt to transmit a message without being verbally prompted by others'* (Potter and Whittaker, 2001).

PART A: Respondent's Details

1. *Your first name*: _____

2. *Role:*
   - Teacher ☐
   - Teaching Assistant ☐
   - Other, please describe ☐

   _____

PART B: The child

Child's first name: _____

a. Communicative partners

3. How often does this child INITIATE contact with others? (tick one box)

Not at all ☐ Not often ☐ Often ☐ Very Often ☐

4. How often does this child INITIATE contact with adults? (tick one box)

Not at all ☐ Not often ☐ Often ☐ Very Often ☐

5. How often does this child INITIATE contact with children? (tick one box)

Not at all ☐ Not often ☐ Often ☐ Very Often ☐

b. Communication and activities

6. At school, when is this child most likely and when most unlikely to INITIATE communication?

- Activities most likely to elicit communicative initiations

- Activities most unlikely to elicit communicative initiations

c. Methods of communication

7. If this child wants to <u>INITIATE</u> contact with others, how does s/he usually do it? (tick one box in each row)

	Not at all	Not Often	Often	Very Often
Pre symbolic means				
1. By behaving in an inappropriate way (e.g. challenging behavior, self-injuries)	☐	☐	☐	☐
2.By looking at you	☐	☐	☐	☐
3.By pointing at objects/ people	☐	☐	☐	☐
4.By approaching or touching you	☐	☐	☐	☐
5.By pushing, pulling you or manipulate your hands	☐	☐	☐	☐
6.By making word-like sounds or partial words (e.g. 'b' for 'biscuit', 'app' for 'apple')	☐	☐	☐	☐
Symbolic means				
7.By using objects of reference	☐	☐	☐	☐
8.By using signs/gestures	☐	☐	☐	☐
9.By using symbols/pictures	☐	☐	☐	☐
10.By using speech				
- Echolalia (i.e. repeats what others have said)	☐	☐	☐	☐
- One or two spoken words (e.g. drink, no)	☐	☐	☐	☐
- Two or three word phrases	☐	☐	☐	☐
- Sentences	☐	☐	☐	☐
11.Other, please describe_____	☐	☐	☐	☐

d. Functions of communication

8. For which of the following reasons does this child usually INITIATE communication with others? (tick one box in each row)

	Not at all	Not Often	Often	Very Often
Behaviour Regulation				
1.To request objects and activities	☐	☐	☐	☐
2.To reject objects and activities	☐	☐	☐	☐
Joint Attention				
3.To comment on objects and other people	☐	☐	☐	☐
4.To ask for information	☐	☐	☐	☐
Social Interaction				
5.To express feelings, personal preferences and dislikes	☐	☐	☐	☐
6.To draw another's person attention to himself/herself	☐	☐	☐	☐
7.To ask for approval of what s/he is doing	☐	☐	☐	☐
8.To perform simple routines of social nature (e.g. say 'hi', 'thank you', wave to somebody)	☐	☐	☐	☐
9.To initiate social games (e.g. tickling, peek-a-boo etc)	☐	☐	☐	☐
10.Other, please describe _____	☐	☐	☐	☐

9. Would you like to add any other comments about the contact this child INITIATES with you?

Thank you for taking time to fill out this questionnaire

APPENDIX 5: Definitions for communicative functions and methods used in CICCA

Functions

Behaviour Regulation	**Verbal or gestural communicative signals to regulate another person's behaviour** (Wetherby and Woods, 2006).
Request	The child asks for an object, service or activity (Stone and Caro-Martinez, 1990).
Reject/protest	The child refuses an object, protests an action or wishes to terminate an event that has already begun (Stone and Caro-Martinez, 1990).
Joint Attention	**Verbal or gestural communicative signals to draw another person's attention to a person, an object or event** (modified from Wetherby and Woods, 2006).
Comment/give information	The child shows or speaks about people, object(s) or event(s) that are either readily apparent to the listener or relate to past or future events (modified from Stone and Caro-Martinez, 1990).
Seek information	The child asks for information about people, object(s) or event(s) that are either readily apparent to the listener or relate to past or future events (modified from Stone and Caro-Martinez, 1990).
Social Interaction	**Verbal or gestural communicative signals to draw another's person's attention to oneself** (Wetherby and Woods, 2006).
Express feelings	The child shares with a partner how they feel, likes or dislikes (modified from Stone and Caro-Martinez, 1990).
Seek attention	The child tries to be noticed (Stone and Caro-Martinez, 1990).
Seek approval	The child asks for permission of what they are doing (modified from Agius, 2009).
Social routines	The child carries out simple routines of a social nature (e.g. say '*hi*', 'goodbye', waves to somebody etc) (Stone and Caro-Martinez, 1990).
Social games	The child initiates either widely known social games such as 'round and round the garden', 'peek-a-boo', 'row, row the boat' or self-created ones such as hiding below/behind objects, tickling games, etc. (modified from School's SLT, 2009).

Methods

Pre-symbolic methods	**The child uses motoric/ pre- symbolic acts involving direct manipulation of a person or object** (Prizant et al., 2006).
Challenging Behaviour	Behaviours or attempts of behaviours that may put people or the individuals themselves in danger of physical damage (e.g. bite, cry, hit, kick, pinch somebody, shout/scream, spit, pull hair, throw objects, throw oneself on the floor, self-injuries etc) (modified from Agius, 2009).
Eye contact	The child looks directly into another person's eyes or face for at least 2 continuous seconds (modified from Agius, 2009).
Eye pointing	The child looks at an object and then glances at/towards a person. The child may alternate the glance between the object and the person until s/he has been given the item (School's SLT, 2009).
Laugh	The child laughs at an object, person, event in the presence of another person (Agius, 2009).
Point	The child extends their index finger and either touches an object or person or points to them by far (contact and distal point). Even when the child uses another finger (not the index one) or the whole palm with the intention to point to something, the behaviour is rated as pointing (modified from Stone et al., 1997).
Proximity/ touch	The child either approaches a person by extending arms, touching or hugging them or bringing an object towards the direction of another person (modified from Prizant et al., 2006).
Re-enactments	The child replicates an event or part of an event (e.g. a child put the caregiver's hands in the position of the movements that go with 'Incy Wincy Spider' and vocalize an approximation of 'incy' to request that social routine) (Prizant et al., 2006).
Simple motor actions	The child claps hands, flaps hands or objects, jumps up and down, uses another's person hand or body to perform a desired action, pulls or pushes objects/persons, turn or run away from an activity, throws somebody's hand on or towards something, throws/hides objects, try to escape from somebody, takes an object or give an object to somebody, resists physically following somebody or doing something, prohibit with his/her body somebody from doing something (modified from Prizant et al., 2006).
Smile	The child smiles at an object, person, event or smiles in the presence of another person (Agius, 2009).
Vocalisations-babbling	*Vocalisations*: The child produces prolonged voiced vowels incorporating a variety of intonation patterns and experimenting with volume. *Babbling*: The child produces purposeful repetitions of the same consonant-vowel combination (School's SLT, 2009).

Symbolic Behaviour	**The child uses symbols such as pictures, sign language or speech to communicate** (Prizant et al., 2006).
Immediate echolalia	The child repeats immediately speech produced by others (Prizant et al., 2006).
Delayed echolalia	The child repeats speech produced by others after a certain period of time (Prizant et al., 2006).
Object of reference	The child touches or gives to others objects which represent something (e.g. gives shoe to an adult when wanting to go outside, gives an empty cup or plate to signify they are thirsty or hungry) (School's SLT, 2009).
Single words	The child uses perfect or non perfect rendition of words (e.g. 'tah' for 'car'). They may only be recognisable by those who know the child well. They are used meaningfully and consistently in their correct context. (School's SLT, 2009).
Signs/gestures	The child uses previous learnt signs or sign approximations to communicate (e.g. Makaton, sign language) (modified from Agius, 2009).
Symbols/ pictures	The child exchanges or attempts to exchange symbols/ pictures with the intention to communicate (modified from Prizant et al., 2006).
Word combinations	The child uses more than one (perfect or non-perfect) renditions of words (e.g. 'tah' for 'car') in a row. They may only be recognisable by those who know the child well. They are used meaningfully and consistently in their correct context. (School's SLT, 2009).

APPENDIX 6: Two examples of the continuum conceptualisation of spontaneity – Kazmareck's and Carter's and Hotchkis's models

- **<u>Kazmareck's model</u>**

a. Listener's preparatory variables

Class	Factor	Example of measurement ⟷			
Selecting a listener	1.Number of potential listeners	None	1	2	3 or more
	2.Familiarity of potential listeners	Regular communicative partners	Occasional communicative partners	Strangers	
	3.Role or function of potential listeners	None	1	2	3 or more
Establishing proximity to selected listener	1.Proximity of selected listener	Within conversational distance		Not within conversational distance	
	2.Type of setting	Setting broadly defines conversational distance		Setting narrowly defines conversational distance	
Obtaining attention of selected listener	1.Nature of ongoing activity of partner	Not engaged in activity		Engaged in activity	
	2.Attention state of partner	Attending to speaker		Not attending to speaker	

b. Environmental factors affecting requests for objects

Class	Factor	Example of measurement ⟷				
Possible referents	1.Position	Within reach		Out of reach		
	2.Visibility	Full view	Partly in view	Briefly in view	Not in view	
	3.Sensory modes other than visual	2	1	0		
	4.Number of choices	1	2	3	4 or more	
Selected listener	1.Verbal behaviour	Models request	Direct cue for request	Indirect cue for request	None	
	2.Nonverbal behaviour	Offer choice of referent	Acting on possible referent	Neutral		
	3.Age of partner	Older	Peer	Younger		
	4.Familiarity of partner	Familiar frequent partner	Familiar infrequent partner	Stranger		
Setting characteristics	1.Number of irrelevant cues	Few	Moderate	Many		
	2.History relative to setting	Familiar	Similar	Novel		
Representation of objects relating to referents	1.Level of representation	Objects	Models	Photos	Pictures	Words
	2.Position	Within reach		Out of reach		
	3.Visibility	Full view	Partly in view	Briefly in view	Not in view	

SOURCE: Kazmareck (1990, p.163)

- **Hotchkis's models**

The four level antecedent hierarchy

Level	Definition	Example of variable	Description	Example
1.Direct prompting	Prompts with the primary intent to directly elicit a specific communicative act by the learner and specify the content and/or form of the act	1.Physical prompt	Physical contact directed at occasioning a specific communicative act.	Teacher physically assists student to form a sign or point to a specific symbol.
		2.Instruction	Learner is instructed to perform specific communicative act.	Teacher says 'Sign biscuit'.
2.Generalised communicative cue	Deliberate general signals that indicate that a communicative act is required or anticipated but do not designate a specific communicative act.	1.Question or mand	Learner is asked question or manded to produce a communicative act.	Teacher says 'What do you want?' or 'Tell me what you want' during morning tea.
		2.System presentation	Aided communication system is presented to learner to indicate that a communicative act is anticipated.	At morning tea teacher holds food object symbol board up for learner to request refreshment.
		3.Expectancy	A sustained expectant look and posture (neck/body arched forward, shrugged shoulders, eye contact, lips pursed, eyebrows raised)	Teacher looks expectantly at learner during morning tea routine waiting for request for refreshments.
3.Stimulus highlighting	Techniques used by partners that either systematically manipulate the number of occasioning variables available to the learner or their saliency, in order to focus learner's attention on some aspect of the natural stimulus complex	1.Comments	Comments that are intended to direct attention to some aspect of the natural stimulus complex.	During morning tea teacher comments 'That toast smells nice!' in attempt to elicit request for toast.
		2.Alter saliency of object or activity	Saliency of object or activity is increased to draw learner's attention to it.	Drink is moved, placed closer or placed in direct view of learner in order to draw attention to it. Teacher taps cup to draw attention to it.
		3.Exaggeration	Teacher exaggerates action to highlight saliency	Teacher pours juice with exaggerated action in front of learner.
4.Natural cues	Cues that are likely to occasion communication and have a high probability of being present in environment of an age-matched non-disabled peer.	1.Presence of referent	Referent is present during communicative interaction	Drink is on table in view of learner.
		2.Natural context	Contexts are considered natural if they occur at an appropriate time of the day, appropriate setting and with appropriate partners	Learner etas morning tea with peers at table at appropriate time of day.
		3.Presence of partner	A partner is present or can be summoned.	

SOURCE: Carter and Hotchkis (2002, pp. 177-178)

APPENDIX 7: AISI protocol with examples from the study

AISI principle	*Definition*	*Example*
General Principles		
1.Establish appropriate proximity/touch (modified from Nind and Hewett, 2001)	The adult approaches the child in distance less than 1 metre and may touch them too. NOTE: In sensory room/soft play code appropriate proximity when the adult approaches the child in distance less than 1 metre AND gets down to their level. In snack/work (appropriate proximity is the case most of the time) code it only when the adult comes to the table from far.	Emma noticed that there was nobody sitting next to Oliver when he finished his biscuit and he was about to ask for another one. She moved next to him making sure that there was no more than a metre distance in between them.
2.Show availability (modified from Prizant et al., 2006)	The adult extends their hands towards the child (palms facing up or down). They may also have wide and questioning eyes.	Emma held out her hand with vertical palm when realised that Oliver would need help with the posting pegs activity.
3.Gain child's attention (modified from Prizant et al., 2006)	The adult calls the child's name before addressing them. They may alternatively say something like *'Hello Paul'*, *'Where is Paul?'* or *'Paul's turn'*. The adult may also sing gaining attention songs such as *'Hello Paul how are you?'*, *'Paul Martin where are you?'*, *'What shall we do with Paul now?'*	Emma chanted *'What shall we do with Nathan now (x2)'* and paused while sitting next to him in the sensory room.
4.Wait for initiations (modified from Prizant et al., 2006)	The adult sets up the stage for interaction (e.g. gets down to the child's level, makes a toy inaccessible, offers the child a communication board with choices of food) and waits for at least 5 seconds for the child to initiate.	Lorna waited for Robert to hand in the 'biscuit' symbol before prompting him to do so. She only prompted him when it was obvious that he was not going to initiate.
5.Respond to all communicative attempts (modified from Prizant et al., 2006)	The adult gives the object the child asks for, takes away the object they protest for, allows them to start and terminate activities when they communicate these. In cases that the child cannot finish their activity or get the object they want, the adult acknowledges the communicative attempt and indicates steps for completion of the present task. When the child makes a choice (e.g. toy, work activity), the adult responds to this choice and engage with them. Adult answering the child's questions belong to this category. When the child chooses an activity and the adult responds by giving them this activity, this principle should be coded. To code responding to the child's communicative attempts, the child should communicate (e.g. 5 elements for an act to be communicative- Bogdashina, 2005) their desires/choices. If the child does not communicate their request/protest and the adult guesses them, this should be coded as 'assign meaning to random actions or sounds' (next principle).	Amber showed Alex his timetable saying *'it's time for work'* when he tried to escape by pushing her away.
6.Assign meaning to random actions or sounds (modified from Christie et al., 2009)	The adult reacts as if the child's behaviour is communicative, even when it is not. The adult assigns meaning to the child's pre-intentional/ unconventional communicative attempts. (e.g. when the child jumps to get an object out of reach, the adult reacts as if the child asked them to bring it down or if the child just touches a photo or holds it in front of their eyes, the adult gives them the object or food of the photo). This principle is coded when not all the 5 elements for an act to be communicative (Bogdashina,	In the sensory room, Amber sat in front of Alex facing him and sang 'row row the boat' joining his rocking.

	2005) are present.	
7.Imitate the child (modified from Prizant et al., 2006)	The adult imitates the child's verbal (vocalisations, words) and non-verbal behaviour (actions) (e.g. the child vocalises, taps the floor, uses equipment in an 'unconventional' way and the adult copies the exact same sounds and actions or a close approximation of them).	Emma imitated Molly's vocalisations in the sensory room and paused in anticipation for more.
8.Follow child's lead/focus of attention (modified from Prizant et al., 2006)	The adult follows what the child is doing or comment on it. In the sensory room, if the child moves away from the interaction with the adult and engages with a piece of equipment, the adult follows them and joins in their game. In the soft play, the child goes up the steps or down the slide and the adult follows. The adult may chant or talk about what the child is attending to or doing.	In soft play, Lorna followed David on the mirror once he had enough on the trampoline and started a new game there related to the mirror.
9.Use exaggerated pitch, facial expression, gestures and body language (modified from Kaufmann, 1994; Greenspan and Wieder, 1998)	The adult uses animated pitch (e.g. exclamation words such as *'ah'*, *'uh, uh'*, words which increase anticipation such as '*aaaaaaaand*', enthusiastic singing, loud laughs), gestures (e.g. wiggle fingers before tickling) and body language (stamping feet, clapping hands or tapping the floor).	Emma was very animated while jumping on the trampoline with Alex. Her tone of voice was gradually increasing before the end of each turn and she laughed loudly once the turn was over.
10.Use minimal speech (modified from Potter and Whittaker, 2001)	The adult uses up to 4 concrete words and map them exactly onto aspects of the situation in hand (e.g. *'time for work'*, *'first work, then toys'*). Words such as *'good boy'*, *' look'*, *'well done'*, *'good job'* are quite abstract and can be coded as minimal speech only if they are accompanied by gestures (e.g. thumbs up, pointing) or symbols (e.g. 'star' for 'well done').	During a sorting activity in work time, Amber spoke slowly and stressed the key words to Nathan: *'find **same**'*.
11.Provide time to process information (modified from Nind and Powell, 2000)	The adult gives the child verbal or non-verbal information and provides them with at least 5 seconds to process the given information (e.g. the adult shows the child the 'finish' symbol when snack is finished or the 'work' photo when it's time for work and gives them time to process this). The difference with the principle of 'wait' is that here the adult has to give a piece of information to the child.	Before starting a new activity Lorna showed Robert his timetable and gave him more than 10 seconds to process the information.
12.Expand on communicative attempts (modified from Rogers and Dawson, 2010)	The adult models the next stage of the child's communication development to build on the child's initiations. When the child is non-verbal, the adult models single words and when the child uses some words to communicate, the adult models two and three word phrases. When the child asks for a toy using the word or an approximation (e.g. 'tars' with or without symbol), the adult may say, '*Paul wants cars'*or '*Give cars'*.	Lorna said '*biscuit'* when Alex (verbal communication level= vocalisations) gave her the 'biscuit' symbol but she said '*more blackcurrant'* when David (verbal communication level= occasional words) gave her the 'blackcurrant' symbol saying an approximation of the word '*blackcurrant'*.
13.Use non-verbal cues (modified from Prizant et al., 2006)	The adult uses non-verbal cues to help the child understand what they are asked to do or not to do. These are: symbols/pictures (e.g. showing their timetable, 'finish' or 'wait' symbol), objects of reference (e.g. show their coat when it's time to play outside), gestures (e.g. 'come here', pointing), physical prompts (e.g. adult touches the child's hands to remind them that they are supposed to do something, uses their body to prevent the child from leaving) and Makaton signs. If more than one non-verbal cues are used, 1 tally should be coded. If the adult keeps using non-verbal cues for more than 5 seconds another tally should be coded according to the 5-seconds-rule.	When Nathan stood up during work time Amber showed him the timetable, tapped on his chair and guided him physically to sit down.

Communicative Opportunities		
1.Offer choice (modified from Potter and Whittaker, 2001; Prizant et al., 2006)	The adult gives a choice of activity or food without any verbal prompt. The adult might hold out two objects for the child to choose or provide the child with a photo choice board for toys (red choice board) or snack (blue choice board).	During work time, Lorna moved the work box closer to Nathan and waited for him to choose the activity he wanted. He had to do all the activities of the work box but he could decide on the order he was going to do them.
2.Stop part-way (modified from Potter and Whittaker, 2001)	The adult stops part-way through an activity or social interaction giving the child a chance to request to continue. The adult stops abruptly and may also say '*stop*' or '*uh, uh*'. (e.g. The adult plays a 'rough and tumble' or 'burst and pause' game and suddenly stops).	In the soft play, Emma sang to David '*heads and shoulders, knees and ___*', and paused so that David would join in.
3.Give small portions (Potter and Whittaker, 2001)	The adult gives the child small portions of food or drink so that the child may ask for more (e.g. when the child asks for a biscuit or a fruit, the adult gives them 1 or 2 bits of it instead of the whole thing).	Lorna gave just one piece of chocolate to Molly every time Molly gave her the 'chocolate' symbol to make her ask for more.
4.Make items inaccessible (Potter and Whittaker, 2001)	The adult puts items 'in sight but out of reach' so that the child will need to ask for them (e.g. The adult does not put any equipment on as they enter the sensory room and wait for the child to ask what they want).	In the sensory room, Lorna put the light curtain out of reach but in sight so that Molly would ask her to take it down.
5.Give material the child will need help with (Potter and Whittaker, 2001)	The adult gives the child materials they will need help with to elicit asking for help (e.g. a box of cars with the lid on, a wind-up toy which the child cannot make work)	Once the work box is put on the table Amber did not take off the lid but waited for Oliver to ask her to do so.
6.Contradict expectations (Potter and Whittaker, 2001; Griffin and Sandler, 2010)	The adult does something unexpected or out of routine to elicit a request or comment (e.g. the adult turns a toy animal over to see whether the child will restore it to the original position or reads a book upside down and turns the pages backward).	Robert is staring into space and Emma stepped in front of him to elicit a reaction (not widely used).
7.Give non preferred items (Potter and Whittaker, 2001)	The adult gives the child items they are not interested in to elicit protest or comment (e.g. the adult give the child a toy that they don't like). Note: The adult gives the child these items when the child has not asked for something else. If the child asks for an item the adult should either give it or indicate steps for getting it and in no occasion give a non-preferred item instead. In such a case, the child gets confused by being given different items to the ones they asked.	Emma put some carrot in Oliver's plate although she knew he does not like it to elicit protest (not widely used).
8.'Forget' something vital (Christie et al., 2009)	The adult sets up a situation where she 'forgets' something vital (e.g. the adult helps the child to put the coat on but does not do the zip up or when changing clothes, the adult helps the child to put one shoe on and 'forgets' the other).	Lorna gave Alex the yogurt he asked for but 'forgot' to give him a spoon so that he would have to ask for it.

SOURCES: Christie et al. (2009), Kaufmann (1994), Manolson (1992), Nind and Hewett (2001), Nind and Powell (2000), Potter and Whitaker (2001), Prizant et al. (2006)

APPENDIX 8: Staff's Self-evaluation checklist- devised by the author

Name of staff: _____

Date: _____

Please tick how often you think you have used each of following principles <u>TODAY</u>.

GENERAL PRINCIPLES

	Not at all	1-5 times	Many times
1. Gain children's attention	☐	☐	☐
2. Establish appropriate proximity and contact	☐	☐	☐
3. Show you are available to the children	☐	☐	☐
4. Wait for initiations	☐	☐	☐
5. Respond to the children's attempts to communicate	☐	☐	☐
6. Assign meaning to the children's apparently random actions or sounds	☐	☐	☐
7. Imitate the children	☐	☐	☐
8. Follow children's focus of attention	☐	☐	☐
9. Use exaggerated pitch, facial expression, gestures and body language	☐	☐	☐
10. Use minimal speech	☐	☐	☐
11. Provide time	☐	☐	☐
12. Expand on communicative attempts	☐	☐	☐
13. Use non-verbal cues	☐	☐	☐

COMMUNICATIVE OPPORTUNITIES

	Not at all	1-5 times	Many times
1. Give a choice of activity, equipment or food	☐	☐	☐
2. Stop part-way through an activity or social interaction	☐	☐	☐
3. Give small portions (so children can ask for more)	☐	☐	☐
4. Make items inaccessible (so children have to ask for them)	☐	☐	☐
5. Give children materials that they will need help with	☐	☐	☐
6. Contradict children's expectations	☐	☐	☐
7. Give children known non-preferred items	☐	☐	☐
8. Set up a situation where you 'forget' something vital	☐	☐	☐

APPEDIX 9: The three focus group interview schedules

FOCUS GROUP 1*: 26/05/2010*
Duration: 45 minutes

1. What did you gain from my presentation on the 5th of May 2010 (*I showed them their videos taken pre intervention*)?

2. Do you feel that you have changed your practice as a result of the presentation?

3. Although it's still early days but have you noticed any difference in the behaviour of any of the children?

Fidelity of implementation checklist is distributed. Staff has to state which of the principles are easy/hard to understand and which easy/hard to implement. After having filled in the checklist the following questions are asked.

4. Which two principles you think are the easiest and which two are the hardest to understand?

5. Which two principles you think are the easiest and which two are the hardest to implement?

6. Are there any principles that you don't feel confident with?

7. Does the last form of the fidelity of implementation checklist make sense to you?

Explain what is going to happen from now on. 2 hrs of recording for each child in the same activities as in the baseline. The aim is to check whether there are changes in the children's behaviour while staff is implementing the principles as often as possible.

FOCUS GROUP 2: *21/07/2010*
Duration: 45 minutes

1. Likert chart of the effectiveness of each principle

2. Which principles have you rated as not effective and why? *Get an opinion about all the principles rated as not effective*

3. Are there any principles that you were not using before the intervention and you now use a lot? Why you were not using it/them before? *Not know it? You haven't thought of it? You thought it was inappropriate?*

4. *Give them a list of the participant children as a reminder.* Which children you think have enhanced the most his/her spontaneous communication after the implementation of the intervention? In which ways (frequency, methods, functions)? *Get an opinion for every child of the sample*

5. *Give them a list of the activities that I was recording as a reminder (work, snack, sensory, soft play).* In which activity/activities have you seen greater differences regarding children's spontaneous communication before and after the intervention? *Get an opinion about the four activities*

6. Was it easy for you to use these principles in your everyday practice? Were there any principles that you consider effective but you couldn't implement as much as you like to? If yes, which ones and why?

7. Are you going to continue implementing any of these principles after the end of the study? Which one/s?

FOCUS GROUP 3: *26/06/2011*
Duration: 45 minutes

1. What was it like being part of this study (*Both benefits and difficulties*)? What did you enjoy the most (*see the practice of other people? Strengthen your confidence?*) and what did you find the most difficult (*be video-recorded? Alter my interactive style?*)?

Pre-amble: For my study I want to find out which principles were harder to remember or carry out so I am going to ask you for your opinions on this.

2. From the top of your head can you write down which principles from the ones we were working on last year you are still using (*no prompts*)? *Use a blank piece of paper (no indication of how much they have to write).*

Discuss a bit about them. 'All of you got… None of you got…'

3. *Show them the graphs (group means) about pre and post intervention data on principles, explain what they mean and get their comments.* Why do you think you were using these principles more than the others post intervention?

4. Which child do you think made the greatest progress in regards to spontaneous communication? *Show them the graph with pre and post intervention data and ask them to comment on it. Highlight the most changed.* What ideas have you got as to why Oliver had the greatest change while David and Robert slighter ones?

   Show two videos of the most changed child, Oliver (pre and post intervention)

APPENDIX 10: Ethical review application and ethical approval letter

Ethical review application

UNIVERSITY OF BIRMINGHAM
APPLICATION FOR ETHICAL REVIEW

Who should use this form:

This form is to be completed by PIs or supervisors (for PGR student research) who have completed the University of Birmingham Ethical Review of Research Self Assessment Form and have decided that further ethical review and approval is required before the commencement of a given Research Project.

Please be aware that all new research projects undertaken by postgraduate research (PGR) students first registered as from 1st September 2008 will be subject to the University's Ethical Review Process. PGR students first registered before 1st September 2008 should refer to their Department/School/College for further advice.

Researchers in the following categories are to use this form:

1. The project is to be conducted by:
    - staff of the University of Birmingham; or
    - a research postgraduate student enrolled at the University of Birmingham (to be completed by the student's supervisor);
2. The project is to be conducted at the University of Birmingham by visiting researchers.

Students undertaking undergraduate projects and taught postgraduates should refer to their Department/School for advice.

NOTES:

- Answers to questions must be entered in the space provided
- Use the up and down arrow keys to move between answer fields; use the side scroll bar to navigate around the document.
- An electronic version of the completed form should be submitted to the Research Ethics Officer, at the following email address: aer-ethics@contacts.bham.ac.uk. Please **do not** submit paper copies.
- If, in any section, you find that you have insufficient space, or you wish to supply additional material not specifically requested by the form, please it in a separate file, clearly marked and attached to the submission email.
- If you have any queries about the form, please address them to the Research Ethics Team.

UNIVERSITY OF BIRMINGHAM APPLICATION FOR ETHICAL REVIEW	*OFFICE USE ONLY:* Application No: Date Received:

1. TITLE OF PROJECT

An investigation into the effect of adult style on the communicative initiations of young children with autism in a special school setting

2. THIS PROJECT IS:

University of Birmingham Staff Research project ☐
University of Birmingham Postgraduate Research (PGR) Student project ☒
Other ☐ (Please specify):

3. INVESTIGATORS

a) PLEASE GIVE DETAILS OF THE PRINCIPAL INVESTIGATORS OR SUPERVISORS (FOR PGR STUDENT PROJECTS)

Name: Title / first name / family name	Dr Glenys Jones
Highest qualification & position held:	Lecturer
School/Department	Education
Telephone:	
Email address:	

Name: Title / first name / family name	Dr Karen Guldberg
Highest qualification & position held:	Lecturer
School/Department	Education
Telephone:	
Email address:	

b) PLEASE GIVE DETAILS OF ANY CO-INVESTIGATORS OR CO-SUPERVISORS (FOR PGR STUDENT PROJECTS)

Name: Title / first name / family name	N/A
Highest qualification & position held:	
School/Department	
Telephone:	
Email address:	

c) In the case of PGR student projects, please give details of the student

Name of student:	Aglaia-Lila Kossyvaki	Student No:	
Course of study:	Mphil/PhD	Email address:	
Principal supervisor:	Dr. Glenys Jones		

Name of student:	N/A	Student No:	
Course of study:		Email address:	
Principal supervisor:			

4. ESTIMATED START OF PROJECT Date: January 2010

ESTIMATED END OF PROJECT Date: September 2011

5. FUNDING

List the funding sources (including internal sources) and give the status of each source.

Funding Body	*Approved/Pending /To be submitted*
Foundation 'Propondis'	Approved

If applicable, please identify date within which the funding body requires acceptance of award:

Date:

If the funding body requires ethical review of the research proposal at application for funding please provide date of deadline for funding application:

Date: N/A

6. SUMMARY OF PROJECT

Describe the purpose, background rationale for the proposed project, as well as the hypotheses/research questions to be examined and expected outcomes. This description should be in everyday language that is free from jargon. Please explain any technical terms or discipline-specific phrases.

Literature suggests that children with autism often initiate very little communication and the range of reasons for communication is more restricted than that of typically developed children. Hence, the purpose of my research project is to investigate how often children with autism initiate communication and for what reasons before and after an intervention that I am going to implement in an autism specialist school with the help of the staff. To develop this intervention I will rely on social communication models (e.g. SCERTS, Intensive Interaction), previous studies in the field (e.g. Potter and Whittaker, 2001) as well as classroom observations, informal interviews with the staff and school documents.

My research questions are:
1. When do children initiate contact with others and for what reason before and after the intervention?
2. How can adults facilitate children to initiate contact with them?
3. What activities appear to enable children to initiate contact with others?

Approaches which teach children how to respond rather than how to initiate communication have mainly been employed. However, teaching children how to respond and how to communicate spontaneously are two different abilities which should be taught using different approaches. The rationale for this project is that teaching students with autism to initiate communication means teaching them to have control over their environment and a better quality of life.

The expected outcome of this study is to define an adult style which teaching staff at school can adopt and help the students with autism to initiate communication more often and expand the reasons they communicate for.

7. CONDUCT OF PROJECT

Please give a description of the research methodology that will be used

An action research case study with a mixture of quantitative and qualitative evidence will be used. A foundation class (children and teaching staff) in an autism specialist school will comprise the sample. A questionnaire for teaching staff and an observation schedule to record the behaviour of students will be used during the baseline. A questionnaire (see attached form) and a student observation form (see attached form) have been developed. The questionnaires –one for each child- will be filled in by the teacher of the classroom to identify the children who are poor initiators of communication and get an idea about communication enabling activities. Class observation will be conducted to record the frequency and nature of the children's communication. Then an intervention based on previous studies in the field will be implemented to modify adult communication style. Specific goals will be decided for each child in collaboration with the teaching staff. After a month of implementation- during which I will be going to the school twice per week to record the process- there will be a meeting with the staff to check the effectiveness of the intervention and potential changes which should be made. Subsequently, the intervention in its new form will be put in practice for another month and after that the children will be observed again using the same observation schedule to check any differences with the baseline. Moreover, at this point semi structured interviews will be conducted with the staff to gain their views about the intervention and its impact on children's behaviour. Video camera will be used to record the children and staff observations as it is the case in most of similar studies. The research is planned to start in January 2010 and data collection to be completed by the end of the academic year (July 2010).

8. DOES THE PROJECT INVOLVE PARTICIPATION OF PEOPLE OTHER THAN THE RESEARCHERS AND SUPERVISORS?

Yes ☒ No ☐

Note: "Participation" includes both active participation (such as when participants take part in an interview) and cases where participants take part in the study without their knowledge and consent at the time (for example, in crowd behaviour research).

If you have answered NO please go to Section 18 . If you have answered YES to this question please complete all the following sections.

9. PARTICIPANTS AS THE SUBJECTS OF THE RESEARCH

Describe the number of participants and important characteristics (such as age, gender, location, affiliation, level of fitness, intellectual ability etc.). Specify any inclusion/exclusion criteria to be used.

My study will include up to 10 children with autism and learning difficulties (3-5 years old, both genders, with restricted spontaneous communication and verbal skills) and up to 6 members of teaching staff (teachers and teaching assistants, both genders, experienced and less experienced). Children and staff are members of a foundation extended curriculum class in an autism specialist school based in the West Midlands.

Inclusion criteria (for children):

- A diagnosis of autism with learning difficulties
- Using up to 20 words (spoken, signed, pictures, symbols, objects) referentially, with communicative intend and regularly.
- Initiating infrequently communication with adults and peers, having restricted reasons and methods they initiate communication.

Exclusion criteria (for adults):

- those with other clinical syndromes and conditions which might affect the study (e.g. Down's syndrome, cerebral palsy)

Inclusion criteria (for staff):

- Working in the specific classroom permanently (either full-time or part-time)

10. RECRUITMENT

Please state clearly how the participants will be identified, approached and recruited. Include any relationship between the investigator(s) and participant(s) (e.g. instructor-student).

Note: Attach a copy of any poster(s), advertisement(s) or letter(s) to be used for recruitment.

My supervisors contacted the senior staff of the school and gained admission for me to work there. We visited together the school and speak with the two of the senior staff (Headteacher and Manager of speech and communication). Then, I visited myself the school several times and I spent time in different classes. The class, which will be my sample, was identified after discussion with the school Manager of language and communication and my supervisors based on the above criteria.

11. CONSENT

a) Describe the process that the investigator(s) will be using to obtain valid consent. If consent is not to be obtained explain why**.** If the participants are minors or for other reasons are not competent to consent, describe the proposed alternate source of consent, including any permission / information letter to be provided to the person(s) providing the consent.

A signed consent will be obtained by the teaching staff who will participate in the research (see attached letter). A consent form will be sent to the parents through the school- home book which will ask for their permission for their child to take part (see attached letter). This procedure will be altered appropriately for parents with language or literacy difficulties.

In case that consent is not obtained for some children or members of staff these will not feature in the video recordings at all. In the one to one work and the extended curriculum activities (e.g. sensory room, soft play area etc) this is easy to be organised because of the small number of participants. More organisation is needed for the circle time activities. In this case either two separate circle times will take place (one with people who accepted participation in the research and one with people who denied) or, if this is not possible, the people who did not give consent will seat from the one side of the circle and the researcher will record only the side that she has participants' consent.

Note: Attach a copy of the Participant Information Sheet (if applicable), the Consent Form (if applicable), the content of any telephone script (if applicable) and any other material that will be used in the consent process.

b) Will the participants be deceived in any way about the purpose of the study? **Yes** ☐ **No** ☒

If yes, please describe the nature and extent of the deception involved. Include how and when the deception will be revealed, and who will administer this feedback.

12. PARTICIPANT FEEDBACK

Explain what feedback/ information will be provided to the participants after participation in the research. (For example, a more complete description of the purpose of the research, or access to the results of the research).

After finishing the research project (September 2011), I will provide the school with a written report of my findings. Parents who are interested may have a copy of the report either from the school or from myself. My email address will be on the parent consent form with the comment that whoever is interested in the findings can email me after the completion of the project. I will also offer to make a small presentation to the staff of the school at the end of my study. Towards the end of my study I plan to ask the staff for their views on taking part in the research and I will write this up in my study.

13. PARTICIPANT WITHDRAWAL

a) Describe how the participants will be informed of their right to withdraw from the project.

The participants' right to withdraw will be cited in the consent form they will sign. If for any reason either staff or parents appear to be finding the process difficult, the researcher will remind them their right to withdraw. In addition, if any student appears to be disrupted by the process, action will be taken to address this.

b) Explain any consequences for the participant of withdrawing from the study and indicate what will be done with the participant's data if they withdraw.

There will be no consequences for the participants. The withdrawal will be mentioned in the research report and the data obtained from them will not be used.

14. COMPENSATION

Will participants receive compensation for participation?

i) Financial **Yes** ☐ **No** ☒

ii) Non-financial **Yes** ☒ **No** ☐

If **Yes** to **either** i) or ii) above, please provide details.

Both staff and parents will be given feedback on the main findings and ideas for future practice in schools.

If participants choose to withdraw, how will you deal with compensation?

These participants will continue to have the option of finding out about the results of the study.

15. CONFIDENTIALITY

a) Will all participants be anonymous? **Yes** ☒ **No** ☐

b) Will all data be treated as confidential? **Yes** ☒ **No** ☐

Note: Participants' identity/data will be confidential if an assigned ID code or number is used, but it will not be anonymous. Anonymous data cannot be traced back to an individual participant.

Describe the procedures to be used to ensure anonymity of participants and/or confidentiality of data both during the conduct of the research and in the release of its findings.

Pseudonyms will be given to the children and numbered labels will be given to the staff (e.g. TS1-Teaching Staff 1, TS2. etc) and used throughout the whole research (collecting and presenting data). A list with the participants' names and their labels will be kept at the researcher's home. This list will be kept for 5 years after the completion of the project.

If participant anonymity or confidentiality is not appropriate to this research project, explain, providing details of how all participants will be advised of the fact that data will not be anonymous or confidential.

16. STORAGE, ACCESS AND DISPOSAL OF DATA

Describe what research data will be stored, where, for what period of time, the measures that will be put in place to ensure security of the data, who will have access to the data, and the method and timing of disposal of the data.

According to the University's Code of Practice for Research all data collected will be preserved and accessible for ten years after the completion of the project. The researcher will be the only person having access to these. After ten years, the documents will be destroyed by a shredder

17. OTHER APPROVALS REQUIRED? e.g. Criminal Records Bureau (CRB) checks

☒ YES ☐ NO ☐ NOT APPLICABLE

If yes, please specify.

A CRB-check is required. The researcher already obtained her CRB-check.

18. SIGNIFICANCE/BENEFITS

Outline the potential significance and/or benefits of the research

- To highlight good practice within the school in relation to facilitating communication
- To identify key principles of effective practice that the staff might adopt
- To identify fundamental issues that children on the autism spectrum have in initiating communication

19. RISKS

a) Outline any potential risks to **INDIVIDUALS**, including research staff, research participants, other individuals not involved in the research and the measures that will be taken to minimise any risks and the procedures to be adopted in the event of mishap

The researcher might identify some staff who are less competent than others. Such information will not be shared with the school in a way that identifies the individual concerned. Instead, advice on good practice will be emphasised within the report.

Staff may feel anxious about being video recorded at school. The researcher will take steps to reduce this by stating clearly what the purpose of the research is and by allowing the staff to ask the researcher to withdraw

I will discuss with staff before I start my observations if there are any occasions that might arise where they would prefer me to stop observing and leave the class.

b) Outline any potential risks to **THE ENVIRONMENT and/or SOCIETY** and the measures that will be taken to minimise any risks and the procedures to be adopted in the event of mishap.

None foreseen

20. ARE THERE ANY OTHER ETHICAL ISSUES RAISED BY THE RESEARCH?

Yes ☒ No ☐

If yes, please specify:

- The use of video recording is necessary to allow the observer to check again behaviours which were not clear and allow inter observer reliability checks. This might raise some ethical issues. Hence, parents and teaching staff will be aware of that before giving their consent and the videos will be used only for research purposes.

- In studies such as these, parents might expect research to have an influence on what happens to their child. It may be that future practice in school is changed as a result of my findings, but I will make parents aware that the staff will not have to change what they usually do as I want to see the children carrying out their everyday activities.

CHECKLIST

Please mark if the study involves any of the following:

- Vulnerable groups, such as children and young people aged under 18 years, those with learning disability, or cognitive impairments ☒
- Research that induces or results in or causes anxiety, stress, pain or physical discomfort, or poses a risk of harm to participants (which is more than is expected from everyday life) ☐
- Risk to the personal safety of the researcher ☐
- Deception or research that is conducted without full and informed consent of the participants at time study is carried out ☐
- Administration of a chemical agent or vaccines or other substances (including vitamins or food substances) to human participants. ☐
- Production and/or use of genetically modified plants or microbes ☐
- Results that may have an adverse impact on the environment or food safety ☐
- Results that may be used to develop chemical or biological weapons ☐

Please check that the following documents are attached to your application.

	ATTACHED	**NOT APPLICABLE**
Recruitment advertisement	☐	☒
Participant information sheet	☒	☐
Consent form	☒	☐
Questionnaire	☒	☐
Interview Schedule	☐	☐
Observation record sheet	☒	☐

21. DECLARATION BY APPLICANTS

I submit this application on the basis that the information it contains is confidential and will be used by the
University of Birmingham for the purposes of ethical review and monitoring of the research project described
herein, and to satisfy reporting requirements to regulatory bodies. The information will not be used for any
other purpose without my prior consent.

I declare that:

- The information in this form together with any accompanying information is complete and correct to the best of my knowledge and belief and I take full responsibility for it.
- I undertake to abide by University Code of Conduct for Research (http://www.ppd.bham.ac.uk/policy/cop/code8.htm) alongside any other relevant professional bodies' codes of conduct and/or ethical guidelines.
- I will report any changes affecting the ethical aspects of the project to the University of Birmingham Research Ethics Officer.
- I will report any adverse or unforeseen events which occur to the relevant Ethics Committee via the University of Birmingham Research Ethics Officer.

Name of Principal investigator/project supervisor:	Dr Glenys Jones
Date:	3 December 2009

Please now save your completed form, print a copy for your records, and then email a copy to the Research Ethics Officer, at aer-ethics@contacts.bham.ac.uk. As noted above, please do not submit a paper copy.

APPENDIX 11: Staff's consent form

UNIVERSITY OF BIRMINGHAM

STUDY ON COMMUNICATION

Dear member of staff,

My name is Lila Kossyvaki and I am a qualified teacher specialising in autism. At present, I am doing my PhD in the School of Education at the University of Birmingham. I am interested in how children with autism communicate at school and how adults can facilitate them to initiate contact. In order to observe how each child communicates and which interactive style is more appropriate for the child, I would like to video record some lessons in your class. I would also like to obtain your views about how each child communicates. You will not have to change what you usually do. After a round of observations, you will be introduced to what the literature suggests about facilitative interactive style and then objectives will be set for each child in collaboration with xxxxxx xxxxxxx and the other colleagues in your class. All names of children, staff and parents will be changed in the report and the videos will only be used for research purposes.

I will be writing my observations and findings up for my PhD degree.

You can withdraw from the study at any point if you wish. If you withdraw, you can still be informed about the findings when the research is completed.

Please tick the box below to say whether you are happy to be involved in the study.

I am very happy to be in the study ☐

I would prefer not to be part of the study ☐

Name: _____

Signed: _____

Date: _____

Should you require any further information about the study please, don't hesitate to contact me by email on xxxxxx@bham.ac.uk or talk to me in person. You can also contact xxxxxx xxxxxxx for more details.

APPENDIX 12: Parents' and staff's extra consent form for presentations in conferences and workshops

Parents' form

UNIVERSITY OF BIRMINGHAM

STUDY ON COMMUNICATION

Dear Mrs/ Mr _____ (parents' surname),

Many thanks for giving your consent for _____ (child's name) to participate in my research. The study is now moving towards completion and I will get back to you soon with some findings on _____ (child's name) communication.

The purpose of this letter is to ask for permission to use videos of your child for presenting the findings of this study in a number of conferences and train other practitioners in the intervention I developed with the school staff. The videos will be used to illustrate methods to best support the children's communication. The children's names will not be used in the video clips.

Please tick the box below to say whether you are happy for the videos of your child to be used for presentations in conferences and training courses:

I am/we are happy for the videos of my/our child to be used for presentations in conferences and training courses ☐

I/we would prefer the videos of my/our child not to be used for presentations in conferences and training courses ☐

Signed: _____

mother / father / carer of the child (please circle as appropriate)

Date: _____

You can contact me by email on xxxxxx@bham.ac.uk if you want any more information.

Staff's form

UNIVERSITY OF BIRMINGHAM

STUDY ON COMMUNICATION

Dear _____ (staff's first name),

Many thanks for participating in my research. The study is now moving towards completion and I will get back to you soon with some findings on children's communication and adult interactive style.

The purpose of this letter is to ask for permission to use some of the videos taken for presenting the findings of this study in a number of conferences and train other professionals in the intervention we developed. The videos will illustrate good practice. The names of children and members of staff will not be used in the video clips.

Please tick the box below to say whether you are happy for the videos of you working with the children to be used for presentations in conferences and workshops.

I am happy for the videos of me working with the children to be used in conferences and workshops ☐

I would prefer the videos of me working with the children not to be used in conferences and workshops ☐

Signed: _____

Date: _____

APPENDIX 13: NVivo categories

Changes in children
General- All children
Molly
Alex
Robert
Nathan
David
Oliver

Activity effect
AISI principles
Stop part-way
Expand on communicative attempts
Give material they will need help with
Give small portion
Contradict expectations
Follow children's focus of attention
'forget' something vital
Provide time
Responds to communicative attempts
Show availability
Use minimal speech
Use non-verbal cues
Wait for initiations
Imitation
Ease to understand/implement principles
Self-evaluation checklist-importance
General changes in practice
Specific changes in practice
Importance of AISI
Most used principles
Principles' effectiveness
Principles not implemented as much as they wanted
Principles to implement next year

Other categories
Using their own videos-gains
Difficulties with video recordings
Children's maturation
Eclectic approach- Importance
Negative effect of looking
Absence of communicative partner
Training other staff
Saying no-difficulties

APPENDIX 14: Individual profiles for the communicative functions and methods for each of the six children (pre and post intervention)

Functions

Molly

Communicative functions	Pre intervention	Post intervention
Behaviour regulation		
Request	35	99
Reject	17	12
Joint attention		
Comment	1	2
Seek information	0	0
Social interaction		
Express feelings	12	11
Seek attention	0	4
Seek approval	0	0
Social routines	0	0
Social games	0	0

Alex

Communicative functions	Pre intervention	Post intervention
Behaviour regulation		
Request	58	62
Reject	11	43
Joint attention		
Comment	0	0
Seek information	0	1
Social interaction		
Express feelings	6	29
Seek attention	2	3
Seek approval	0	2
Social routines	0	1
Social games	1	15

Robert

Communicative functions	Pre intervention	Post intervention
Behaviour regulation		
Request	52	63
Reject	59	43
Joint attention		
Comment	0	0
Seek information	0	0
Social interaction		
Express feelings	46	76
Seek attention	0	6
Seek approval	1	2
Social routines	0	0
Social games	2	14

Nathan

Communicative functions	Pre intervention	Post intervention
Behaviour regulation		
Request	37	79
Reject	17	20
Joint attention		
Comment	0	0
Seek information	0	0
Social interaction		
Express feelings	8	36
Seek attention	0	2
Seek approval	1	1
Social routines	0	0
Social games	0	12

David

Communicative functions	Pre intervention	Post intervention
Behaviour regulation		
Request	81	79
Reject	11	17
Joint attention		
Comment	31	72
Seek information	0	15
Social interaction		
Express feelings	48	28
Seek attention	4	11
Seek approval	0	0
Social routines	7	1
Social games	2	9

Oliver

Communicative functions	Pre intervention	Post intervention
Behaviour regulation		
Request	23	78
Reject	40	65
Joint attention		
Comment	0	0
Seek information	0	0
Social interaction		
Express feelings	13	84
Seek attention	3	0
Seek approval	0	0
Social routines	0	0
Social games	2	0

Methods

Molly

Communicative methods	Pre intervention	Post intervention
Pre symbolic methods		
Challenging behaviour	5	4
Eye contact	0	8
Eye pointing	1	5
Laugh	0	0
Point	1	0
Proximity/ Touch	7	27
Re-enactments	0	2
Simple Motor Actions	52	48
Smile	4	9
Vocalisations/babbling	21	13
Symbolic methods		
Delayed echolalia	0	2
Immediate echolalia	0	5
Object of Reference	0	3
Single Words	0	0
Signs/gestures	0	0
Symbols/Pictures	4	34
Word combinations	0	0

Alex

Communicative methods	Pre intervention	Post intervention
Pre symbolic methods		
Challenging behaviour	2	3
Eye contact	9	18
Eye pointing	0	0
Laugh	1	18
Point	1	0
Proximity/ Touch	20	23
Re-enactments	6	13
Simple Motor Actions	41	82
Smile	0	10
Vocalisations/babbling	27	55
Symbolic methods		
Delayed echolalia	0	0
Immediate echolalia	0	0
Object of Reference	0	1
Single Words	5	12
Signs/gestures	0	0
Symbols/Pictures	13	28
Word combinations	0	0

Robert

Communicative methods	Pre intervention	Post intervention
Pre symbolic methods		
Challenging behaviour	35	8
Eye contact	26	48
Eye pointing	1	0
Laugh	31	63
Point	0	0
Proximity/ Touch	5	13
Re-enactments	5	21
Simple Motor Actions	66	63
Smile	10	18
Vocalisations/babbling	45	72
Symbolic methods		
Delayed echolalia	0	0
Immediate echolalia	0	0
Object of Reference	1	2
Single Words	3	19
Signs/gestures	0	0
Symbols/Pictures	3	7
Word combinations	1	2

Nathan

Communicative methods	Pre intervention	Post intervention
Pre symbolic methods		
Challenging behaviour	4	14
Eye contact	1	21
Eye pointing	0	0
Laugh	3	10
Point	0	0
Proximity/ Touch	1	24
Re-enactments	1	8
Simple Motor Actions	49	77
Smile	2	14
Vocalisations/babbling	15	41
Symbolic methods		
Delayed echolalia	0	0
Immediate echolalia	0	0
Object of Reference	1	1
Single Words	0	0
Signs/gestures	0	0
Symbols/Pictures	5	10
Word combinations	0	0

David

Communicative methods	Pre intervention	Post intervention
Pre symbolic methods		
Challenging behaviour	11	4
Eye contact	33	36
Eye pointing	0	1
Laugh	24	10
Point	16	24
Proximity/ Touch	11	20
Re-enactments	7	15
Simple Motor Actions	32	57
Smile	20	11
Vocalisations/babbling	16	22
Symbolic methods		
Delayed echolalia	0	1
Immediate echolalia	4	10
Object of Reference	0	0
Single Words	89	128
Signs/gestures	1	0
Symbols/Pictures	12	9
Word combinations	11	14

Oliver

Communicative methods	Pre intervention	Post intervention
Pre symbolic methods		
Challenging behaviour	13	18
Eye contact	5	3
Eye pointing	0	0
Laugh	2	34
Point	0	0
Proximity/ Touch	5	29
Re-enactments	1	7
Simple Motor Actions	63	161
Smile	11	25
Vocalisations/babbling	35	64
Symbolic methods		
Delayed echolalia	0	0
Immediate echolalia	0	0
Object of Reference	0	1
Single Words	0	0
Signs/gestures	0	0
Symbols/Pictures	0	4
Word combinations	0	0

APPENDIX 15: Ease of understanding and implementing AISI principles checklist- devised by the author

Please tick whether it is easy or hard to understand and whether it is easy or hard to implement each of following principles

GENERAL PRINCIPLES

	Easy to understand	Hard to understand	Easy to implement	Hard to implement
1. Gain children's attention	☐	☐	☐	☐
2. Establish appropriate proximity and contact	☐	☐	☐	☐
3. Show you are available to the children	☐	☐	☐	☐
4. Wait for initiations	☐	☐	☐	☐
5. Respond to the children's attempts to communicate	☐	☐	☐	☐
6. Assign meaning to the children's apparently random actions or sounds	☐	☐	☐	☐
7. Imitate the children	☐	☐	☐	☐
8. Follow children's focus of attention	☐	☐	☐	☐
9. Use exaggerated pitch, facial expression, gestures and body language	☐	☐	☐	☐
11. Use minimal speech	☐	☐	☐	☐
12. Provide time to the children to process the information	☐	☐	☐	☐
13. Expand on children's communicative attempts	☐	☐	☐	☐
14. Use a range of non-verbal cues to support understanding (e.g. Makaton signs, gestures, facial expression, photos/symbols, physical prompts, body language)	☐	☐	☐	☐

COMMUNICATIVE OPPORTUNITIES

	Easy to understand	Hard to understand	Easy to implement	Hard to implement
1.Give a choice of activity, equipment or food	☐	☐	☐	☐
2.Stop part-way through an activity or social interaction	☐	☐	☐	☐
3.Give small portions (so children can ask for more)	☐	☐	☐	☐
4.Make items inaccessible (so children have to ask for them)	☐	☐	☐	☐
5.Give children materials that they will need help with	☐	☐	☐	☐
6.Contradict children's expectations	☐	☐	☐	☐
7.Give children known non-preferred items	☐	☐	☐	☐
8.Set up a situation where you 'forget' something vital	☐	☐	☐	☐

APPENDIX 16: Effectiveness of the AISI principles checklist- devised by the author

Name of staff: _____

Date: _____

Please circle how effective you think each of the following principles was in enhancing children's spontaneous communication of the participant children

GENERAL PRINCIPLES

1.Gain children's attention	*Not Effective*	*Quite Effective*	*Effective*	*Very Effective*
2.Establish appropriate proximity and contact	*Not Effective*	*Quite Effective*	*Effective*	*Very Effective*
3.Show you are available to the children	*Not Effective*	*Quite Effective*	*Effective*	*Very Effective*
4.Wait for initiations	*Not Effective*	*Quite Effective*	*Effective*	*Very Effective*
5.Respond to the children's attempts to communicate	*Not Effective*	*Quite Effective*	*Effective*	*Very Effective*

6.Assign meaning to the children's apparently random actions or sounds	*Not Effective*	*Quite Effective*	*Effective*	*Very Effective*
7.Imitate the children	*Not Effective*	*Quite Effective*	*Effective*	*Very Effective*
8.Follow children's focus of attention	*Not Effective*	*Quite Effective*	*Effective*	*Very Effective*
9.Use exaggerated pitch, facial expression, gestures and body language	*Not Effective*	*Quite Effective*	*Effective*	*Very Effective*
10. Use minimal speech	*Not Effective*	*Quite Effective*	*Effective*	*Very Effective*
11.Provide time to the children to process the information	*Not Effective*	*Quite Effective*	*Effective*	*Very Effective*
12. Expand on children's communicative attempts	*Not Effective*	*Quite Effective*	*Effective*	*Very Effective*
13. Use a range of non-verbal cues to support understanding	*Not Effective*	*Quite Effective*	*Effective*	*Very Effective*

COMMUNICATIVE OPPORTUNITIES

1.Give a choice of activity, equipment or food	*Not Effective*	*Quite Effective*	*Effective*	*Very Effective*
2.Stop part-way through an activity or social interaction	*Not Effective*	*Quite Effective*	*Effective*	*Very Effective*
3.Give small portions (so children can ask for more)	*Not Effective*	*Quite Effective*	*Effective*	*Very Effective*
4.Make items inaccessible (so children have to ask for them)	*Not Effective*	*Quite Effective*	*Effective*	*Very Effective*
5.Give children materials that they will need help with	*Not Effective*	*Quite Effective*	*Effective*	*Very Effective*
6.Contradict children's expectations	*Not Effective*	*Quite Effective*	*Effective*	*Very Effective*
7.Give children known non-preferred items	*Not Effective*	*Quite Effective*	*Effective*	*Very Effective*
8.Set up a situation where you 'forget' something vital	*Not Effective*	*Quite Effective*	*Effective*	*Very Effective*

APPENDIX 17: AISI principles in sketches

All drawn by N. Papadopoulos



Assign meaning to the child's random actions or sounds

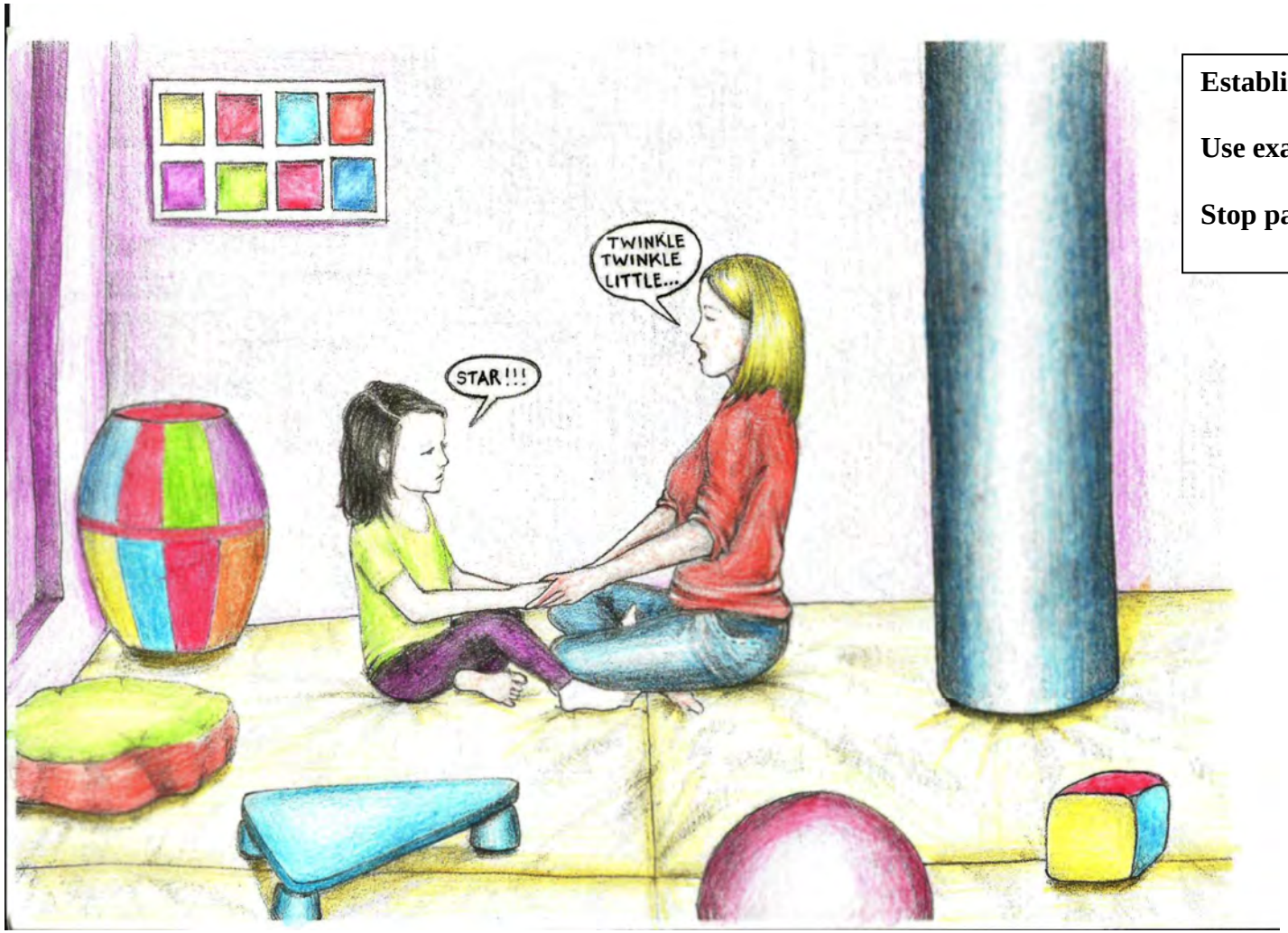
Imitate the child

Follow the child's focus of attention



Expand on child's communicative attempts

Give small portions



Establish appropriate proximity/touch

Use exaggerated pitch (e.g. singing)

Stop part-way



Gain child's attention

Show availability

Wait for initiations

Give materials the child will need help with



‘Forget’ something vital

Offer choices



Make items inaccessible

Offer choices