

An evaluation of Lego-based Therapy and its impact on anxiety experienced by primary school-aged children with social communication difficulties

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ABSTRACT

Educational provision for children with social communication difficulties is constantly evolving to support not just social development, but also emotional development. With an emphasis on integrative and inclusive practices for all children, a range of interventions to support the diverse needs of this heterogeneous population are needed. Lego-based Therapy has captured interest over the past decade as an intervention that can support and nurture the social and emotional needs of children with social communication difficulties.

This research evaluated the claim that Lego-based Therapy could reduce the anxiety experienced by primary school-aged children with social communication difficulties; a claim that has previously been unsupported.

Using a pragmatic mixed-method approach, three case-studies were conducted. Quantitative data, from pre-and-post measures and single-case experimental designs (SCEDs), was triangulated with qualitative data, from semi-structured interviews. Numerical measures were collected from children, their parents and teachers in order to provide a holistic overview of a child's anxiety.

Pre- and post-analysis along with visual analysis from the embedded SCEDs provided tentative evidence to support the principal research question. According to self-report data from all three children, Lego-based therapy can be considered to have some positive effects on their reported anxiety following a 10-week Lego-based Therapy intervention. A similar finding was also reported by two of the three children's teachers. However, contradictory findings came from parental ratings of their child's anxiety, where a positive impact could not be determined. The qualitative analysis revealed core categories the facilitators and children perceived to be important in the success of Lego-based Therapy.

Using the preliminary findings of the study, this research concludes that for primary school-aged children with social communication difficulties, Lego-based Therapy can have some positive effects on anxiety.

1 INTRODUCTION

This thesis presents an evaluation of an intervention called 'Lego-based Therapy' and its impact on anxiety in three primary school-aged children with social communication difficulties.

This chapter locates the presented study within the current educational landscape for children with social communication and emotional needs, along with the researcher's personal and professional interest. The chapter concludes with an overview of the thesis structure.

1.1 CURRENT EDUCATIONAL LANDSCAPE

Around three children in every classroom are reported to have a communication difficulty which impedes their ability to learn (The Communication Trust, 2011). 'Communication difficulties' encompass difficulties in sound processing and speech production, as well as communicating appropriately in context. This is also known as 'social communication' (ICAN, 2017).

The exact number of children and young people in the UK struggling with social communication is not known. This is due to multiple variables including, diverse terminology and professional practices, along with recent changes in diagnostic criteria (Bishop, 2014; Neggers, 2014; Masi et al., 2017). However, what is known is that there is an important role for professionals to assess and intervene, in order to understand what it means for a child to have social communication difficulties (DfEE, 2014).

As interest in social communication difficulties grows within the research literature, an understanding of the broader needs of this population is also developing. One area that has gained particular attention, due to its high comorbidity with social communication difficulties, is anxiety (van Steensel, Bogels, and Perrin, 2011).

Despite the Special Educational Needs and Disabilities (SEND) Code of Practice (DfEE, 2014) emphasising a need to support children with communication needs, only a third of teachers asked in a survey felt 'very confident' in supporting children's social communication development (The Communication Trust, 2011). Therefore, research exploring interventions within this context would be beneficial.

1.2 PERSONAL AND PROFESSIONAL INTEREST

The researcher's personal and professional interest motivated the selection of the presented study's focus.

Having an uncle receive a diagnosis of 'Autism Spectrum Disorder' as an adult and learning about the challenges he faced when he was in school, the researcher wanted to contribute to the evidence-base for supporting children and young people with social communication difficulties within the school setting.

This personal interest expanded into a professional interest during the researcher's time as a secondary school teacher, where she observed a growing number of children with mental health needs. This included an increasing presence of anxiety in young people identified with social communication difficulties. Whilst working in the secondary school setting, the researcher became aware of the importance of supporting social and emotional development in order for young people to be successful with their learning.

This recognition and awareness was further nurtured during the researcher's time on placement as a Trainee Educational Psychologist (TEP). An increasing proportion of time was spent assessing and planning interventions for children with social communication difficulties, and who were experiencing high levels of anxiety. During the second year of the Doctorate, whilst on placement, the researcher was introduced to 'Lego-based Therapy', an intervention which had the potential of being able to support social *and* emotional development of children and young people.

1.3 RESEARCH RATIONALE

The current educational climate and researcher interest have together stimulated this study. The researcher hopes to contribute to the evidence-base for school-based social skills interventions, specifically Lego-based Therapy, and their potential impact on anxiety for children with social communication difficulties. This is an under-researched but growing area of need.

1.4 STRUCTURE OF THE THESIS

Chapter Two: Literature Review

Chapter Two provides a critical overview of key Psychological and Educational theoretical and research literature, which motivated and informed the research questions.

Chapter Three: Methodology and Method

In this chapter a critical exploration of real world research and evidence-based practice in educational settings takes place. A look at pertinent issues related to different research paradigms follows, leading to the justification of the selected methodology and method to respond to the research questions. This chapter ends with a critical look at possible threats to validity and reliability and how the research intended to manage these.

Chapter Four: Results

This chapter starts with an account of the different data analyses the researcher explored and considered. This is presented with reference to the chosen research design. Findings from the three participants are then presented, along with a consideration of the validity and reliability checks.

Chapter Five: Discussion

Chapter five begins by presenting key findings in response to the principal and subsidiary research questions. An interpretation of the findings, drawing on key psychological theory and research considered in Chapter two, takes place before implications of the findings and suggestions for future research are stated.

Chapter Six: Conclusion

To conclude this study, a summary of the main findings followed by the unique contributions of this research are presented.

1.4.1.1 Key term: 'social communication difficulties'

The term 'social communication difficulties' is used throughout this study in recognition of the broad spectrum in which social communication difficulties presents in children and young people. This term within the discussed research literature encapsulates children who may or may not have a formal diagnosis of 'Autism Spectrum Disorder (ASD)' or 'Social Communication Disorder (SCD)'. A detailed explanation of the use of this term can be found in section 2.3.4.

2 LITERATURE REVIEW

2.1 INTRODUCTION

The aim of this chapter is to explore, critically, literature which is relevant to the presented study. It begins by considering psychological perspectives on the development of social communication. This will be followed by a consideration of the needs of children who experience social communication difficulties; attention will be paid to those with Autism Spectrum Disorder (ASD).

A review of literature focusing on the presence of anxiety in children with social communication difficulties will be undertaken, considering the role of anxiety in the presentation of ASD and social communication difficulties. Within this section, a systematic literature review (SLR) will be conducted. It will examine and evaluate the evidence-base for social skills interventions and whether they are able to support the emotional needs, specifically anxiety, experienced by children with social communication difficulties. The SLR will conclude with a critical examination of the gaps within the evidence-base, which subsequently motivated this study.

The close of this chapter examines Lego-based Therapy (LeGoff et al., 2014), a social skills intervention, and its underpinning theory and research. The literature review determines the unique contribution of this study along with the research questions this study aims to answer.

2.2 SOCIAL COMMUNICATION

2.2.1 What is social communication?

Social communication is "the synergistic emergence of social interaction, social cognition, pragmatics (verbal and nonverbal aspects) and language processing (receptive and expressive)" (Adams, 2005, p.182). The pragmatics of social communication involve the interpretation of both non-social i.e. general knowledge founded in the physical world, and social aspects i.e. the non-observable factors such as emotions and beliefs in the environmental context (Bishop, 2013).

For children, social communication involves multiple skills such as turn-taking and joint attention (Baird and Norbury, 2015). These skills are vital for a child's ability to form meaningful relationships with peers (Owens, Granader, Humphrey and Baron-Cohen, 2008). Whilst for typically developing children these skills progress over time with relatively little input or teaching, for some children, social communication can be an area of great difficulty (Owens, Granader, Humphrey and Baron-Cohen, 2008).

2.2.2 Typical Development of social communication

Communication typically develops in infancy, where children progress through three phases of communication: intentional, symbolic and linguistic communication. These phases become progressively more sophisticated as the child develops (Brown and Elder, 2014, Noens and van Berckelaer Onnes, 2004; Prizant, Wetherby, Rubin, and Laurent, 2003).

The sociability of babies and infants, as demonstrated by the display of nonverbal behaviours, underpins language, communication and therefore social interaction. The trajectory for developing social communication is presented in table 2.1. Only approximate ages and stages for development are offered due to individual differences in development. However, the trends presented are consistent across developmental psychology (Harley, 2008).

The development of the skills, presented in table 2.1, lays the foundation for a child's ability to form and maintain relationships in later life. Hulme and Snowling (2009) explain that if there are impairments in acquiring any of these early communicative skills or behaviours, then there is an increased risk a child may develop difficulties with social and adaptive behaviours.

Age	What's happening?	Evidence
From birth	Babies make vegetative sounds including crying, burping and sucking noises. Soon after birth, babies are attracted to the human face as they engage in prolonged mutual gaze	Stark (1986)
Around 4 months	Cooing and laughing noises begin to emerge. Infants begin to discriminate the gaze direction of another person and can disengage their attention from one stimulus to another.	Hood, Willen and Driver (1998)
4-6 months	Some babies may begin to engage in vocal play. During this time the infant is beginning to be able to direct and redirect their attention using visual cues e.g. caregiver's head turning.	Stark (1986)
6-9 months	Most infants begin to babble. This is more distinguished than earlier vocal noises as consonant and vowel sounds begin to be made. During this time most infants engage in dyadic interaction with their caregiver, forming the foundations of 'joint attention'.	Juscyk (2000)
Around 18 months	Most children will begin to utter their first word. During this time joint attention becomes more evident as a child and their caregiver are able to coordinate their focus on an object with intention e.g. protodeclarative pointing.	Veneziano, Sinclair and Berthoud (1990)
Around 3 years	By three years old, typically developing infants will be able to utter more than two words and engage in telegraphic speech and some may even be able to use full sentences to communicate. During this time, most children will begin to demonstrate cognitive skills such as 'theory of mind'.	Bates, Bretherton and Snyder (1988)

Table 2-1. Typical development of social communication from birth to 3-years-old

2.3 CHILDREN WITH SOCIAL COMMUNICATION DIFFICULTIES

2.3.1 Prevalence of children with social communication difficulties

Due to several intricate connections in social communication development, some children may experience a difficulty with language and communication which can result in a Special Educational Need (SEN).

Estimating the true number of children with a social communication-related need is problematic due to multiple variables. These include the diverse terminology and professional practices, along with recent changes in diagnostic criteria (Bishop, 2014; Neggers, 2014; Masi et al., 2017). Recent Department for Education statistics (DfE, 2019) report 15% of children with an Education Health and Care Plan (EHCP) have a 'Speech, Language and Communication Need'. A further 42.3% have a need linked to the social use of language i.e. 13.3% for Social, Emotional, Mental Health (SEMH) and 29% for ASD; the highest type of need reported. However, these groups are neither exclusive or conclusive. Social communication difficulties may also be observed across the categories, resulting in the actual figure being higher.

2.3.2 Characteristics of social communication difficulties

Children with social communication difficulties struggle to make sense of information shared between individuals; a characteristic that emerges in early childhood (Young, Brewer and Pattison, 2003). Children with these difficulties are likely to find making and sustaining eye-contact challenging (Mundy, Sigman, Ungerer and Sherman, 1986). Consequently, they will find processing other people's thoughts and feelings especially difficult (Castelli, 2005; NHS, 2015). Difficulties in understanding emotions is linked to the 'Theory of Mind (ToM)' hypothesis (Baron-Cohen, Spitz and Cross,1993; Uljarevic and Hamilton, 2013). Altogether, children with social communication difficulties will often find making and keeping friends difficult and may struggle to join in with play (Baron-Cohen, 1987; Charman et al., 1997).

The presentation of social communication difficulties in children is variable (Kuenssberg, McKenzie and Jones, 2011; Mandy and Skuse, 2008). For some, the production of speech can be challenging, for example these children may have a Language Impairment (LI) which is linked to deficits in expressive language (Brinton, Fujiki and McKee, 1998). For

other children, their needs will revolve around their understanding of speech; this group may struggle with social communication due to difficulties in comprehending the structure of language e.g. syntax and grammar. These symptoms may be classed as a Pragmatic Language Impairment, also known as Social Communication Disorder (SCD) (Adams, Lockton, Gaile, Earl and Freed, 2012).

Table 2.2 outlines diagnostic features of SCD along with features of another disorder affecting social communication, known as Autism Spectrum Disorder (ASD). Whilst the table shows similarities between SCD and ASD, the DSM-V explicitly states when diagnosing SCD, ASD has to be ruled out. Therefore, whilst there is an overlap of behaviours between SCD and ASD, the two are seen as discrete (Adams et al., 2012*).*

Social Communication Disorder	ASD Spectrum Disorder
• Persistent difficulties in the social use of verbal and nonverbal communication • Deficits resulting in functional limitations in effective communication, social participation, social relationships, academic achievement or occupational performance, individually or in combination • The onset of symptoms begins in the early developmental period, but the deficits may not fully manifest until social communication demands exceed limited capacity • The symptoms are not attributable to another medical or neurological condition, or to low abilities in the domains of word structure and grammar and are not better explained by an ASD spectrum disorder, intellectual disability (intellectual developmental disorder), global developmental delay or another mental disorder.	• Persistent deficits in social communication and social interaction across multiple contexts • Restricted, repetitive patterns of behaviour, interests, or activities • Symptoms present in early development • Symptoms cause clinically significant impairment in social, occupational, or other important areas of current functioning • These disturbances are not better explained by intellectual disability (intellectual developmental disorder) or global developmental delay.

Table 2-2 DSM-V criteria for SCD and ASD adapted by Baird and Norbury (2015 p.747)

2.3.3 Autism Spectrum Disorder

The National Autistic Society's (NAS) definition of ASD is quite general. ASD is "a lifelong developmental disability that affects the way a person communicates and relates to people around them" (NAS, 2017). This presents a challenge for professionals when it comes to identifying a specific disorder, especially since there is overlap across a broad range of behaviours associated with social communication difficulties (Kuenssberg, McKenzie and Jones, 2011; NHS, 2015). For example, children with ASD, LI and SCD, are less likely to engage and interact with peers, therefore they are all likely to have poorer peer relationships and spend more time in isolated play (Lord and Magill-Evans, 1995; Travis, Sigman and Ruskin, 2001). The only behaviours distinct to ASD are the observable restricted and repetitive behaviours (Happé and Ronald, 2008).

Congruence between the disorders continues to suggest that the population of children who have social communication difficulties represents a larger cohort of children than educationalists, perhaps, appreciate (Baird et al., 2006).

2.3.4 Using 'social communication difficulties' as a broader term

Interest in understanding Autism has grown exponentially since it was first recognised by Kanner in 1943. In this time, the way academics have referred to this disorder has changed (Johnson and Myers, 2007; Newschaffer et al., 2007). Autism is now used as an umbrella term and often refers to other social communication difficulties such as Asperger syndrome and Rett syndrome (Johnson and Myers, 2007). For this reason, in recent years Autism is referred to as a 'spectrum disorder' to acknowledge that it encompasses a range of impairments and behaviours, and that there is not one definitive list of characteristics (Newschaffer et al., 2007). Anyone who experiences social communication difficulties will do so in their own unique way (Scottish Government, 2011).

The heterogeneity makes formally diagnosing very difficult. Baron-Cohen et al. (2009) predict around 40% of children have a social communication difficulty, such as ASD, which is not diagnosed. For this reason, the broader concept of 'social communication difficulties' is used throughout the rest of the presented study in an attempt to capture understanding that considers the broad presentation of these difficulties.

2.3.5 Impact of social communication difficulties

Irrespective of whether a child has a formal diagnosis, it is important to recognise that social communication difficulties can have a negative impact on a child's quality of life (Kaale, Smith and Sponheim, 2012). For primary school-aged children, difficulties in social communication have been linked to poorer educational outcomes (Adams et al., 2012; Botting, Crutchley and Conti-Ramsden, 1998; Whitehouse, Watt, Line, and Bishop, 2009). However, common measures of achievement and intelligence are often not standardised for this population, therefore determining the true picture of educational outcomes is difficult (Cumming, Dickson and Webster, 2013). Consequently, research has recently shifted to focus on social communication difficulties and its relationship with well-being.

Evaluation of the relationship between social communication difficulties and well-being has increased in recent years, with studies reporting high concordance between disorders like ASD and anxiety (Rotheram-Fuller and MacMullen, 2011). Simonoff et al. (2008) found the highest common comorbid disorder was social anxiety at 29.2%, similar findings were also reported by Ghaziuddin (2005). White, Oswald, Ollendick and Scahill (2010) also found up to 84% of children with ASD related behaviours experienced aspects of anxiety. Finally, a meta-analysis found 39.6% of 2121 children and adolescents had a comorbid anxiety disorder with ASD (van Steensel, Bogels, and Perrin, 2011). The reportedly high comorbidity between anxiety and social communication difficulties warrants further exploration.

2.4 EMOTIONAL WELL-BEING AND CHILDREN WITH SOCIAL COMMUNICATION DIFFICULTIES

2.4.1 Social communication difficulties and well-being

The emotional wellbeing of children and young people in UK schools is at crisis point (Care Quality Commission, 2017). It is estimated 10% of children aged 5-16 years have a clinically significant mental health illness, equating to one in every classroom (Public Health England, 2016). According to a recent survey, an estimated 90% of school leaders reported an increase in the number of children experiencing anxiety and/or stress over the last 5 years (YoungMinds, 2017). Furthermore, with an under-resourced NHS Children

and Adult Mental Health Service (CAMHS), only a quarter of children and young people are getting the support they need (YoungMinds, 2017).

According to Green et al. (2005), anxiety and depression are the most common mental health difficulties faced by children and young people. However, for children with social communication difficulties, anxiety, especially social anxiety, appear to be all too common. The inherent features of these social communication difficulties appear to increase vulnerability for developing anxiety (Rumney and Mahon, 2017).

Vasey and Dadd's 'Transactional developmental pathways model' (2001) helpfully captures the potential relationship between anxiety and social communication difficulties. The model explains how repeated exposure to social difficulties leads to the development of maladaptive coping strategies and therefore increased levels of anxiety. Interpreting or predicting the behaviour of others then acts as a way to maintain this anxiety (Brent, Rios, and Happé, 2004).

2.4.2 Anxiety and social communication difficulties

Although the link between anxiety and social communication difficulties is not new (see Kanner, 1943), the increasing prevalence of social communication difficulties in children requires a proactive approach to exploring this relationship.

Some researchers hypothesise that anxiety may be an underlying factor for social communication difficulties (Bellini, 2004). Although, at present, anxiety is not perceived to be a phenomenological characteristic of either SCD or ASD (White et al., 2010), what is recognised is the bi-directional relationship between anxiety and social communication difficulties (NHS, 2015; Delli, Polychronopoulou, Kolaitis and Antoniou, 2018).

Ghaziuddin (2005) describes several characteristics typical of ASD as potential symptoms of anxiety including, distress when the immediate environment changes unexpectedly and change in routines resulting in an inability to adapt to surroundings.

Anxiety in children with social communication difficulties is linked with alexithymia (an inability to recognise and label emotions) and limited emotional acceptance (Maisel et al, 2016). Lei and Ventola (2018) explain that children with social communication difficulties are likely to find it challenging to appropriately identify and regulate their affective responses when faced with an uncertain or ambiguous situation, like those

involving the interpretation of social and emotional cues. Consequently, when children with these needs are placed in these situations it can result in high levels of anxiety. This relationship has been partly explained by deficits in ToM; a hallmark feature of social communication difficulties (Baron-Cohen, Spitz and Cross,1993; Uljarevic and Hamilton, 2013).

The potential interaction between ToM and anxiety in social communication difficulties can be observed in early social skill development (Lei and Ventola, 2018). In typically developing children, skills relating to ToM develop simultaneously with cognitive and emotional regulation. During the exchange of joint attention, typically developing infants can engage in "highly affect-laden dyadic interactions" with their caregiver (Lei and Ventola, 2018, p2.). These dyadic interactions allow the child to develop affective regulation and maintenance through the sharing of mutual emotional responses, Hughes and Leekam (2004) refer to this process as social referencing.

According to researchers, these exchanges are important for a child to learn how to manage and identify emotions in themselves and in others (Kasari et al.,1990; Mundy, 1995; Mundy and Newell, 2007). The relationship between ToM, joint attention and emotional competency is reported within research literature (Baldwin, 1992; Kasari et al., 1990; Moses, Baldwin, Rosicky, and Tidball, 2001). Furthermore, research also indicates that for children with social communication difficulties, attention and emotional regulation are likely to be poorly integrated which can lead to internalised behaviours such as anxiety. (Kasari et al., 1990; Lei and Ventola, 2018; Whalen and Schreibman, 2003; Whalen, Schreibman, and Ingersoll, 2006).

Also linked to anxiety and social communication difficulties is the child's awareness of social disconnection and their apparent longing for this to be different. However, it could be argued that this profound awareness is more observable in high functioning children with these difficulties (Attwood, 2000).

The idea of wanting to belong in their social environment is supported by Wolfberg et al. (1999). They investigated pre-schoolers with additional needs, including ASD, and found that they displayed behaviours indicative of wanting to be included in their social environment. Similar findings have been reported with secondary school-aged students too (Tobias, 2009). Osborne and Reed (2011) report when a secondary school adopts an

inclusive ethos a sense of belonging can be nurtured in young people with ASD spectrum disorder.

2.5 INCLUSION OF CHILDREN WITH SOCIAL COMMUNICATION DIFFICULTIES

2.5.1 Inclusive education

Inclusive education champions anti-discriminatory practices for SEND, making unfair practices unlawful and advocates inclusion as a basic human right (Centre for Studies on Inclusive Education, CSIE, 2013). Over the last decade, the promotion of inclusive practices with SEND has continued to be promoted (see DfEE, 2014).

Eldar, Talmor and Wolf-Zukerman (2010) refer to inclusion as "teaching children with special needs together with typical peers. The idea behind inclusion is that every child should be an equally valued member of the school culture" (p. 98). It is believed that children who have additional needs benefit from learning in a mainstream classroom, and their peers experience academic and social benefits from being with individuals from diverse backgrounds (Dybvik, 2004).

Although inclusive legislation (DfEE, 2014) calls for children with SEND to be educated in the mainstream classroom, this provision has not always had a positive impact on children with social communication difficulties, particularly children and young people with ASD (Reed, 2016). Some argue that whilst inclusion is a human right, the education of some young people has been compromised due to placing too much emphasis on 'rights' rather than 'individual need' (Ravet, 2011; Spence, 2010).

2.5.2 Inclusive education and children with social communication difficulties

Children with ASD have the highest representation in mainstream schools compared to other categories of SEND (DfEE, 2014). Waddington and Reed (2017) surveyed educational authorities in the UK and found 60% of children with ASD were educated in mainstream schools, representing 0.5-1.0% of the entire mainstream population.

Whilst reasons vary (see Eaves and Ho,1997), Waddington and Reed (2017) noted social skills and self-help skills as being amongst the biggest predictors of placement in mainstream education. It is important to recognise that these statistics only represent the

ASD population of young people, and do not incorporate those without formal diagnosis. Therefore, this could be distorting the true picture of what is happening in the inclusion of children with social communication difficulties. According to Baron-Cohen et al. (2009) around 40% of children who have a diagnosable social communication difficulty are not formally identified. This puts them at risk of not receiving the right support and increases their vulnerability to a range of comorbid issues that have been discussed above. This is a concern shared by others (Barnhill and Myles, 2001; Humphrey and Symes, 2010).

The high presence of children with social communication difficulties in mainstream classrooms is not enough to infer that inclusion in the regular classroom is always the right decision; as Ravet (2011) stated, there may be misinterpretation between 'need' and 'right'. The decision to include children with ASD in the classroom was partly motivated by the view that specialist settings were unable to nurture academic and social potential, whereas regular classrooms could (Reed, 2016). The evidence for academic progress in mainstream settings is mixed; from small academic gains (Freeman and Alkin, 2000; Ruijs and Peetsma, 2009) to larger academic gains (Schneider and Leroux, 2004). Some have reported no benefit to academic progress at all (Harris et al., 1990).

For social progress the evidence is mixed. Some research reports positive outcomes for social skills (Buysse and Bailey, 1993; Webb et al., 2012) and others on the contrary (Reed, Osborne and Waddington, 2012; Boyd et al., 2014). The discrepancy for both social and academic progress may be accounted for by: heterogeneity in the presentation of needs, variations in study methodology, differing approaches and attitudes to teaching within each study.

A troubling finding within the literature is evidence to suggest that social isolation and loneliness in mainstream classrooms for children with ASD is commonplace (Knight, Petrie, Zuurmond and Potts, 2009; Koste, Nakken and Van Houten, 2010); pupil voice work also supports this (Humphrey and Lewis, 2008). Furthermore, research reports a high incidence of bullying within this population in mainstream settings (Attwood, 2006). Humphrey and Symes (2011) created a flow diagram to display the possible interactions occurring in mainstream settings which could be impacting on both academic and social progress for children with social communication difficulties. Humphrey and Symes

(2011) called their model 'The Reciprocal Effects Peer Interaction Model (REPIM)', the model is presented in figure 2.1.

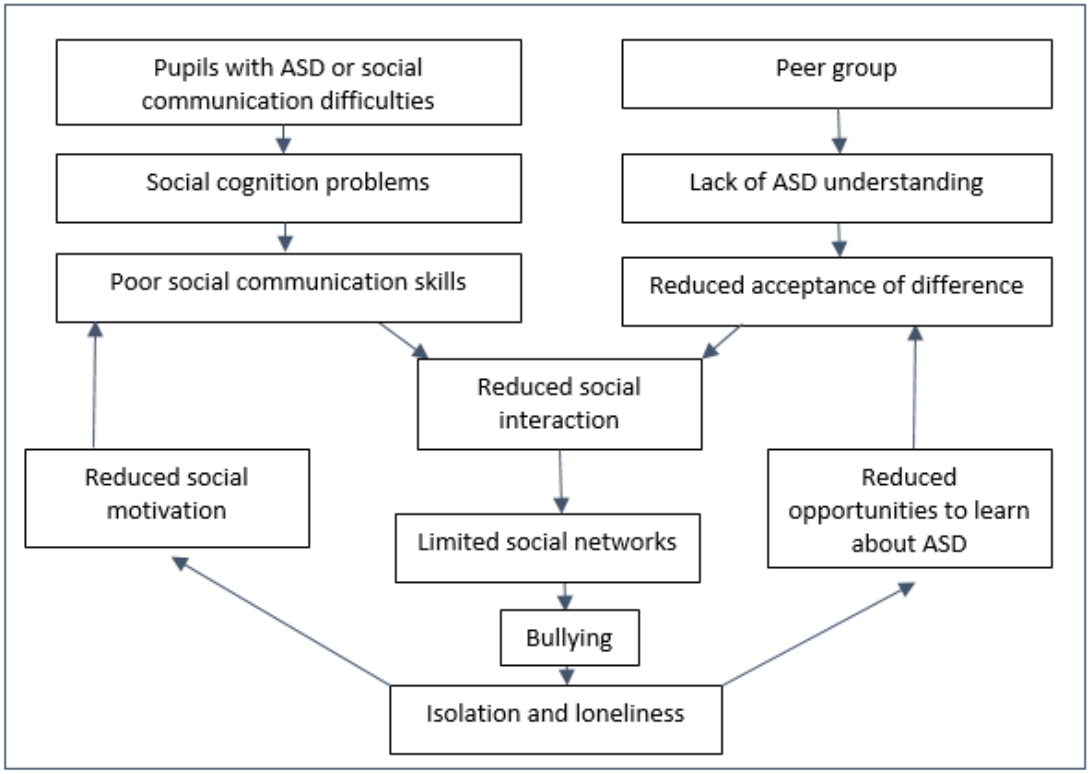


Figure 2-1 The 'Reciprocal Effects Peer Interaction Model' (REPIM) from Humphrey and Symes (2011) (Adapted from Reed, 2018, p.271)

2.5.3 Exclusion of children with social communication difficulties

According to the Department of Education (2017), children with ASD are three times more likely to be excluded from school for a fixed period than children who do not have any SEN. This figure does not account for those who experience social communication difficulties but who are not formally identified with SEND, therefore the figure is, again, likely to be higher.

According to Osbourne and Reed (2009), the challenging behaviour that children with social communication difficulties can display becomes the most demanding aspect for adults around them to manage. Asburner, Ziviani and Rogers (2010) found that teachers reported more challenging behaviours amongst high-functioning ASD children than age and gender-matched typically developed peers; a finding also reported by MacIntosh and Dissanayake (2006). However, the evidence is not conclusive and several variables such as behaviour policies and types of reporting used across mainstream and specialised settings may confound these findings.

Reed (2016) summarises the value and impact of inclusion in mainstream settings, but acknowledges that children who have social communication needs are more likely to "exhibit higher levels of emotional problems and display more behavioural problems, than both their typically developed peers or their ASD-peers educated in specialist schools" (p.275). However, with legislation emphasising the need to provide for *all* children in mainstream settings, educationalists need to find ways of identifying and supporting individual need.

2.6 SCHOOL-BASED INTERVENTIONS TO SUPPORT SOCIAL COMMUNICATION DIFFICULTIES

Several types of intervention programmes exist to support children with social communication difficulties, from behavioural to developmental approaches (Ospina et al., 2008). Two broad themes of interventions are present within the literature, those that focus on social skills and those that focus on emotional development.

2.6.1 Social skills interventions

Many of the school-based interventions for children with social communication difficulties focus on the development of social skills, since children with these difficulties will require more concrete teaching (Owens et al., 2008).

The primary goal for many school-based interventions is to improve the social communication of children and young people (Sutton, Webster and Westerveld, 2019). The ability to communicate in a social context has important implications for the development of positive relationships with peers and adults (Bauminger-Zviely, Karin, Kimhi and Agam-Ben-Artzi, 2014) and overall improved quality of life (Watkins, Ledbetter-Cho, Gevarter and O'Reilly, 2017). Murdock, Cost and Tieso (2007) identified four key behaviours which impact on social communication, and therefore should be considered within social skills interventions: verbal initiations, verbal responses, nonverbal communication and joint attention.

Whilst some meta-analyses of social skills interventions report positive effectives (Hwang and Hughes, 2000), others have reported minimally effective outcomes for children with social communication difficulties (Bellini, Peters, Benner and Hopf 2007). According to Sutton et al. (2019) these earlier reviews were too broad and determining

the real impact of a social skills intervention was problematic. Therefore, they aimed to conduct a more focussed review of the evidence-base concentrating specifically on mainstream education and the outcomes of the research. They analysed 22 studies which utilised a school-based social skills intervention with elementary school-aged children with formal diagnoses of ASD. Sutton et al. (2018) found the interventions were able to increase both frequency and duration of initiating and responding communicative behaviours.

Different approaches to social skills interventions exist. Within recent reviews, however, interventions which incorporate peers of the children have shown to offer positive results, including increased inclusion (Sansosti, 2010), as well as the promotion of joint attention, maintenance of interactions and turn-taking behaviours (Chan et al., 2009). Kasari et al. (2016) found that social skills groups conducted in school could positively affect both peer engagement as well as peer acceptability. However, this study observed high dropout rates and the authors reported they were unable to disentangle the active ingredient of the intervention which led to the observed effects. Perhaps future research could focus more on the mechanism of the intervention rather than overall effects alone.

Teaching social skills is not the only way for supporting children with social communication difficulties; other interventions seek to manage the emotional needs experienced by this population.

2.6.2 Emotion-based interventions

With a developing understanding of the spectrum of needs children with social communication difficulties experience, intervention approaches are evolving (Delli, et al, 2018). Research has highlighted the negative implications of within this population has for their overall social functioning as well as academic progress (Bellini, 2004; Reaven et al.,2009; Wood, Drahota and Sze, 2007). Given the high prevalence and comorbidity of children with social communication difficulties and emotional needs such as anxiety, intervention approaches for this specific area of need have gained more attention.

Interventions focusing on the emotional needs of children with social communication difficulties are commonly founded on Cognitive Behavioural Therapy (CBT) principles. CBT interventions aim to address the underlying thoughts of the child and how they manifest into anxious behaviours (Rotheram-Fuller and MacMullen. 2011). CBT has

been a popular option for anxiety-based behaviours. More recently, with increased waiting times for clinical treatment, schools have been considered well-placed for delivering CBT to support the wellbeing of all children and young people including those with additional needs. A systematic review by Neil and Christensen (2009) reported that schools were well-placed for delivering CBT-based interventions, with promising outcomes.

Luxford, Hadwin and Kovshoff (2017) evaluated the effectiveness of school-based CBT on symptoms of anxiety, social worry, social responsiveness, and indices of attentional control and attentional biases to threat, in adolescents diagnosed with ASD. They found that, compared to a wait-list control group, the CBT group displayed a positive change in anxiety symptoms as reported by parents, teachers and the young person themselves. This study gives further support for the effectiveness of CBT interventions to support the needs of young people with social communication needs.

A popular intervention with support for reducing anxiety-related behaviours for children with social communication difficulties is the FRIENDS intervention (Barrett, Webster and Turner, 2000). Whilst the evidence-base for this intervention is promising (Briesch, Sanetti, Briesch, 2010; Clarke, 2011; Slack, 2013), there are concerns as to whether CBT approaches are the most appropriate form of intervention to be used with children and in schools. Limited staff capacity and resources, coupled with the view that CBT leads to an overly pathologised view of the child hinder the use of CBT approaches in schools (Kendall, 1985).

Although the evidence-base is positive for interventions that can support the social and the emotional needs of children with social communication difficulties separately, are there interventions which can be used to support both needs together? This question is particularly pertinent due to the comorbidity of anxiety and social skills deficits. In order to explore this question further, a systematic literature review will take place to explore the potential of social skills interventions in supporting the emotional needs, specifically anxiety, of children with social communication difficulties.

2.7 SYSTEMATIC LITERATURE REVIEW

2.7.1 Rationale and objectives of a systematic literature review

Since there is a high prevalence of children with social communication difficulties and high comorbidity of social communication difficulties and anxiety, along with a need to include and support them within the mainstream educational setting, a systematic literature review (SLR) has been developed to explore the potential for social skills interventions in supporting the social and emotional needs experienced by this population.

2.7.1.1 Systematic literature review research question

What is the evidence-base for social skills interventions in supporting the emotional needs, specifically anxiety, of children and young people with social communication difficulties?

2.7.1.2 Why a systematic literature review?

A SLR answers a specific research question by collating empirical evidence within pre-set inclusion criteria. Its aim, according to Higgins and Green (2011), is to use "explicit, systematic methods that are selected with a view to minimizing bias, thus providing more reliable findings from which conclusions can be drawn and decisions made" (section 1.2.2).

SLRs have become an important component in ensuring the quality of research across a range of disciplines. Moher, Liberati, Tetzlaff, Altman and The PRISMA Group (2009) explain how such reviews keep research relevant, develop professional practices and guide future research. In education, they facilitate the development of evidence-based practices which are fundamental in guiding policy-makers and practitioners (Andrews, 2005).

Traditionally, SLRs have been associated with meta-analysis. Whilst a more positivist stance is useful in developing nomothetic conclusions about education, Andrews (2005) states that quantitative approaches are undermined by their narrowed and rigid approach, and overlook questions concerning why an intervention works (Mallett, Hagen-Zanker, Slater and Duvendack, 2012). Consequently, more interpretive methods are encouraged.

2.7.2 Systematic literature review method

2.7.2.1 Qualitative synthesis approach

A qualitative approach allows for the synthesis of evidence using both qualitative and quantitative studies (Snilstveit, Oliver and Vojtkova, 2012). Qualitative approaches are more useful when collated studies are heterogeneous. This is a problem reported in studies evaluating interventions supporting social communication difficulties due to the diverse spectrum of behaviours within this population (Mandy and Skuse, 2008; Kuenssberg, McKenzie and Jones, 2011). For this reason, a qualitative synthesis will be adopted in this SLR.

A qualitative SLR looks closely at the data and writes about findings in order to develop understanding beyond numbers (Snilstevit et al., 2012). Whilst more qualitative synthesis can compensate for the difficulties in more quantitative analysis, qualitative approaches have been criticised for lacking standardised guidance on how one should be conducted (Mays, Pope, and Popay, 2005). To negate issues of potential ambiguity in the approach to this qualitative SLR, an explicit account of the process is presented in the following sections; steps were supported by Popay et al. (2006).

2.7.2.2 Literature search strategy

Databases: SCOPUS, OVID: PsychInfo, Science Direct and NU search were utilised to conduct the literature search. Reference-lists were also manually reviewed to identify any additional relevant articles. The following terms: *'Social skills training/intervention', 'children', 'ASD', 'social communication difficulties', 'anxiety'* were used to complete the searches. Minor modifications were made to the search strategy, as necessary, within each of the databases. Once articles were identified by the databases, appraisal of the literature began by reviewing all titles and abstracts for relevance. Any potentially relevant articles were then read in full.

The literature search was first conducted in July 2018. In May 2019, the researcher re-ran the searches to ensure the literature search was up-to-date; no new eligible studies were found.

2.7.2.3 Eligibility and exclusion criteria

This SLR only included studies looking specifically at social skills interventions used to support children with social communication difficulties and those that measured their impact on a child's anxiety. Studies employing both quantitative and mixed method designs were accepted for review. Eligibility and exclusion criteria for selecting studies are presented in Table 2.3.

	Eligibility criteria	Exclusion criteria
Participants	• Child or young person (aged between 5-18 years) • Have a social communication difficulty, may or may not include a formal diagnosis • Diagnoses may be comorbid with other related difficulties such as anxiety	• Participants are not described as having a social communication difficulty • Participants are aged below 5 years of age or above 18 years of age
Type of study	• Human participants • Study design that incorporated pre- and post-intervention validated measures of anxiety for the child/young person (this could be either self- or other-rated) • Data has been recorded and reported • Quantitative and mixed method design	• Studies do not focus on evaluating the effectiveness of an intervention on emotional needs • Studies only employing qualitative methods
Intervention	• Studies that explicitly state and describe a recognised social skills intervention. This means any intervention that sought to increase the social skills of participants. • Examples of the social skills taught include: introducing oneself; starting, maintaining and ending a conversation; appropriate use of eye contact; taking turns; understanding perspective; listening to others; and appropriate use of humour.	• Studies that do not explicitly state the intervention as the focus of the study, and do not provide a thorough description of the intervention • Studies that incorporated a treatment element other than social skills, such as CBT, were excluded due to the potential confounding influence on mood.
Outcome	• Parent, child or teacher report can be used as providing data for effectiveness • Measures must look at anxiety specifically	• Studies that do not evaluate the effectiveness of the intervention on any measure related to anxiety.
Type of article	• Written in English • Written as a primary source of data • Peer-reviewed articles or dissertation studies	• Not written in English • Written as a secondary source of data • Studies that had not been peer-reviewed, or were not dissertation studies • Articles based on opinion or did not include empirical data

Table 2-3 Eligibility and exclusion criteria for studies to be included in systematic literature review

2.7.3 Results of systematic literature review

2.7.3.1 Results of primary identification, screening, eligibility and inclusion

The following steps were used to analyse the output of the SLR: identify, screen, eligibility and inclusion (Moher et al, 2017). The primary searches identified 3158 studies within the search engines using the key words stated; 3145 were identified once duplicates were removed. Titles and abstracts were then examined to screen studies for potential eligibility; 22 studies were selected (Ng, Pitt, Huckvale, Clavisi, Turner, Gruen and Elliot, 2014). All 22 articles were read in full and assessed for eligibility, of these, 13 were excluded and 9 were selected for final synthesis. Appendix 1 presents all screened studies along with reasons for exclusion. The process of identifying, screening, eligibility and inclusion is presented in a flowchart in figure 2.2.

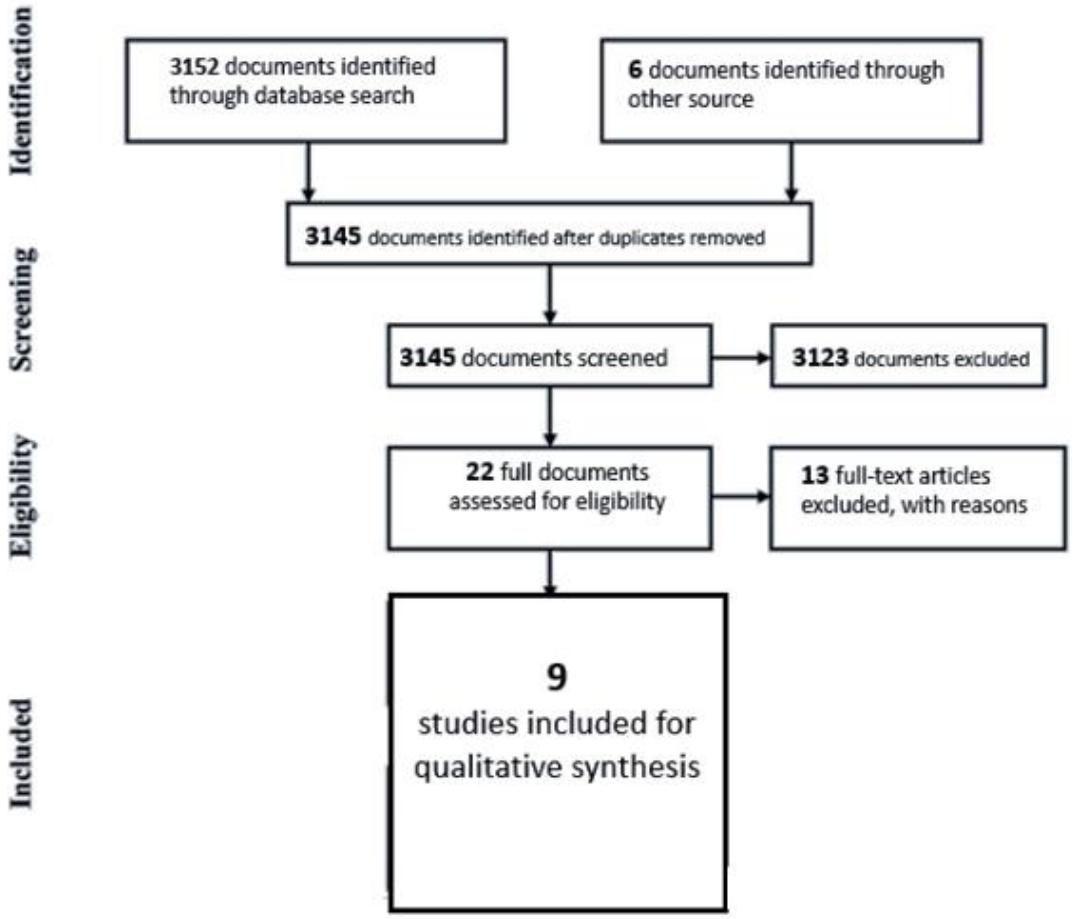


Figure 2-2 Flowchart displaying the process of identifying, screening, eligibility and inclusion for research to be included in a qualitative synthesis (Adapted from Moher et al, 2017)

2.7.3.2 Results of systematic literature review: synthesis of research studies

Synthesis of research studies from the SLR is presented in table 2.4.

Study	Country	Study design	Setting	Participant demographics (sample size)	Intervention details	Intervention frequency and duration	Control group?	Dependent Measure(s) measuring anxiety	Commentary on results	Follow-up?
1. Schohl et al. (2014)	USA	Randomized Control Trial	Clinic based	Participants with ASD aged 11–16 Mean age13.65 ± 1.50. (N=58)	The PEERS® Curriculum for School-Based Professionals. Skills taught: Conversation, humour, handling disagreements, choosing appropriate friends. Homework, Parent psychoeducation	14 weekly sessions lasting 90 min, 21 total hours	Wait-list control group – 29 participants	- Social Interaction Anxiety Scale *(Mattick and Clarke,1998)*	Social anxiety significantly reduced between intervention and control group (p=0.01 d=0.2).	No
2. Yoo et al. (2014)	South Korea	Randomized Control Trial	Clinic based	Participants with ASD aged 12–18 years Mean age 14.04 ± 1.64 (N=47)	Korean Version of PEERS® Treatment Manual. Skills taught: conversation, electronic communication appropriate use of humour, good sportsmanship, embarrassing conflict management Homework and parent psychoeducation	90 min weekly sessions for 14weeks, 21 h over 14 weeks	Wait list control group – 27 matched participants	-Child Depression Inventory *(Kovacs, 1985)* -State and Trait Anxiety Inventory for Children *(Spielberger, 2010)*	The most significant change was seen in internalizing problems, including anxiety and depression, according to both parental observation and self-report.	Yes - 3 months post treatment

3.	Kuehnel (2013)	USA	Randomized Control Trial	Online	Participants with characteristics of ASD, Asperger's syndrome and PDD aged 14-18 (N=50)	Video modelling program, called Knoodle, developed from PEERS®. Skills taught: Conversation, skills, planning get together, handling disagreements and embarrassing feedback, asking for help	30–180 s videos modelling each skill, 15–30 min weekly sessions. Running for 8 Weeks 3h over 8 weeks	Wait-list control Group - due to unforeseen circumstance the control group had to receive a matched intervention called Mindflash	- A range of scales focussing on: social skills, social support, Depression, attitudes, and Anxiety. Anxiety was measured by Revised Children's Manifest Anxiety Scale, Second Edition *(RCMAS-2; Reynolds and Richmond, 2008)*	Using multiple regression, gains in social skills from adolescent and parent perspectives predicted changes in reported anxiety and depression.	No follow-up
4.	Laugeson et al. (2014)	USA	Non Randomized Control Trial	School based	Participants with ASD aged 12–14 Mean age 13 ± 0.7 (N=73)	The PEERS® Curriculum for School-Based Professionals – see description in Schohl et al. (2014).	Daily 30-min lessons, delivered 5 days a week over the course of 14weeks 35 h over 14 Weeks	33 active treatment control participants in Super Skills intervention	-Social Anxiety Scale *(La Greca and Lopez, 1998)*	Trend towards significant anxiety reduction for PEERS intervention group compared to active treatment control ($p < 0.06$, $d=0.95$).	No

5.	Beaumont et al. (2016)	Australia	Non Randomized Control Trial	School based	Participants with ASD aged 7–12 years (N=69)	Secret Agent Society. Skills taught: *Condition 1:* structured multi-level computer game teaching recognition of emotions, conversation, bullying. *Condition 2:* unstructured- use game "as see fit" and no training for facilitators	90-min (or twenty 45-min) group sessions for 10 weeks lasting 15 h over 14 weeks	No inactive control group: two conditions of the same intervention; structured and unstructured	-The Spence Children's Anxiety Scale—Parent Version, *(Spence, 1998)*	Anxiety significantly reduced in structured intervention ($p < 0.001$, $d=0.3$) and were maintained at follow up. No significant reduction in anxiety for unstructured condition	Yes – 6 weeks post treatment
6.	Laugeson et al. (2012)	USA	Non Randomized Control Trial	School based	Participants with ASD aged 12-17 years Mean age= 14.6± 0.71) (N=28)	The PEERS® Curriculum for School-Based Professionals – see description in Schohl et al. (2014)	90-min sessions, delivered once a week over the course of 14-weeks	Delayed Treatment control	-Social Skills Rating System *(SSRS; Gresham and Elliott1990)* -Social Responsiveness Scale *(SRS; Constantino and Gruber, 2005)*	Intervention resulted in overall improvement in social skills as reported by parents and teachers on the SRS including behaviours linked to anxiety / avoidance. Gains maintained at follow-up	Yes 14 week follow-up

7.	Tse et al. (2007)	Canada	Non-Comparative study	Clinic based	Participants, with ASD 13–18 Mean age 14.6 ± 1.7 (N=46)	Non- manualised intervention. Skills taught includes expression of feelings, non-verbal Communication and conversation skills.	12 weekly sessions lasting 90 min each 18 h over 12 weeks	No control group	-Nisonger Child Behaviour Rating Form *(Aman, Tasse, Rojan, and Hammer, 1996)*	Anxious and insecure behaviour decreased significantly over intervention	No
8.	Loudon (2008)	USA	Non-comparative study	School based	Participants with Asperger's syndrome mean age 11.5 (N=3)	Non-manualised, skills taught: 1. social skills groups – conversation skills 2.video-self modelling (role play) 3.social narratives (social stories)	20 min sessions every day for 11 weeks	No control group	Multidimensional Anxiety Scale for Children *(March, Sullivan and Parker, 1999)*	All three participants had decreased anxiety levels; significance calculations not possible in current design	1 month follow-up but data not available for anxiety
9.	Lei et al. (2017)	USA	Non-comparative study	Clinic based	Participants with ASD aged 5-8 (N=21)	Pivotal Response Treatment (PRT) is a manualised behavioural treatment. Its primary aim of increasing social communication skills in children with ASD through natural reinforcements	Each child received 3 treatment sessions (7 h total) weekly for 16 weeks.	No control group	-Child and Adolescent Symptom Inventory – ASD Anxiety Subscale *(CASI-Aut-Anx; Gadow and Sprafkin, 2002)* -Child Behaviour Checklist *(CBCL;*	Parents reported significant reductions in anxiety ($p = 0.02$) and internalising symptoms ($p = 0.003$) following PRT.	No follow-up

					Achenbach and Dumenci, 2001) -Social Responsiveness Scale-Second Edition *(SRS-2; Constantino and Gruber, 2012)*

Table 2-4 Study details of eligible studies involved in a qualitative systematic literature review exploring the evidence-base for social skills interventions in supporting emotional needs, specifically anxiety, of children with social communication difficulties

2.7.4 Analysis of systematic literature review

2.7.4.1 Quality appraisal

Gough (2007) argues that, before eligible studies can be synthesised, it is important to ensure that evidence "is of sufficient and appropriate quality and relevance" (p.230); a step supported by Popay et al. (2006) in qualitative SLRs.

According to the Evidence for Policy and Practice Information and Coordinating (EPPI) Centre (2002) three questions should be asked in a SLR to determine quality of research:

1. How trustworthy are findings?
2. How appropriate and relevant is the study design to answer the research question(s)?
3. Which research contributes the greatest weight to the evidence-base?

Checking the relevance of the studies has been espoused by implementing Moher et al's stages (2017). However, the quality of each study needs to be checked before synthesis to ensure conclusions are not undermined by poor methodology (Popay et al., 2006).

To check the quality and trustworthiness of the research, Gough's (2007) proposed "Weight of Evidence (WoE)" Framework, along with Gersten, Fuchs, Compton, Coyne, Greenwood and Innocenti's (2005) quality indicators were used to determine the quality of the studies identified.

2.7.4.1.1 Quantitative quality evaluation criteria

Gertsten et al.'s (2005) indicators were used because the studies identified in this review were conducted using group experimental and quasi-experimental research designs. Table 2.5 displays an outline of these indicators alongside Gough's (2007) WoE framework. For more details of Gersten et al's (2005) quality indicator descriptions please refer to Appendix 2.

Weight of Evidence Criteria	Implications for this review
A – Generic quality of execution of study	Studies which give a transparent and clear purpose to the study, are accurate and accessible to understand with clear commentary on the intervention and procedure will be given a higher weight of evidence.
B – Appropriateness of the method	Studies that use sufficient variables to measure their intended purpose and consider a range of relevant tools which are "fit for purpose", along with studies who use a control group to aid comparison will be given a higher appraisal.
C – Relevance of approach taken to review research question	Studies which provide quality data analysis, give honest answers to the research question based on their results, and which give implications for future interventions and research will be given a higher weight of evidence. Studies which adopt a clear ethical and moral approach to their conclusions will be given a higher weight of evidence.
D- Overall assessment of the quality of the evidence	**The above criteria will be combined to give an overall judgement for the quality of evidence. Studies will be given a low, medium or high assessment.**

Table 2-5 Weight of evidence criteria

To assess the quality of included studies further, each will be commented on for their validity and reliability. Table 2.6 presents the WoE scores along with validity and reliability comments which were guided by Gersten et al's (2007) quality indictator descriptions.

Study	Weight of Evidence	Validity	Reliability
Schohl et al. (2014)	A-High B-High C-High D-**High**	• A range of measures utilised and from different perspectives in order to triangulate data to achieve internally valid conclusions • Randomised and blind conditions employed to reduce bias • Measures could be deemed as artificial reducing external validity	• Experimental and wait-list control groups took the measures at the same points in time in order to compare results • Explicit overview of intervention provided • Lack of diversity in sample
Yoo et al. (2014)	A-High B-High C-Medium D-**High**	• Revised version of intervention was culturally sensitive for the proposed sample • Observation tool used to measure during study, but not in follow-up • Methodology was partially blind • Ratings from third party not included in study	• Explicit overview of intervention provided • Wait-list control and experimental groups were matched for characteristics to reduce potential confounding variables • Assessment schedules consistent across experimental and control group
Kuehnel (2013)	A-High B-Low C-Medium **D-Medium**	• Randomized Control Trial (RCT) used to reduce bias • Preliminary study employed to inform intervention design and measures • Spread of ages to increase generalisability of conclusions • Multiple measures were selected to gather information about social, emotional, and academic variables from multiple perspectives at multiple time points.	• Due to unforeseen circumstances control group and experimental group did not receive the same intervention, this makes direct comparison difficult • Clear overview of intervention provided • Online computerised intervention ensures consistency in intervention delivery • Not all lessons were completed by all participants
Laugeson et al. (2014)	A-High B-Medium C-High **D-Medium**	• Study did not employ a randomised control design to establish effects of the intervention • Diagnostics data on participants was not comprehensive • Potential risk of treatment contamination across the two groups • One of the Authors receives royalties from the sale of the intervention therefore researcher bias could be present	• Explicit overview of intervention provided • Measures used in the study had their reliability reported where appropriate
Beaumont et al. (2016)	A-High B-Medium C-Medium **D-Medium**	• Control group were not inactive and therefore still receiving a social skills intervention	• Manualised intervention supplied to and used by all facilitators for consistency • No fidelity checks of the intervention were conducted

		• The use of the facilitator ratings may have introduced bias due to their involvement in the intervention • Diagnostics data on participants was not comprehensive • No follow-up data included in the research	
Laugeson et al. (2012)	A-High B-Medium C-Medium **D-Medium**	• Randomisation was not used to allocate groupings • Follow-up measures were conducted to assess effectiveness over time • Diagnostics data on participants was not comprehensive • Parental ratings may have introduced bias	• Clear and explicit inclusion criteria for participation used • The same therapists were used to deliver the intervention across all condition • Explicit overview of intervention provided • Fidelity checks were conducted
Tse et al. (2007)	A- Medium B-Low C-Low **D-Low**	• Study is a 'preliminary study' • Vague description of participants included in the research • Validity of the three measures were checked but not reported • Two participants did not complete the intervention • Not all participants completed the survey • No control group employed • Small sample size • No follow-up data collected	• Standardised sequence for intervention followed, but intervention was not manualised • Intervention delivered by social worker or psychologist • Intervention was a combination of aspects from other interventions • Reliability of the three measures were checked but not reported
Loudon (2008)	A-High B-Medium C-High **D-Medium**	• Detailed descriptions of the three participants presented • Multiple measures were selected to gather information about social, emotional, and academic variables from multiple perspectives • Social validity reported by the author for the adopted approach to the intervention • School setting increased the ecological validity • Control conditions were not employed; participants acted as controls in themselves • Multiple threats to external validity acknowledged and reported by the author	• Timing and duration of baseline observations were consistent for each participant • Non-manualised intervention used, but standardised approach to the intervention used • Procedural reliability reported • Standardised observation record used and inter-observer reliability reported
Lei et al. (2017)	A-High B-Medium C-Medium **D-Medium**	• This study was an 'open-label' trial • Explicit diagnostic data presented for each participant	• Manualised intervention followed

	• Clear inclusion criteria presented and followed • Only parent reports used to evaluate impact • Narrow age range used reduced generalisability to other age groups • No control group used	• Fidelity assessments of intervention implementation carried out

Table 2-6 Assessment of study quality using Gough's weight of evidence criteria (2007)

2.7.4.1.2 Summary of quality appraisal

Of the nine studies reviewed, two were identified as high quality (Schohl et al., 2014; Yoo et al., 2014), six were identified as medium quality (Lei et al., 2017; Loudon, 2008; Laugeson et al., 2012; Beaumont et al., 2016; Laugeson et al., 2014; Kuehnal, 2013) and one of low quality (Tse et al., 2007).

2.7.4.2 Qualitative analysis of identified studies

Now the studies have been appraised for their validity and reliability, the SLR will take a closer look at the details of each study in order to form conclusions in relation to the SLR question. The headings in this section have been guided by Gersten et al (2007) and their indicators for group and quasi-experimental research.

2.7.4.2.1 Participant demographics

Of the nine studies, seven involved participants from secondary/high school ages, and two involved participants who were primary/elementary school-age. The youngest participants were aged 5-years (Lei et al., 2017) and the oldest participants were aged 18-years (Yoo et al., 2014; Tse et al., 2007).

All nine studies included participants who were either formally diagnosed with ASD, Asperger's Syndrome, high functioning ASD, or Pervasive Developmental Disorder not otherwise specified, or who displayed behaviours indicative of these conditions. Having a formal diagnosis was not always specified as an inclusion criterion for participation in the study (Kuehnal, 2013).

The wide age ranges and broad range of needs in this SLR are helpful in establishing the effects of social skills interventions for children with social communication difficulties, however the breadth makes closer analysis of the impact of age difficult.

2.7.4.2.2 Research design and sample size

A range of research designs and methodologies were employed. One study employed a multiple-baseline single-case experimental design (Lei et al., 2017). Two conducted

non-comparative experimental studies (Loudon, 2008; Tse et al., 2007). Three carried out comparative studies involving an experimental and control group, but did not randomly assign participants to the groups (Laugeson et al., 2014; Beaumont et al., 2016; Laugeson et al., 2012). And, three conducted randomised control trials (Schohl et al. 2014; Yoo et al., 2014; Kuehnal 2013). All nine were experimental. None of the studies employed qualitative methods to supplement their quantitative methods.

Only four of the studies carried out follow-up measures (Yoo et al., 2014; Beaumont et al., 2016; Laugeson et al., 2012; Loudon 2008), and were therefore the only ones to be able to report if the observed effects were maintained after the intervention had finished. Loudon (2008) was unable to provide data on anxiety in the follow-up phase.

The sample sizes within the studies were varied, from 73 participants (Laugeson et al., 2014) to 3 participants (Loudon, 2008). The range of sample sizes reflects the different methodologies employed.

The variability in design and samples makes it difficult to reach a conclusive answer to the SLR question. The lack of control groups and randomisation within the studies makes establishing causation between the interventions and their effects problematic.

2.7.4.2.3 Intervention characteristics

Social skills intervention can be delivered in different contexts, and because the target population of this SLR focuses on children, the selected studies were either conducted in a clinic or school context. One study delivered the social skills intervention using an online platform (Kuehnal, 2013). Four delivered their intervention in a clinic (Schohl et al., 2014; Yoo et al., 2014; Tse et al. 2007; Lei et al., 2009) and four were delivered within a school context (Laugeson et al., 2014; Beaumont et al., 2016; Laugeson et al. 2012; Loudon, 2008).

Different social skills interventions were employed. Five studies used versions of the PEERS® social skills intervention (Laugeson et al., 2014; Beaumont et al., 2016; Laugeson et al. 2012; Schohl et al., 2014; Yoo et al., 2013). PEERS® stands for 'Program for the Education and Enrichment of Relational Skills'. It is a 16-week manualized, social skills training intervention for youths with social challenges. The intervention focuses on the development of: conversation, choosing friends, using different forms of communication, humour, organising 'get togethers', playing

games/sports with others, handling arguments and bullying, and skills on how to change a bad reputation.

Two studies delivered non-manualised interventions, drawing on principles from other interventions; these studies did present an outline of the sessions (Tse et al., 2007; Loudon, 2008). The last two studies used manualised interventions. One used Pivotal Response Treatment (PRT); a behaviourist-based treatment designed to increase social motivation to enhance quality of social interaction in children with ASD (Lei et al., 2017). The other used an intervention called 'Secret Agent Social Skills program' (Beaumont et al., 2016) which looks to develop and increase emotional and social awareness in children aged 8 -12 years.

The mean period of intervention delivery was 13 weeks with one session being delivered weekly. The length of sessions varied between 15 minutes and 90 minutes (e.g. Kuehnal, 2013 and Schohl et al., 2014). Of those lasting 90 minutes some indicated, depending on individual need, that two 45 minute sessions might be appropriate (Beaumont et al., 2016).

The different intervention approaches for developing social skills is a positive. It increases the flexibility and adaptability of interventions for use in different settings, including schools. This synthesis has also shown general trends for the length of the intervention phase, timings of each session and skill areas.

2.7.4.2.4 Measures used to evaluate impact on anxiety

As part of the inclusion criteria only studies which collected data on a participant's anxiety would be included within this review. Across the nine studies, eleven different tools were used to measure the intervention's impact on anxiety; these measures and corresponding study are presented in table 2.7. The range of measures used suggests there is not a gold standard measure to evaluate the impact of an intervention on a child's anxiety.

Every study used at least three different tools to evaluate the intervention. However, the perspective from which the measure was taken varied across the studies. Two studies collected measures using parent report only (Lei et al. 2017; Tse et al., 2007); Tse et al. (2007) attempted a child survey but response rate was poor. Two studies used both parent and child report measures (Yoo et al., 2014; Kuehnal, 2013) and five studies

collected measures from three perspectives: parent, teacher and child (Beaumont et al., 2016; Loudon, 2008; Schohl et al., 2014; Laugeson et al., 2014; Laugeson et al., 2012).

The range of measures showcases the need to consider options carefully in order to find a measure that is fit-for-purpose with regards to the research question, design and participant demographics.

	Name of measure	Reference	Study or studies that used the measure
1.	Social Interaction Anxiety Scale	Mattick and Clarke (1998)	- Schohl et al. (2014)
2.	State and Trait Anxiety Inventory for Children	Spielberger (1972)	- Yoo et al. (2014)
3.	Revised Children's Manifest Anxiety Scale, Second Edition	Reynolds and Richmond (2008)	- Kuehnal (2013)
4.	Social Anxiety Scale	La Greca and Lopez, (1998)	- Laugeson et al. (2014)
5.	The Spence Children's Anxiety Scale—Parent Version	Spence (1998)	- Beaumont et al. (2016) - Laugeson et al. (2012)
6.	Social Skills Rating System	Gresham and Elliott1990)	- Laugeson et al. (2014) - Yoo et al. (2014) - Loudon (2008) - Schohl et al. (2014)
7.	Nisonger Child Behaviour Rating Form	Aman, Tasse, Rojan, and Hammer (1996)	- Tse et al. (2007)
8.	Child and Adolescent Symptom Inventory − ASD Anxiety Subscale	Gadow and Sprafkin (2002)	- Lei et al. (2017)
9.	Multidimensional Anxiety Scale for Children	March, 1999	- Loudon (2008)
10.	Social Responsiveness Scale-Second Edition	Constantino, 2012)	- Laugeson et al. (2012) - Laugeson et al. (2014) - Lei et al. (2017) - Tse et al. (2007) - Schohl et al. (2014) - Yoo et al. (2014)
11.	Child Behaviour Checklist	Achenbach and Dumenci, 2001)	- Lei et al. (2017) - Yoo et al. (2014)

Table 2-7 A display of the resources used to measure the impact of social skills intervention on a child's level of anxiety

2.7.4.2.5 Social skills intervention's impact on children with social communication difficulties' anxiety

All nine studies indicated, to some degree, that the social skills interventions were able to decrease levels of anxiety experienced by the children. Due to the variations in methods, not all the studies were able to report levels of significance (e.g. Loudon, 2008). Consequently, it is not possible to establish causality between the intervention in these studies and their impact on anxiety. However, other studies were able to report significant associations between the intervention and its role in reducing anxiety.

Lei et al. (2017) found the parent report measures showed significant reduction in anxiety ($p=0.02$) and internalising symptoms following the PRT intervention. Significant effects of the intervention on parental reports of child anxiety levels were also reported by Beaumont et al. (2016) in their structured intervention, and they also found that these effects were maintained at the 6-week follow-up. The significant effects in the structured condition suggest that the framework used in an intervention is important, but more research is needed in understanding an intervention's mechanisms.

Laugeson et al. (2012) analysed their data using a MANOVA, and their results revealed significant improvements across all scales in the treatment group compared to the control group after intervention and at follow-up, including subscales measuring anxiety. A similar decreasing trend in anxiety levels was also reported in Laugeson et al. (2014), control group (DS=3.17) compared to treatment group [mean DS = -8.60; $F(1,15) = 4.24$, $p<.06$, $d = 0.95$]; no other difference scores (DS) were found to be significant.

Yoo et al. (2014) also found that measures linked to anxiety displayed some of the most significant changes following the intervention ($P < 0.01$.). Significant reductions in anxious and insecure behaviours were observed following intervention ($p<.04$) by Tse et al. (2007). The experimental group in Schohl et al.'s (2014) study showed a significant decrease in social anxiety on the SIAS, $t(27) = 3.19$, $p<0.005$, $M_{pre} = 32.28$, $SD_{pre} = 14.39$, $M_{post} = 24.72$, $SD_{post} = 9.67$, but the wait-list group did not, $t(27) = -0.04$, not significant, $M_{pre} = 26.83$, $SD_{pre} = 13.44$, $M_{post} = 26.90$, $SD_{post} = 16.03$. Finally, Kuehnal (2013) used multiple regression which indicated changes in anxiety levels, reported by both parental and child perspectives.

Yoo et al. (2014) and Schohl et al. (2014) were two studies deemed as being of high quality due to their employment of a RCT design. Because these two studies reported

significant results of the social skills intervention on reported levels of anxiety, tentative conclusions can be drawn in response to the SLR question. However, both these studies used the PEERS® intervention and therefore questions remain regarding the extent to which other social skills interventions can reduce anxiety.

Although all studies reported, to some degree, reductions in anxiety the extent to which they were able to state this is problematic. The lack of: effect sizes, control groups, randomisation, as well as the variations in the perspective taking the measure and approaches to intervention, make it difficult to establish causation between an intervention and its effects.

2.7.5 Conclusion of systematic literature review

This qualitative SLR explored the evidence-base of studies evaluating the impact of social skills interventions in supporting emotional needs, specifically anxiety, of children with social communication difficulties. The rationale behind the review was based on the high comorbidity of social communication difficulties and anxiety-related behaviours, and the potential for social skills interventions to reduce anxiety levels in order to support both social communication and wellbeing.

The search strategy and inclusion criteria revealed 9 eligible studies for synthesis. The studies looked at children aged between 5-18 years of age, with and without a formal social communication difficulty diagnosis, involved in a social skills intervention where the anxiety experienced by the child was measured. Although the quality of the studies was variable, each study reported to some degree reductions in anxiety. Therefore, this SLR provides some tentative conclusions regarding the positive implications for social skills interventions in reducing anxiety for children with social communication difficulties.

This review has highlighted that different methodologies can be employed in this research area, but attention must be paid to the robustness in the delivery of each design. Whilst RCTs are deemed a gold standard of research, the heterogeneity in social communication difficulties is a barrier to employing this method. Contributing to research quality was the consistency in intervention delivery across the studies; whether the intervention was manualised or not, fidelity checks and regularity in the timing of assessment measures enhanced validity and reliability.

This SLR has showcased the value of both clinic and school-based settings in supporting children and young people. With schools being well-positioned to support children's social skills development, school-based interventions may be a good option for future research, especially since families may have better access to school services than clinical services. Furthermore, through the extensive network of support in schools from both staff and peers, the social and emotional skills developed in an intervention may be more likely to be maintained and generalised.

Finally, this SLR was helpful in highlighting potential gaps in the evidence-base. Only two of the studies focussed on children aged 5-11 (Beaumont et al., 2013; Lei et al., 2017), therefore it is difficult to evaluate the effects of a social skills intervention on this age group; future research could benefit from exploring the impact within the primary-school population.

Information gained from this SLR will be utilised to inform the formulation of research questions and study design. Before this can be established a closer look at a school-based social skills intervention which can be utilised with primary school-aged children is needed; the selected intervention is 'Lego-based Therapy' (LeGoff et al., 2012). Lego-based Therapy has been selected in recognition that it might be able to complement the strengths and reduce some of the criticisms observed across the interventions in this SLR.

2.7.5.1 Limitations of the systematic literature review

Based on the key words used in the search, a high number of articles was identified (N=3145) reflecting the popularity in this research area. Despite adjusting key words, a high number remained. The researcher noticed that the relevance of studies identified by the search engines decreased so a decision was made that only abstracts containing *all* the key words would be screened. Consequently, there is a chance that potentially relevant articles may have been missed and not included in the SLR. Therefore, a true picture of the existing evidence-base may not be presented.

Finally, although every effort was taken to reduce researcher bias, only one researcher was used in the interpretation, appraisal and synthesis of studies; reliability and validity could have been increased through the introduction of another researcher.

2.8 LEGO-BASED THERAPY

2.8.1 History and rationale of Lego-based Therapy

Lego-based Therapy is a social development programme for children with ASD and other social communication difficulties. Lego-based Therapy was developed in the mid-1990s by Psychologist, Daniel LeGoff, in his clinic in Honolulu, Hawaii. LeGoff developed this approach after observing two of his clients with ASD spontaneously interact whilst playing with Lego®.

The intervention was developed in recognition that, whilst several social skills interventions exist, the evidence-base for their effectiveness with children with social communication difficulties and the ability to generalise the skills learnt was limited (McConnell 2002; Owens et al. 2008; Rogers 2000).

LeGoff et al. (2014) also report that existing interventions are not engaging for young people due to their artificial and mundane approach to social situations. Therefore, there was a need to identify an approach that would be more naturalistic, fun and motivating, especially if children with difficulties are to experience success and enjoyment in social situations. This rationale is supported by other researchers who also report a need for interventions to reflect more real-life situations in order to build interest and increase participation (Attwood, 1998; Delprato, 2001). Kohler et al. (1997) suggest the more naturalistic an intervention the more likely it will reinforce spontaneity in social interaction and strengthen the appropriateness of the interactions beyond the intervention.

Lego-based Therapy uses a strengths-based approach to intervention by using a child's own interests to motivate learning and change (Attwood, 1998). Its approach to supporting social development is highly structured and systematic, taking advantage of the predictable nature of Lego®. Building Lego® provides a joint interest and goal for children.

The intervention itself involves a trained adult guiding a small group of children to develop their sharing, turn-taking, eye-contact and follow social rules. This happens through participation in two types of activity:

1. Lego set building - pre-prepared sets of Lego® with visual instructions, where children take on set roles: the engineer, the builder and the supplier

2. Freestyle building - children agree a Lego® project and build collaboratively with no visual instruction sheets.

2.8.2 Theoretical underpinning of Lego-based Therapy

At its core, Lego-based Therapy satisfies many of the features outlined as being effective for an intervention to support social communication (Rogers, 2000; McConnell, 2002). Its emphasis on peer mediation, adult modelling and group learning in a natural setting through activities, along with the monitoring of a child's performance over time, are all reflected in the Lego-based Therapy manual (LeGoff et al., 2014).

Using an understanding of the core difficulties observed in children with ASD, Lego-based Therapy uses the Lego® building with peers to build an understanding of social rules, verbal and non-verbal communication, collaboration and joint problem-solving (LeGoff et al., 2014). Unlike other interventions, it is also able to develop joint attention in children through play instead of through adult-directed instructions such as those observed in the PEERS® intervention.

Furthermore, the predictable and systematic nature inherent to building Lego® is more likely to motivate a child with social communication difficulties. Research shows that children with social communication difficulties find systems appealing (Baron-Cohen, 2006; Baron-Cohen et al., 2003). For these reasons, LeGoff saw adapting Lego® play in order to serve another function as justified (Owens et al., 2008). This justification is supported by evidence, where rule governed games i.e. Lego® are seen as a useful transition to more comprehensive social interactions compared to other social-based games such as role play (Dewey, Lord and Magill, 1988).

2.8.3 Evidence-base for Lego-based Therapy

The current evidence-base for Lego-based Therapy is promising, but limited. At present there are only four peer-reviewed studies (LeGoff, 2004; LeGoff and Sherman, 2006; Owens, 2008, Andras, 2012) and three dissertation studies (Boyne, 2014; Brett, 2013; Cheng, 2016). The limited evidence-base highlights a need for more studies exploring its impact on children, particularly within the school setting. Furthermore, two of the published studies name the creator of Lego-based Therapy as a researcher, therefore there is potential for researcher bias due to professional and personal investment. This provides further justification for more objective evaluations of Lego-based Therapy.

2.8.3.1 Study findings

LeGoff (2004) used a wait-list control design and found 47 young people with ASD showed significant improvements in 3 measures of social competence (initiation skills, sustained interaction, frequency and severity of repetitive behaviours) compared to a waitlist control after 12 weeks. He also reported that these skills improved further after another 12 weeks.

LeGoff and Sherman (2006) employed a thirty-six month pre- and post- treatment series design with 60 young people with ASD who participated in Lego-based Therapy. They found significantly more improvement over 3 years compared to a waitlist control on the Gilliam Autism Rating Scale and Vineland Adaptive Behaviour Scales.

Owens et al. (2008) conducted a UK-based study of 6-11 year olds with ASD over 18 weeks. An RCT design was used comparing Lego-based Therapy against the Social Use of Language Programme (SULP) and a no intervention group. They found, whilst both interventions improved social competence, the Lego-based Therapy group showed better improvements in maladaptive behaviour, autism specific social difficulties and duration of social interaction with peers.

Andras (2012) employed a small-scale within-groups design, where 10 weekly sessions were delivered with 8 primary-aged (8-11) children with autism in a mainstream setting. Significant improvements in frequency of social interactions on the playground and more engagement in organised games was reported, along with continued improvements after the end of intervention.

Brett (2013) evaluated Lego-based Therapy using a mixed-method design with 14 primary school-aged children. Quasi-experimental methods were used to evaluate change in social competence, and semi-structured interviews were used to gather the children's perspectives. She found significant increases on some social competence scales including: socialisation, play and interpersonal skills. Emergent categories from the qualitative analysis suggested that children were found to be inherently interested in Lego and experienced positive social interactions with sessions.

Boyne (2014) used a single-case experimental design in a mainstream primary setting with 6 children aged 6-10. She found 5/6 participants improved in at least one of the social communication skills measured and, improvements were maintained for 3/6

participants post intervention. Furthermore, parents and teacher reported improvement in social skills for 5/6 participants in school and 3/6 participants in the home.

Cheng (2016) employed a mixed-method approach in a mainstream primary setting to understand the effectiveness of an 8-week Lego® Therapy group intervention for children with ASD. Nineteen Key-stage two children (7-11 year olds) participated in the intervention. Using quantitative analysis, no significant improvements were reported across the measures. However, qualitative interview with the children's teaching assistant revealed 5 categories related to observed positive changes within the children.

2.8.3.2 Research summary and potential gaps for future research

Out of the seven studies, three indicated significant improvements in social behaviours within clinical settings (LeGoff, 2004; LeGoff and Sherman, 2006; Owens, 2008) and four highlighted, to some degree, its positive impact within a school setting following Lego-based Therapy (Andras, 2012; Brett, 2013; Boyne, 2014; Cheng, 2016). However, variations in research design and quality, along with developer involvement, mean the ability to conclude that Lego-based Therapy can lead to gains in social skills is compromised.

There is a need for more high quality research to be conducted, especially within the school setting, to determine Lego-based Therapy's efficacy. Future research should look to employ robust methods which use control conditions to determine causation, along with methods which elucidate understanding about the mechanisms of the intervention works. The heterogeneity of the target population, for which Lego-based Therapy was created, also needs to be acknowledged when considering research designs.

Finally, one of the claims of Lego-based Therapy made by the developer is its capacity to reduce anxiety experienced by children with social communication difficulties:

> "it [Lego-based Therapy] may also be helpful for children with other social communication difficulties and anxiety conditions (especially social phobias), depression, or adjustment difficulties manifesting as depression or anxiety, though research has yet to evaluate the effectiveness of the approach with these difficulties" (LeGoff et al., 2014, p27-28)

As stated there is no evidence to support this claim, thus providing another area for future research to explore. Considering all key areas and issues discussed in the literature review and SLR, a focus for this study has been identified.

2.9 CURRENT STUDY

2.9.1 Rationale

There are several factors motivating this research, including:

- High prevalence of children with social communication difficulties in mainstream schools
- Comorbidity of social communication difficulties and anxiety
- Need for school-based interventions to support social communication and emotional needs
- Need to explore Lego-based Therapy's potential impact on anxiety
- Need to improve the validity and reliability of the existing evidence-base of Lego-based Therapy

2.9.2 Research questions and hypotheses

	Questions	**Hypotheses**
Primary research question	**For children with social communication difficulties, does Lego-based Therapy have an effect on anxiety?**	**For children with social communication difficulties, Lego-based Therapy does have an effect on anxiety**
Subsidiary research questions	A. For children with social communication difficulties, does Lego-based Therapy have an effect on a child's self-reported anxiety?	For children with social communication difficulties, Lego-based Therapy does have an effect on a child's self-reported anxiety
	B. For children with social communication difficulties, does Lego-based Therapy have an effect on a parent's report of their children's anxiety?	For children with social communication difficulties, Lego-based Therapy does have an effect on a parent's report of their child's anxiety
	C. For children with social communication difficulties, does Lego-based Therapy have an effect on a teacher's report of the child's anxiety?	For children with social communication difficulties, Lego-based Therapy does have an effect on a teacher's report of the child's anxiety
	D. If positive changes were perceived, what within Lego-based Therapy could have helped bring these about?	*Due to the exploratory nature of this question, a research hypothesis is not appropriate*

Table 2-8 Primary and subsidiary research questions and research hypotheses for the presented study

2.10 CHAPTER SUMMARY

This chapter explored the current research and academic literature into social communication and its development in children. A consideration of atypical development has also been outlined. Research exploring school-based interventions supporting social and emotional development was analysed through a SLR. This was followed by an examination of Lego-based Therapy and its evidence-base. From this, gaps within the existing literature were highlighted and provided as a rationale for the presented study.

3 METHODOLOGY AND METHOD

3.1 INTRODUCTION

This chapter presents a clear rationale for the philosophical and theoretical positions which guided the methodological and procedural decisions used to respond to the principal and subsidiary research questions of this study.

The chapter begins with a broad look at what 'Real World' research is, along with a critical look at evidence-based practice in educational settings. Major theoretical paradigms and philosophical assumptions that underpin research will be explored, ending with a look at the paradigm which influenced the design and processes adopted in this study.

Threats to validity and reliability in the chosen study design will also be deliberated. This chapter concludes with a full acknowledgement of ethical considerations made during the research. The author hopes to highlight how the heterogeneity of the population sampled in this study has been integral to the selected study design.

3.2 REAL WORLD RESEARCH

> "…real world research can shape the world as well as explain to us why the world is in the shape that it is." (Robson and McCartan, 2016, p.6)

Unlike in basic, or fundamental, research, where the main impetus for conducting research stems from a desire to increase human knowledge, applied research, or 'real world research', aims to solve practical problems, as well as to understand the living reality in which people exist.

Basic research is often, and perhaps wrongly, associated with a higher level of prestige than applied research. This is, in part, due to its explicit pursuit of developing an academic discipline and its more reputable links with scientists in university-based laboratories. This dichotomy is misplaced. Both basic and applied research have value in advancing human knowledge about the world, but each adopt a different theoretical perspective depending on the purpose of the research.

Cohen, Manion and Morrison (2011) helpfully explain the purpose of applied research. They explain that it allows people to discover 'truths' about the world around them and make sense of their own experiences.

In Education, there is a need to understand what is going on for teachers, children, and their families. Educational researchers therefore need to avoid generating findings from basic research, since the findings are likely to oversimplify the experiences of the people working in education by presenting excessively generalised conclusions.

To understand the experiences of young people in schools specifically, Jensen, Hoagwood and Trickett (1999) write about a need to move away from the "ivory towers" of university-led laboratory to the "earthen trenches" of real world research; particularly with reference to interventions. To do this, Jensen et al. (1999) state that research needs to work in partnerships with families and schools in order to truly determine what interventions work for children and young people. With reference to interventions, the concepts of 'what?' 'for whom?' and 'why?' gives way to researching phenomena in real world settings. This is called 'evidence-based practice' (Gulliford, 2015; Frederickson, 2002; Spring, 2007).

3.3 EVIDENCE-BASED PRACTICE IN EDUCATIONAL SETTINGS

The notion of evidence-based practice (EBP) has been viewed as an essential part of a psychologist's role for the best part of 70 years (Burnham, 2013). Finding a definition of EBP within a psychological framework can be problematic. The majority of existing definitions have emerged from medical perspectives, and therefore may not be appropriate when applied to professionals working from a more social science perspective (Hunsberger, 2007).

A definition from Levant and Hasan (2008), helpfully captures a meaning of EBP which showcases the more holistic nature of it in Psychology. "Evidence-based practice in Psychology is the integration of the best available research with clinical expertise in the context of patient characteristics, culture and preferences" (p.695). Whilst this definition highlights the broad contributions of EBP, it is a general definition. Caution is needed in its interpretation when considering applied fields of Psychology such as in Education, especially when using the phrase: "clinical expertise".

As previously stated, EBP is largely associated with its role supporting educationalists in asking 'what works?', 'for whom?' and 'why?' (Frederickson, 2002; Hattie, 2008; Lilienfeld et al., 2013; Stoiber and Waas, 2002; Spring, 2007). The importance of EBP in exploring these questions is reflected in the SEND Code of Practice (DfEE, 2014). Here, the emphasis is on supporting young people with additional needs by drawing upon existing research when supporting schools through the selection and delivery of interventions. The role of the Educational Psychologist (EP), specifically, is to work collaboratively with schools and families in applying psychological knowledge and skills to formulate interventions to meet individual need (Wagner, 2002). A view supported by Stoiber and Waas (2002), who agree that the essential role of the EP is to determine the most appropriate intervention to support need.

EBP hopes to overcome the variance in practitioner decision-making processes (Gulliford, 2015). A hierarchy of evidence, stemming from a positivist perspective, offers a way of viewing what sort of research could carry more valid and reliable foundations to guide professional practice. Scott, Shaw and Joughin (2001) proposed the hierarchy displayed in figure 3.1, where greater rigour is observed at the top; a similar view was also captured by Pawson (2006).

The appropriateness and value of this hierarchy in Educational research has been questioned by Frederickson (2002). Frederickson (2002) argued, whilst the hierarchy is helpful in asking efficacy questions such as 'can it work?', it is not so helpful when asking real world research questions such as 'does it work?'.

Although Scott, Shaw and Joughin (2001) argue for EBP to be guided by methods observed higher up in the hierarchy, Frederickson (2002) states that for real world research the research question should determine design and not vice versa. When this approach is adopted, more valuable contributions will be made to EBP. Nevo and Slonim-Nevo (2011) support this, stating there needs to be a balance between research quality and practical implications for the psychological practitioner. This view gives way to recognition that RCTs, often deemed as 'gold standard', may not always be the best approach to understanding an individual and their specific context.

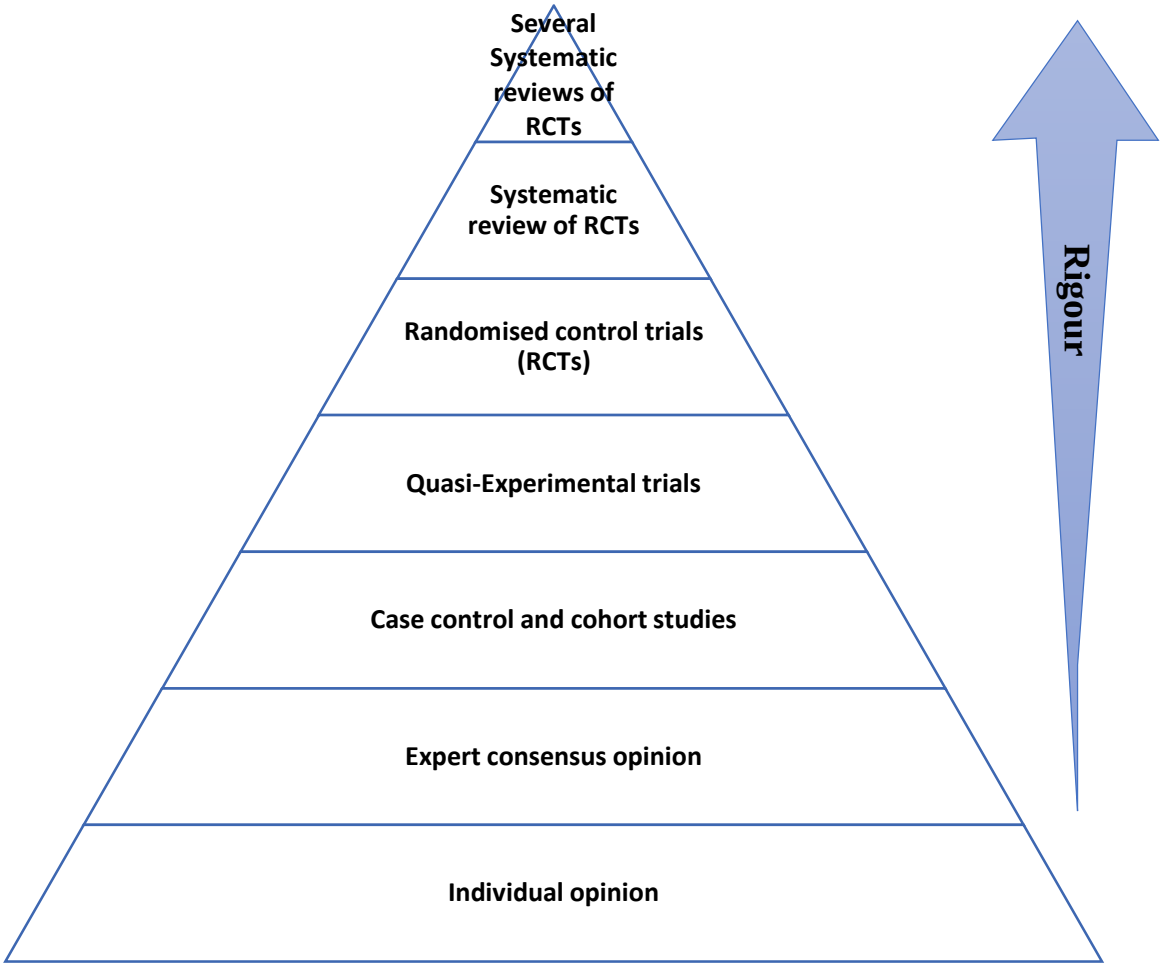


Figure 3-1 Hierarchy of evidence adapted from Scott, Shaw and Joughin (2001)

This study hopes to contribute to the EBP in the educational provision for children with social communication difficulties. The needs of this population are heterogeneous. Therefore, in order to contribute to the evidence-base, acknowledging that the research design should be guided by the research question is critical (Ramchandani, Joughin and Zuri, 2001; Frederickson, 2002). This perspective is reflected in the National Professional Development Centre (NPDC) review of Autism intervention research, where only 8% of studies were based on RCTs (Wong et al., 2015). Similarly, Kasari and Smith (2013) found research within this population was largely conducted using single-case experimental design (SCED). This hegemony in research design reflects the current landscape in the evidence-base for interventions within this population. It also showcases the importance of moving towards theoretical and philosophical assumptions that complement the tenet of real world research.

3.4 THEORETICAL PARADIGMS AND ASSUMPTIONS WITHIN RESEARCH

3.4.1 Dominant paradigms in Educational Psychological research

To substantiate a piece of research, valuing one's own philosophical paradigm is a crucial starting point (Scotland, 2012). A research paradigm gives full consideration to: ontological, epistemological and methodological stances, and once justified enables the selection of appropriate methods to answer research questions (Mack, 2010). Crotty (1998) defines ontology as the study of being and one's view on reality. Epistemology is concerned with how knowledge is formed and shared (Cohen, Manion and Morrison, 2011).

Four dominant paradigms exist in educational and psychological research: positivism, interpretivism, post-positivism and pragmatism.

3.4.1.1 Positivism

Positivism assumes that reality can be observed and "all genuine knowledge is based on sense experience and can be advanced only by means of observation and experiment." (Cohen et al., 2011, p.7). For the positivist paradigm, the ontological assumption views reality as external to the researcher and "objects have meaning independently of any consciousness of them" (Mack, 2010, p.7), this results in a reality that can be predicted. The epistemological stance assumes a deductive position, where truth is indisputable and therefore can unquestionably be attained since knowledge is objective (Grix, 2004). Ultimately, any phenomenon has an "independent existence which can be discovered via research" (Scotland, 2012, p.10); a view supported by McNiff, Lomax and Whitehead (2003). Positivist research, due to its view that reality can be predicted, also assumes explanations are generalisable; a position Usher (1996) describes as "highly problematic" (p. 14) giving way to other paradigms.

3.4.1.2 Interpretivism

The interpretivist paradigm offers a contrasting view. Here, ontology concerns itself with relativism; the view that reality is individual and subjective (Guba and Lincoln, 1994). Consequently, it only exists when humans consciously engage with it. Therefore, subjectivist epistemology is adopted, where the world is not independent from our knowledge of it (Grix, 2004). When researchers adopt this paradigm in research, they aim to "…demystify social reality through the eyes of different participants" (Cohen et al., 2007, p. 19). Although the interpretivist paradigm can illuminate social phenomena

through double hermeneutics, the aim of evaluative research in EBP is to offer a more generalisable understanding of an intervention's effectiveness and not necessarily a single individual's perspective of it. For this reason, the interpretivist paradigm on its own is not appropriate within the context of the presented study.

Although positivist and interpretivist paradigms have offered value to research, critics argue both are reductionist on their own. Todd et al. (2004) saw both paradigms as becoming "entrenched ideological positions" leading to new paradigms where philosophical underpinnings from both are combined (Gelo, Braakmann and Benetka, 2008, p.267).

3.4.1.3 Post-positivism

Post-positivism is described by Letourneau and Allen (1999) as "the search for `warranted assertability' as opposed to `truth'…" (p.623). The epistemological view of post-positivism is similar to positivism; it states there is an objective truth. However, human knowledge cannot be wholly based on *a priori* assessments from an objective individual, and human inferences play an inevitable role in the pursuit of knowledge (Lindlof and Taylor, 2011). This position is reflected in post-positivism ontology which supports critical realism, whereby a reality is said to exist but, it is a reality that humans can only come to know "imperfectly and probabilistically" (Robson and McCarten, 2016, p.21). According to post-positivism, reality cannot truly be perceived because humans have "imperfect sensory and intellectual capabilities" (Letourneau and Allen, 1999, p.624). For this reason, any research making a claim about reality requires a high level of critical analysis in order to get as close to an understanding of 'truth' as possible (Guba and Lincoln, 1994).

According to this paradigm, to substantiate a piece of research the researcher needs to adopt a scientific approach. All research begins with theory which takes into account the wide range of complex, interacting relationships which exist amongst a range of constructs and variables (Cook, 1985; Greene, 1990). Due to the multiplicity of relationships, post-positivism gives way to the use of both qualitative and quantitative methods (Shadish, 1993; Cook, 1985).

Post-positivism supports real world research and the concept of EBP in education. This paradigm infers, that whilst interpretivism would undermine the notion of reliable and valid conclusion in EBP, positivism would be an almost impossible position to assume

because the researcher is working in a real life setting where the environment is underpinned by a rich picture of socio-political factors. This rich picture would inevitably, and unavoidably, introduce bias into the research process. Robson and McCarten (2016) infer that in any research which involves a practitioner-researcher, it is likely that the study will be underpinned by post-positivist assumptions.

However, Morgan (2007) criticised post-positivist assumptions. Explaining that employing a 'top-down' approach to research, whereby all assumptions are stated at the start of a research journey, places too many constraints which could limit what could be learnt from the research (Morgan, 2007). Pragmatism offers an alternative perspective, whereby research is led more flexibly through its methodological assumptions whilst still celebrating some of the assumptions of post-positivism (Morgan, 2007).

3.4.1.4 Pragmatism

Pragmatism, like post-positivism, acknowledges the theoretical and philosophical underpinnings of both positivism and interpretivism. Pragmatism states that multiple realities exist, and offers logical epistemic values and a rational approach to research (Johnson, Onwuegbuzie and Turner, 2007).

This paradigm's ontological assumption is that, whilst the natural world is fixed, the social and psychological world depends on human culture and language (Johnson and Onwuegbuzie, 2004). The epistemological stance states that relationships within research are dependent on what is suitable for each individual study (Mertens, 2010). Therefore, in this paradigm the research question is seen as the key determinant of action (Saunders, Lewis and Thornhill, 2009). This means that pragmatists see different ways of interpreting and researching phenomena, with a view that an answer can be provided through different methods. Thus, this paradigm gives way to mixed-method research, where both qualitative and quantitative methodologies are employed. Pragmatism rejects the view that that qualitative and quantitative methods cannot be combined because of their discordant paradigms (Johnson and Onwuegbuzie, 2004).

3.4.1.5 Research paradigm of current study

Intrinsic to the aim of this study was a desire to establish a degree of causality between an intervention's effectiveness, Lego-based Therapy, and its impact on the emotional needs of children with social communication difficulties within a real world setting. Whilst there is a need for the evidence-base in Educational Psychological research to

seek global explanations for some behaviours, reflected by the positivist paradigm, this can often be overstated leading to an under-representation of children and young people who display atypical development (Gulliford, 2015).

Furthermore, the high degree of "inter-individual differences" amongst children with social communication difficulties (Gulliford, 2015, p.41) was acknowledged, resulting in a need to consider a theoretical and philosophical assumption which valued the multifaceted nature of this population and complexities of a real life setting. For this reason, the researcher considered post-positivist and pragmatic epistemological and ontological assumptions.

Ultimately, it was recognised that due to the heterogeneous nature of the target population of this study, the potential outcomes of Lego-based Therapy would not be the same for each participant and for this reason the researcher felt that post-positivist methods would not be appropriate for this study. Therefore, in order to respond to the primary and subsidiary research questions, the pragmatic paradigm was viewed as most appropriate to guide this study.

3.5 METHODOLOGICAL CONSIDERATIONS

Methodology is a broad term used to refer to "research design, methods, approaches and procedures used in an investigation that is well planned to find out something" (Kivunja and Kuyini, 2017, p.27). The epistemological and ontological position inform what methodology to employ. In order to make decisions around methodology, Mertens (2015) poses the following question guide this process: "How can the knower go about obtaining the desired knowledge and understanding?" (p.10)

3.5.1 Fixed, Flexible and Mixed-method design

Robson and McCarten (2016) describe two types of research design: Fixed and Flexible. Fixed designs are found in both positivist and post-positivist paradigms; they are theory-driven and deductive. This means that variables are identified prior to research by making reference to pre-existing theory. Typically, although not always, variables in fixed designs are measured quantitatively. One of the key advantages of fixed designs is the ability to draw explicit links between theory and research. However, a fixed design can be criticised for its limited ability to capture the nuances of human behaviour. In

contrast, more approaches are viewed as being able to encapsulate the uniqueness of individuals within a study (Creswell and Poth, 2017).

Flexible designs view the "researcher as an instrument of data collection" (Robson and McCarten, 2016, p.147), where research methods are adapted in response to the evolving research process and emergence of data. Flexible designs complement the ontological and epistemological assumptions of the interpretivist paradigm. Flexible designs begin with the researcher identifying an area they would like to explore further; they do not explore a causal relationship like fixed designs do. Because of the nature of flexible designs, and the appreciation for the subtleties and complexities of human behaviour; multiple qualitative data collection techniques along with possible quantitative measures, can be used. The more "do-it-yourself" approach of flexible design requires a high level of critical analysis in order to substantiate a study (Denzin and Lincoln, 2005; Maxwell, 2012).

Whilst fixed and flexible designs offer advantages, the dichotomy between the two has given way to the 'Incompatibility thesis' (Howe, 1988). This argues that to view one design as being better than the another is wrong, and argues for a move towards a more mixed-methodological approach to research. According to Johnson and Onwuegbuzie (2004), "The goal of mixed-methods research is not to replace either of these approaches but rather to draw from the strengths and minimize the weaknesses of both, in single research studies and across studies." (p.14).

3.5.1.1 Rationale for a mixed-method approach in this study

The aim of this study is to evaluate the effectiveness of an intervention and therefore employing mixed-methodology may be appropriate. According to Robson and McCarten (2016), the evaluative nature of this intended purpose lends itself to fixed, flexible and even multi-strategy design. Multi-strategy design is growing in popularity within real world research for reasons captured by Johnson and Onwuegbuzie (2004). Whilst acknowledging the benefits of theory-driven, realist approach of fixed designs, multi-strategy design also appreciates the value of flexible designs in using qualitative data to understand the uniqueness of human behaviour.

This study aims to explore the impact of the Lego-Therapy on anxiety, a currently un-researched area. Therefore, employing mixed-methodology will be able to provide a more comprehensive understanding of this potential phenomenon than what might be

understood by using one approach alone (Creswell and Clark, 2011; Morse and Niehaus, 2009).

3.6 CASE-STUDIES

According to the pragmatic paradigm, research methodology should be led by the research question. The research questions of this study not only ask "does" Lego-Therapy work, but also "how" and "why" it might work. For this reason, a mixed-method approach in the form of a case-study may be most appropriate (Robson and McCarten, 2016; Yin, 2003).

Case-studies allow for a range of data collection methods. Yin (2003) explains that this can create a hybrid approach whereby the conclusions formed can be viewed as more "convincing and accurate" (p.98). The researcher recognises the limited control over variables that exist in the real world context of this study. Therefore, the flexibility of a case-study design may be appropriate to adopt, as well as complement the pragmatic paradigm (Sharpe, Mobley, Hammond, Withington, Drew, Stringfield and Stipanovic, 2012).

Yin (2003) defined the case-study research method as "an empirical inquiry that investigates a contemporary phenomenon within its real-life context; when the boundaries between phenomenon and context are not clearly evident; and in which multiple sources of evidence are used." (p.13).

A researcher adopting a case-study will need to decide between two variants of case-study design; a single case-study or multiple case-studies. According to Yin (2003) multiple case-studies have "distinct" (p.46) advantages to single-case-studies. Herriott and Firestone (1983) also describe multiple case-studies as being more compelling and offer a study greater robustness compared to a single case. However, single cases do continue to offer value when an unusual or rare case emerges from a context (Herriot and Firestone, 1983). Therefore, according to Yin (2009), a multiple case-study design should be used where possible with an aim of drawing out cross-case conclusions.

Cross-case conclusions facilitate the possibility of generating new theories and increases, to some degree, generalisability; a common misconception held regarding case-study designs (Creswell, 2007; Willig, 2013; Yin, 2009). The ability to formulate or extend new theory relies heavily on the criticality of the researcher. For a multiple

case-study design to be executed with high rigour, it requires a cautious and timely approach; selecting this design should not be a decision taken lightly by a researcher (Yin, 2003; 2009).

3.6.1.1 Critique of case-study design

Although the case-study design is a popular method in real world research, it is not without its critics. Gerring (2007) argues that the difficulties not only rest in the disentangling of the "definitional morass" (p.17) reflected in the variable language adopted by the two key proponents of the approach Yin (2003) and Stake (1995), but also in its difficulties in verifying the validity and reliability of any conclusions reached with this approach. However, Sandelowski (2011) argues that the pragmatic position adopted in case-study designs is a critical strength since it has the ability to provide an intensive look at a specific case which has an explicit purpose.

3.6.1.2 Rationale for a multiple case-study design

Yin (2003) highlighted the usefulness of using single-case methodology when the presented case explores a phenomenon within a heterogeneous population, such as children with social communication difficulties. Yin (2003) also presents the benefits of using a case-study methodology when evaluating a well-tested theory or intervention, or when the researcher is attempting to extend theory or intervention.

In the context of this study, the researcher is hoping to explore the impact of Lego-based Therapy on anxiety within this population; an area not currently explored within the literature. According to literature, using multiple-cases is considered more compelling and evidence becomes more robust than using one case alone, and therefore multiple case-studies will be employed in this research (Herriott and Firestone, 1983).

Case-studies allow for a range of data collection methods, which Yin (2003) explains can create a hybrid approach whereby the conclusions formed can be viewed as more "convincing and accurate" (p.98). Therefore, the researcher will collect quantitative data in order to best answer the question "does the intervention work?" and triangulate this with qualitative data to provide information around the mechanisms of intervention.

This multiple case-study design will combine quantitative data from individual single-case experimental designs (SCEDS) and qualitative data collected from semi-structured interviews, aggregated across all cases. The latter generalised qualitative data

interpretation will help to interpret the findings of the quantitative data of the individualised case-studies.

3.6.2 Single-case experimental designs (SCEDs)

SCEDs were developed through the work of Skinner (1966) who wanted to develop methodology which "produced meaningful, reliable data at the level of the individual" (Robson and McCartan, 2016, p.134). As with other experimental designs, SCEDs aim to establish the effects of an independent variable on a dependent variable, whilst using an approach to allow for a rigorous evaluation of an intervention's effectiveness using a single individual (Neuman and McCormick, 1995; Kratochwill et al., 2010). This ideographic methodology uses a single subject as their own control, a view Barlow and Nock (2009) describes as practically beneficial and allows causal relationships to be established for that individual.

3.6.2.1 AB design

The simplest SCED is the AB design (Robson and McCartan, 2016). Where 'A' is the baseline measure and 'B' is the introduction of the independent variable i.e. the intervention. Both are described as "phases" in which a series of measurements are taken over a specified time period (Robson and McCartan, 2016).

The purpose of the baseline phase is to establish the relative stability of a measure with an individual through a minimum of 5 data points (Gulliford, 2015). According to Kratochwill et al. (2010) this helps to enhance the internal validity. The purpose of phase 'B' is to establish if an intervention is working through repeated measurements on key variables which are clearly defined and objective to increase reliability (Hitchcock et al., 2014).

3.6.2.2 ABA/ABAB design

Some researchers argue it is difficult to infer causality in AB designs due to lack of replication and restrictions in repeating this over several cases (Kratochwill et al., 2010), and therefore other designs e.g. ABAB designs are employed.

Whilst the ABAB design helps to moderate some of the factors that affect the internal validity, educational researchers hold concerns over the expectation that behaviours will return to baseline following the cessation of the intervention (Winn, Skinner, Allin and Hawkins, 2004). These concerns are two-fold; one, because it can be perceived unethical

to remove an intervention which may be working (Kazdin, 1980) and two, target behaviours in school-based interventions may not reverse. Once an academic or functional skill is taught it is unlikely to return to baseline due to practice and maturation effects after the intervention (Sindelar, Rosenberg, and Wilson, 1985).

3.6.2.3 Rationale for using SCEDs as an embedded unit of analysis

Although SCEDs do not allow the researcher to generalise the effects of an intervention, Horner et al. (2005) state when there is joint agreement amongst stakeholders that the: dependent variable is of high social importance, intervention meets clinical need, and, fidelity of the independent variable is feasible, then the SCED is an appropriate method to employ.

With a continuing need to explore strategies to support social communication coupled with a need to develop Lego-based Therapy's evidence-base, employing a SCED as an embedded unit of analysis in this multiple-embedded case-study design is justified. Whilst other designs were considered, this study employed the 'AB' SCED; it was hoped that any positive effects of the intervention would be long-lasting, and therefore a reversal approach to a SCED was rejected.

3.6.3 Semi-structured interviews

Qualitative data is non-numerical and provides detailed perspectives about a chosen topic or area. Typical methods include diaries and in-depth interviews (Mack, 2010). From the information gained from these methods understanding of how and why something has happened in a given context can evolve; observations of the data help to inform theories.

Interviews are popular forms of qualitative data collection; they offer a different perspective compared to those offered from quantitative approaches. Interviews allow individuals to tell a story within the confines of their own consciousness (Vygotsky, 1987). When people talk about their experiences, even in complex social and educational situations, the spoken word gives the researcher a richness from which they can elucidate meaning about life and its experiences. This position is seen as adding value to previous knowledge about humans and how they work (Wildeman, 1990). This is based on the assumption that through language people can "symbolize their experience" (Seidman, 2006, p8). According to Ferrarotti (1981), education is best understood when those whose lives revolve around it are explored.

Different forms of interview exist, but 'semi–structured' or 'focused' interviews are popular in educational real world research. The benefits of this form are manifold. Not only do they allow the researcher to build a rapport with the interviewee, but their structure allows the researcher to gain a unique insight into their points of view on a given topic through their flexibility (Pathak and Intratat, 2016). Although interviews are time-consuming, both to deliver and process, semi-structured formats allow for a greater degree of control over the process and timing of the interview. McCracken (1988) explains that there needs to be careful management in allowing interviewees to tell their story whilst also ensuring content remains focussed and relevant.

3.6.3.1 Rationale for using semi-structured interviews as an embedded unit of analysis

Due to the chosen research design, population and research questions, it was important for the second embedded unit of analysis within the multiple-embedded case-study design to explore the impact of Lego-based Therapy from a more open and flexible position. The selection of semi-structured interviews over other qualitative methods was due not only to the pragmatic advantages, but also to the more informal and flexible approach for interviewees.

3.7 STAKEHOLDERS AND RECRUITMENT

3.7.1 Key stakeholders

To support the engagement and completion of this research, the researcher identified five key stakeholders. Appendix 3 outlines the stakeholders and strategies to increase engagement.

3.7.2 Sampling and participant recruitment

Access to participants was supported through colleagues working within the Educational Psychology Service. A purposive approach was taken to ensure participants selected met specific criteria needed to respond to the research questions. Other forms of sampling would not have been effective since the aim here was to understand the interaction between an intervention and a target population's response to it.

3.7.2.1 School recruitment

Schools who received Lego-based Therapy training from the Educational Psychology Service (who employed the researcher) were eligible to participate in this study. The

researcher felt there would be greater consistency if schools involved in the research had all received the same training package.

A list of eligible schools was collated. Initially five schools were selected on a purposive basis; those that were geographically accessible to the researcher were prioritised for practical purposes. The five schools were contacted by the researcher through an email outlining the research and asking if they would be interested in the research. An identical email was sent to each of the schools, the person who the researcher corresponded with at this stage was the schools' Special Educational Needs Co-ordinator (SENCo).

Three schools responded to the researcher's email, stating interest. The researcher followed up the email by meeting each SENCo in person to outline the research in more detail. At the end of this meeting, consent forms and information sheets were provided (see appendices 4, 5, 6 and 7). Each school was given time to consider the research and discuss with relevant persons e.g. the Head of School, before further contact was made.

All three schools consented to participation in the research. Each school allocated a key person for the researcher to contact; for two schools contact remained with the SENCo, and the third was with the intervention's facilitator. Once schools had provided their consent, selection of children for participation took place.

3.7.2.1.1 Context and description of Lego-based Therapy training

Lego-based Therapy was an intervention programme offered by the Educational Psychology Service as part of their traded service model; this meant schools purchased the intervention through the Local Authority.

This intervention was selected due to its promising evidence-base along with the service's recognition of the growing number and broader needs of children and young people with social communication difficulties.

The intervention training was delivered through a mentoring model, whereby an Assistant Educational Psychologist (AEP) worked alongside a designated member of primary school staff to deliver the intervention; typically, this was a Teaching Assistant (TA). This mentoring model involved the AEP leading the first few sessions to present the behaviour of a 'facilitating adult' in Lego-based Therapy. As the intervention training progressed, the AEP took on a supporting role and the member of staff led the

sessions. The ‘facilitating adult’ in Lego-based therapy is the individual who runs the sessions with the children.

To develop the training package, the Educational Psychology Service consulted LeGoff’s Lego-based Therapy manual (LeGoff et al., 2014). The AEP’s had a pivotal role in the training package’s development; their role in this process supported their knowledge and skill development of Lego-based Therapy.

3.7.2.1.2 School’s withdrawal from the research

Due to unforeseen circumstances, outside of the researcher’s control, one school withdrew from the research in October 2018. In response to this, a letter was sent to the consenting parents to inform them of the situation (appendix 8). They were provided with reassurance that whilst their participation in the research had come to an end, their child’s access to the intervention could continue at the discretion of the school.

3.7.2.2 Description of participating Schools

Descriptions of the two remaining schools were gathered from: the school websites, most recent OFSTED reports, and through discussions with staff.

3.7.2.2.1 School One

School One is a larger than the average-sized primary school and situated in the central area of the county. Most children are White British and very few children speak English as an additional language. An average proportion of children are eligible for the pupil premium. The proportion of disabled children and those who have special educational needs who are supported through an Education Health and Care Plan (EHCP) is well below-average. A well above-average proportion of children join and leave the school partway through their education; this is somewhat due to its location near to a Royal Air Force (RAF) base.

3.7.2.2.2 School Two

School Two is a smaller than average-sized rural primary school situated in the south of the county. The proportion of children known to be eligible for pupil premium and free school meals, and those who are in local authority care or from families in the armed forces, is well below the national average. A large majority of children are White British and almost all speak English as their first language. The proportion of disabled children and those with special educational needs supported through EHCP is below-average.

3.7.2.3 Recruitment of children

Prior to schools purchasing training in Lego-based Therapy, the Educational Psychology Service had outlined characteristics of children who could benefit from the intervention. Therefore, it was assumed schools who had received training for this intervention would have in mind children who display social communication difficulties and/or anxiety to participate in Lego-based Therapy.

Once schools consented, the researcher met with each key contact to discuss children they were going to consider for the intervention. Typically, the way Lego-based Therapy works is that schools select six children who they feel would benefit from it; these children are then divided into two groups of three. During this initial meeting, the researcher shared a set of inclusion criteria for children who would be eligible to participate in the study (see Table 3.1).

Criteria for inclusion in this study are that the child must:	
1	Be primary school-aged and in full-time mainstream education
2	Have social communication difficulties as a primary area of need, this may or may not involve a formal diagnosis of ASD, SCD or LI
3	Display anxiety-related behaviours within school "a lot" or "most of the time". Children may or may not have had a medical diagnosis for an anxiety disorder.
4	Not be receiving another intervention developing social and/or emotional skills for the duration of the study
5	Have an interest and be motivated in using and playing with Lego
6	Have good attendance (~96%) and not be at risk of exclusion

Table 3-1 Participant inclusion criteria

Once the inclusion criteria had been shared, each school was able to give an idea of how many within their chosen group of six met the criteria. It was planned that if there were more than two eligible children, the parents/guardians and the child would be given a consent form, and of those who consented, two would be selected at random to be the participants. However, by chance, each school were only able to identify two eligible children.

Originally, the researcher aimed to recruit six children, two children from each school. However, due to the late withdrawal of one school, outlined in section 3.2.7.1, the researcher had to continue with four eligible children.

The parents/guardians and the children themselves were given consent forms and information sheets about the research. All four parents/guardians and children consented to participating in the research (See appendices 9 and 10 for consent form templates).

3.7.2.3.1 Discussions with key contact regarding inclusion criteria

Before entering discussions, the researcher reviewed descriptions of behaviours indicative of social communication difficulties (Adams et al, 2012) along with behavioural descriptions of generalised anxiety disorder and social anxiety from the ICD10 (World Health Organisation, WHO, 1992) and DSM IV (American Psychological Association, APA, 1994).

The researcher recognised that these difficulties would look different for each child (Newschaffer et al. 2007; Scottish Government, 2011) and therefore anticipated potential challenges determining and deciding eligibility with regards to social communication difficulties as a primary area of need. This aspect may or may not involve a formal diagnosis of ASD, SCD or LI, or identified anxiety-related behaviours within school "a lot" or "most of the time". Children may or may not have had a medical diagnosis for an anxiety disorder, specifically.

To navigate this, the researcher asked open-ended questions with the member of staff during the discussion to explore what each child's behaviours and difficulties looked like. As the researcher listened to the comments, she reflected on the behaviours in relation to the "typical" patterns of behaviours that may be seen in children with social communication difficulties and who may be anxious. This collaborative process supported the identification of potentially eligible participants.

This approach supported the real world nature of this research, since it was recognised that the insight the key contact had regarding each child would be invaluable information to guide the selection of participants for the intervention and therefore this study. Researchers working in partnership with schools to support the research process is celebrated by Jensen et al (1999).

3.7.2.3.2 Participant withdrawal from School one

When pre-intervention and baseline data was collected and analysed in September 2018, it became apparent that one of the identified participants from school one did not meet all the inclusion criteria for participation in the study. All measures (child, parent, and

teacher report) highlighted the child did not display anxiety-related behaviours “a lot” or “most of the time”. For this reason, the child was withdrawn from the research.

To comply with ethical procedures, a letter was sent to the parents and informed of the situation (see appendix 11). They were provided with reassurance that whilst the research participation had come to an end, their child’s access to the Lego-based Therapy could continue at the discretion of the school; the child did continue to receive and participate in the intervention.

Despite the researcher’s best efforts to recruit further participants, three eligible and consenting children remained in the research process.

3.8 PROCEDURE

Once participants had been identified and consent from all key stakeholders granted, the research began.

3.8.1 Pilot phase

In July 2018, the researcher gained consent from a Primary School to carry out a pilot phase. Pilot phases are seen as a fundamental step in clinical-based research (Leon, Davis and Kraemer, 2012) and could therefore been seen as good practice in applied research. Pilot studies are designed to test methods and procedures to be used on a later study, normally of a larger scale (Porta, 2008).

The purpose of this study’s pilot phase was to explore the feasibility of measures and to offer an opportunity to develop a fidelity measure. Specifically, the researcher wanted to see if children who met the inclusion criteria were able to understand the language and respond to the questions on the measure.

The outcome of the pilot phase successfully highlighted the accessibility and practicality of the selected measures and helped to inform the development of an intervention fidelity measure (see appendix 12).

3.8.2 Independent and dependent variables

The independent variable in this multiple-embedded case-study design was the intervention; Lego-based Therapy.

The central dependent variable was the impact of Lego-based Therapy on anxiety in children with social communication difficulties. The subordinate dependent variables (DV) were:

DV 1: The impact of Lego-based Therapy on anxiety in children with social communication difficulties as rated by the child

DV 2: The impact of Lego-based Therapy on anxiety in children with social communication difficulties as rated by the child's parent/guardian

DV 3: The impact of Lego-based Therapy on anxiety in children with social communication difficulties as rated by the child's class teacher

In order to gain a holistic overview of the child's anxiety, four tools were used to measure the dependent variables. Triangulating measures increased the validity and reliability of any potential conclusion compared to using only one measure on its own. Furthermore, the researcher recognised the importance of triangulating measures specifically around anxiety in children with social communication difficulties, since this population often do not display age-typical symptoms of anxiety (White et al., 2010). Table 3.2 outlines each measure used, along with a critical consideration of each measures.

Even though research suggests there may be incongruence between parent's perceptions of their child's anxiety and the child's report of their own anxiety (Achenbach, McConaughy, and Howell, 1987; Baxter, Miyahara, Mirfin-Veitch and Hunter, 2017; Nauta et al., 2004), the researcher wanted to capture the views of the parent and therefore employed the parental version of the SCAS to ensure that a more ecological overview of the child's anxiety was achieved. According to Nauta et al. (2004) and Kolko and Kazdin (1993) collecting views of more than one informant provides a holistic view of anxiety, and therefore, one can argue that triangulating the views of parent and child is complementary rather than contradictory.

3.8.2.1 Rationale for self-report measures of anxiety

The researcher acknowledged that there were alternative ways of measuring anxiety, such as behavioural observations. Although behavioural observation schedules are often employed, and may have increased the ecological validity of the study, they were

rejected as the researcher did not feel that observation schedules would be the best approach to gain the most valid measure of anxiety to support this particular study.

According to Hitchock et al (2014), variables in SCEDs must be clearly defined and operationalised using robust measures. Glennon and Weisz (1978) explain that anxiety presents differently across and within individuals, and therefore defining and agreeing on the behavioural presentation of anxiety is very challenging meaning behavioural observation schedules can lack validity. Questionnaire measures of anxiety can be viewed as more valid because their content is assessed for psychometric robustness including their internal and external validity, and reliability (see table 3.2).

Measure	What?	How?	When?	Validity and Reliability
Paediatric Index Emotional Distress (PI-ED; O-Connor et al., 2010)	Using a 14-question questionnaire, the PI-ED assesses psychological distress. It asks children and young people about their symptoms of anxiety and depression.	Each child participant will begin this baseline measure when consent has been received; the number of times to be completed will be no less than 5.	Once-a-week; on the same days and at the same time to increase the reliability, during baseline and intervention phase.	The PI-ED is psychometrically robust as it was established using large clinical and non-clinical samples. Using a large sample of school based participants n=1026 and a clinical sample of n=143, O'Connor et al. (2016) concluded the PI-ED was both a reliable and valid tool to measure emotional distress, including Anxiety, in children and young people.
Spence Children's Anxiety Scale (*SCAS*; Spence, 1994)	A 45 item self-report questionnaire assessing symptoms of the most common anxiety disorders in childhood.	This will be completed by the child. This scale has been recognised as a suitable tool used to measure anxiety-related behaviours in populations with social communication difficulties such as ASD (Baxter et al., 2017).	Once by the child, prior to intervention as a pre-intervention and post-intervention measure.	As a standardised measure, research has reported good internal validity and reliability across different samples (Wang et al., 2016; Orgiles et al., 2011; Nauta, 2005; Spence, Barrett and Turner, 2003).
Spence Children's Anxiety Scale (parent report) (SCAD-P; Spence, 2000)	A 39 item self-report questionnaire assessing symptoms of the most common anxiety disorders in childhood.	This will be completed by the parent of the child. This scale has been recognised as a suitable tool used to measure anxiety-related behaviours in populations with social communication difficulties such as ASD (Baxter et al., 2017).	Once by the parent, prior to intervention as a pre-intervention and post-intervention measure.	Research reports good validity and reliability for measuring anxiety, especially when used alongside other measures (Whiteside and Brown, 2008; Essau, Muris and Ederer, 2002). Nauta (2005) stated this measure as being a 'relatively quick, but sufficiently detailed, reliable and valid parent questionnaire' (p.72).
School Anxiety Scale-Teacher Form (SAS-TF; Lyneham et al., 2008)	A 16-question questionnaire for teachers to complete. It is designed to assess the behaviour of primary school-aged, targeting the behaviours and feelings distinctive to the experience of anxiety.	Each class teacher of the participant will begin this baseline measure when consent has been received; the number of times to be completed will be no less than 5.	Once-a-week; on the same days and at the same time to increase the reliability, during baseline and intervention phase.	Validity and reliability of the SAS-TR has been reported in studies. Significant correlations have been reported across a range of anxiety dimensions including social anxiety (0.93) (Sariçam and Çetintaş, 2015). Similar conclusions were reached by Lyneham et al., (2008)

Table 3-2 A description of tools to measure the impact of Lego-based Therapy on anxiety in children with social communication difficulties

3.8.3 Pre-intervention phase

3.8.3.1 Pre-baseline phase

A detailed history of each participant was collated using information from the school, including personal demographics, behavioural descriptions, as well as any outside agency involvement and previous intervention participation. The researcher also collected detailed information about the nature of the social communication difficulty of each participant and how their anxiety presents.

3.8.3.2 Pre-intervention measure

To gain a holistic insight into the child's anxiety, pre and post intervention measures were collected. The SCAS was completed by the parent and child in July 2018, before baseline measures and intervention began. Parents and child completed their versions of the questionnaire separately to avoid coercion of views. Additionally, the questionnaire encouraged the recipient to answer all questions as truthfully and honestly as they could.

3.8.3.3 Baseline phase

The baseline phases of the quantitative stage of the multiple-embedded case-study began for all participants in the final two weeks of the summer term 2018, and continued into the autumn term 2018. Five data points were collected in total; two data points were collected prior to the summer holiday and three were collected after. Baseline measures were collected from the child participant and the class teacher of the child.

Each child completed the PI-ED questionnaire once a week each week during the baseline phase. To increase the reliability and validity, where possible, the questionnaire was completed on the same day and time each week. Each child completed the questionnaire on their own, but had support from their teacher if they needed help reading the question. The researcher hoped by encouraging the child to complete the measure independently, it would minimise coercion of their views through the presence of an adult directly assisting them with the questionnaires.

The teacher of each child completed the SAS-TR scale once a week each week during the baseline phase. To increase the reliability and validity, where possible, the questionnaire was completed on the same day and time each week. Each questionnaire asked the adult to consider how the child had been over the last week in school. They were encouraged to answer all the questions as truthfully and honestly as they could.

3.8.4 Intervention phase

The intervention phase for each school began once all baseline data points had been completed for all participants. The intervention, Lego-based Therapy, began in the penultimate week of September 2018. The intervention occurred weekly over ten weeks; the intervention was not delivered and measures were not taken during the October half term week. The intervention ended in the final week of the autumn/winter term, in December 2018.

SCEDs collect repeated measures on a weekly basis during the intervention phase; measures collected during this phase are then compared against baseline data during data analysis. Each child completed the PI-ED once-a-week each week, same day and time, where possible. Each class teacher of the child completed the SAS-TR once-a-week each week, same day and time, where possible.

3.8.4.1 Description of Lego-based Therapy intervention

Lego-based Therapy is a collaborative play-based Therapy in which children work together to build Lego®. It is an opportunity for children with social communication difficulties to develop skills such as turn-taking, collaboration and social interaction.

Lego-based Therapy was delivered once a week for one hour over ten weeks. In each school, the sessions were facilitated by two trained adults to six children. All six children were identified by the school, and selected because the school felt that the children would benefit from an intervention that could nurture their social communication skills. The children were placed into two groups of three, with one adult facilitating.

Lego-based Therapy is not a manualised intervention; however, it does follow a general pattern of delivery. Initial sessions help the children to identify group rules and familiarise themselves with the structure of Lego-based Therapy, including: how to work as a team, language to describe the Lego® bricks, which models to build, and what to do if there is any confusion or there are any potential misunderstandings.

Each Lego-based Therapy session has two core components, which are delivered in the following order:

- Structured play – the children work on a specific Lego® model
- Free play - the children play and build anything they like, but are encouraged to do this together

During structured play, each child is given a clearly defined job which rotates each session;

1. Engineer – reads the Lego® instructions to the supplier and builder
2. Supplier – finds the Lego® bricks and passes to builder
3. Builder – builds the model

The facilitating adult supports the process and prompts the children to problem-solve and work together.

3.8.4.2 Intervention and measure fidelity

3.8.4.2.1 Intervention fidelity

Since the embedded SCED hoped to provide an opportunity to draw causal inferences between the intervention and its impact on anxiety within each case-study, it was important to perform fidelity checks. According to Gutkin (1993), if an intervention is not implemented with fidelity, the ability to draw inferences is limited and the findings will lack validity.

During the course of the intervention phase, three fidelity checks were carried out by the researcher. The researcher visited each school to observe the delivery of the intervention and completed an observation checklist. The checklist was created with close consideration of the Lego-based Therapy intervention book written by the creator of Lego-based Therapy (LeGoff et al., 2017). Three colleagues of the researcher, who were trained in the delivery of Lego-based Therapy, were also consulted with regards to the checklist. The fidelity checklist was then trialled and finalised during the pilot phase.

During the fidelity checks, observations were made with regards to: the physical environment, adult activity, child activity and the Lego-based tasks. The purpose of the fidelity checks was to ensure integrity and quality of the intervention delivery. At the end of each fidelity check, the researcher gave a score out of 5 to indicate whether the aims of the intervention were met (1=aims not met, 5=aims met extremely well).

3.8.4.2.2 Measure fidelity

To ensure measures were being completed on a weekly basis, the researcher contacted the key person on a weekly basis via email. Measures were collected regularly after each fidelity check and reviewed by the researcher. The aim of this review was to ensure measures were being completed by participants and to check that data collection was

manageable for the schools. None of the recruited schools reported difficulty with the process.

3.8.5 Post-intervention phase

Once the intervention had finished, the researcher collected post-intervention measures using the SCAS from parents and the children.

Furthermore, in order to explore the mechanism of the intervention further, semi-structured interviews were conducted. Originally, the researcher only wanted to conduct interviews with the member of staff who delivered and facilitated the intervention. However, the researcher felt it would be invaluable to also explore the views of each child participant in order to give the case-studies greater depth. This adaptation was supported by the pragmatic paradigm.

Consent for this amendment to the research was authorised by the University of Nottingham's ethics committee in December 2018. The researcher sought additional consent from parents to interview their child (see appendix 13).

The researcher prepared questions for each facilitator and child. The nature of semi-structured interviews allowed for flexibility depending on the progress of each interview. All interviews lasted no longer that 45 minutes (see appendix 14 and 15 for proposed interview schedules). Interviews took place in December 2018 and January 2019. A full summary of the procedure and timeline of activity is presented in Table 3.3.

Phase	Activity	Individuals	Purpose	Duration of phase
Recruitment	Identification of schools Gaining consent Selection of eligible participants	Researcher School Staff	To recruit and gain consent from schools for participation in Pilot and research study	**4 weeks** (April-May 2018)
Pilot	Observations of Lego-based Therapy in a primary school to inform development of fidelity check	Researcher	To explore the feasibility of measures and to offer an opportunity to develop a fidelity measure for the real research	**10 weeks** (May to July 2018)
	Review the accessibility and practicality of selected measures	Researcher		
Pre-intervention	Pre-intervention measure using the SCAS; child and parent forms	Parent Child	To establish a baseline of anxiety in children with social communication difficulties prior to intervention	**5 weeks** - Two weeks (July 2018), - Three weeks (September 2018)
	Collecting five baselines measures using the PI-ED	Child		
	Collecting five baseline measures using the SAS-TR	Class teacher		
Intervention	Delivery of weekly one hour session of Lego-based Therapy	Lego-based Therapy facilitator	To measure potential changes in child's anxiety during the course of the intervention	**10 weeks** (September to December 2018, excluding half term)
	Collection of weekly measures using PI-ED	Child		
	Collection of weekly measures using the SAS-TR	Class teacher		
Post-Intervention	Pre-intervention measure using the SCAS; child and parent forms	Parent Child	To establish a measure of anxiety in children with social communication difficulties post intervention	**2 weeks** - One week (December 2018) – One week (January 2019)
	Semi-Structured Interviews	Researcher with Lego-based Therapy facilitator and child	To explore the perceptions of Lego-based Therapy and its potential impact on a child's anxiety	

Table 3-3 Summary of procedure timeline

3.9 DESCRIPTION OF DATA ANALYSIS

A brief overview of the quantitative and qualitative data analyses is presented. Further critical discussion of the data analysis strategies can be found in section 4.3.

3.9.1 Quantitative data analysis

3.9.1.1 Pre- and post- scores

Scores from the pre- and post- SCAS, child and parent report, were collected and displayed in tables where means, standard deviations and differences between scores were calculated; these were calculated for each child.

To support more rigorous analysis, the reliable change index (RCI) was calculated. The RCI (Jacobson and Truax, 1991) evaluates the change between two single points to see whether a change is statistically and clinically significant. It is a mechanism that has been praised for its use in measuring intervention change (Speer and Greenbaum, 1995).

3.9.1.2 Embedded SCED analysis

There is not a standardised approach to the analysis of SCED data, reflected by the different approaches offered by researchers (Manolov, Gast, Perdices and Evans, 2014; Manolov and Moeyaert, 2017). It was therefore crucial to consult the literature for the most appropriate methods to employ. To support this study's structure of data analysis, advice was sought from Tate et al.'s (2016) guidance on SCED reporting.

SCEDs are, typically, analysed visually, since the absence of a large sample size restricts the ability to employ inferential statistics (Gulliford, 2015). Skinner described this type of analysis as 'eyeballing' the data, where the relative scores from phase A are compared to phase B (Robson and McCartan, 2016).

According to Lane and Gast (2014): "Visual analysis of graphic displays of data is the hallmark for interpreting effects of an intervention during studies using a single-case experimental design" (p.445), therefore, graphs were constructed to study results during phase A and B. Guidance was sought from Carr and Burkholder (1998) in the construction of the graphs using Excel®.

For each child, data from the PI-ED and SAS-TR were placed into two separate line graphs. Line graphs are common in SCED analysis since they allow for the progress over time to be displayed (Spriggs and Gast 2010). Each graph was then analysed to see

if the intervention produced “dramatic, replicable changes in behaviour that last over time” (Cooper, Heron and Heward,2007, p.149). To respond to the research questions within and between-condition visual analysis took place (Lane and Gast, 2014)

To increase the reliability of the visual analysis of each graph, the researcher asked a colleague, who was independent from the research, to rate each graph in terms of whether they felt the intervention increased or decreased the anxiety scores (Harbst, Ottenbacher and Harris, 1991). Brossart et al.’s (2006) approach to interrater agreement was used (refer to section 4.2.2.3.2 for more details).

3.9.2 Qualitative data analysis

The semi-structured interviews conducted with the facilitator and the child were analysed using content analysis.

Qualitative data analysis strategies such as grounded theory or interpretative phenomenological analysis are often found within set theoretical paradigms, however, content analysis is not (Forman and Damschroder, 2008).

Content analysis is a technique that employs a systematic and objective approach to analyse informational content of textual data (Downe-Wamboldt, 1992; Krippendorff, 1980; Mayring, 2000; Sandelowski, 1995). Content analysis allows a researcher to draw reliable and valid inferences from a piece of qualitative data and apply it to their research context. This process allows the researcher to provide new knowledge and insight to their research question(s), with the hope that it might be able to provide some practical implications (Krippendorff, 1980). The aim of content analysis, according to Elo and Kyngäs (2007), is to “attain a condensed and broad description of the phenomenon, and the outcome of the analysis is concepts or categories describing the phenomenon” (p.108).

Content analysis, as an analytical approach, has been criticised for being neither qualitative or quantitative in nature. Researchers explain that content analysis it is too simplistic to offer data which can be statistically analysed, and lacks essential features that make it a purely qualitative process (Morgan, 1993). However, its use in social science and health research is growing (Erlingsson and Brysiewicz, 2017; Neundorf, 2002). Benefits of employing content analysis include its flexibility and adaptability (Harwood and Garry, 2003). The flexibility and adaptability of content analysis complements the pragmatic mixed-method design observed in this study; a view

reflected by other researchers (Milne and Adler, 1999; Sarantakos, 2012). Despite its critics, content analysis is a content-sensitive approach which is able to develop understanding and meaning within a given piece of text (Downe-Wamboldt, 1992; Krippendorff, 1980).

3.10 DATA QUALITY: VALIDITY AND RELIABILITY

Case-studies often incur several threats to validity and reliability and although the issues to be discussed are not isolated to this methodology, they are commonplace and can impact on the trustworthiness of findings (Robson and McCartan, 2016; Palincsar and Parecki, 1995).

3.10.1 Threats to validity

Validity, simply, refers to the accuracy of a result (Robson and McCartan, 2016). For evaluation research, validity is mostly concerned with the ability to draw accurate conclusions about the intervention, the observed outcomes, and how much the researcher is able to say that one variable led to the other.

3.10.1.1 Internal validity

Gulliford (2015) suggests a minimum of 5 baseline measures should be collected in order to establish stability. Kratochwill et al. (2010) supports the importance of this in trying to increase internal validity. To increase the validity of the outcomes, the researcher aimed to collect 5 baselines and where possible, would collect the baseline measures until stability had been achieved. Aiming for stability in the baseline increases the probability of establishing a valid measure of the child's anxiety prior to the intervention, and therefore allows the potential impact of the intervention to be accurately measured (Kratochwill et al. 2010).

3.10.1.2 Construct validity

Referring to table 3.2, existing literature on tools to measure anxiety indicate the selected measures (PI-ED, SCAS and SAS-TR) as being both valid and reliable.

In order to further increase the validity of gauging the anxiety of the participants, the researcher used the descriptions of generalised anxiety disorder and social anxiety from the ICD10 (WHO, 1992) and DSM IV (APA, 1994) with schools when identifying children who would be eligible to be involved in this study. Although standardised descriptions were used to inform selection, the researcher remained aware of the

ambiguity of identifying anxious behaviours in typically and atypically developed children. Therefore, open discussions took place with each school during the selection process in order to allow for some flexibility (see section 3.7.2.3.1 for more details).

3.10.1.3 Instrumentation

The researcher recognised that any conclusions could have been confounded by the quality in the delivery of the intervention. In order to circumvent issues in the variability in intervention delivery fidelity checks were carried out multiple times throughout the intervention (see section 3.8.5).

3.10.1.4 History effects

Due to the length of the intervention it was possible that events outside of the study could in some way impact on the validity of the evaluation. It was important the researcher maintained close contact with each school in order for these events to be noted and acknowledged.

3.10.1.5 Maturation effects

The maturation effect refers to any biological or psychological process within an individual that systematically varies over a passage of time, independent of specific external events, for example growing older (Campbell and Stanley, 1963). This study spans over a period of 6 months, during this time the participants will be maturing due to processes and experiences outside of the researcher's control. When it comes to interpretation of findings, it will be important to consider the impact of maturation.

3.10.1.6 External and ecological validity

Campbell and Stanley (1963) describe external validity as the ability to generalise findings from a study, especially those conducted in tightly controlled conditions, to other settings and populations. Ecological validity, more specifically, relates to the generalisability of a study's findings to a real world situation. In applied educational research, a study which has good external and ecological validity would be able to take the findings from the study and directly apply them to the school context.

The aim of a case-study design is not to prove that an intervention or programme works across all contexts and all populations. Here, the case-study aimed to describe an intervention in a real-life context for evaluative purposes (Yin, 2003). It was therefore recognised that the outcomes of this study would not be applicable or generalisable to

the whole population of children with social communication difficulties since only a small sample was used. However, the study findings would be a starting point, and the researcher hoped any outcomes would still contribute to the existing evidence-base and provide a platform for more rigorous fixed-group designs with larger sample sizes in the future.

3.10.2 Threats to reliability

Robson and McCartan (2016) define reliability as "…the stability or consistency with which we measure something" (p.105); anything which lacks reliability is said to lack validity. Therefore, the researcher took steps to increase the reliability observed in each case-study.

3.10.2.1 Reliability of data collection

To reduce the number of extraneous variables affecting data collection and to increase the reliability of the measures, the researcher requested that all questionnaires were to be completed on the same day each week and at the same time, and by the same person i.e. class teacher. It was recognised that due to factors present within a working school this would not always be possible, so where changes occurred the researcher asked that this be noted on the questionnaires to supply context.

Finally, it is important to note that the class teachers who were involved in the completion of the measures were the same individuals throughout the study.

3.10.2.2 Interrater reliability

A colleague, independent from the research, was recruited to review the outcomes of each data analysis graph. Interrater agreement was then calculated to ensure that any analysis was trustworthy. A weighted Cohen's Kappa (Cohen, 1968) was calculated and Altman (2001)'s levels of agreement used to determine the reliability of the visual analysis (more details can be found in section 4.2.2.3).

To increase the reliability of the qualitative data analysis, the researcher employed a structured approach to analysis in the form of content analysis (Forman and Damschroder, 2008; Elo and Kyngäs, 2007). Anonymised scripts were also shared with a colleague, independent of the research, to consider the data and see if there was agreement in the codes and categories identified.

3.11 ETHICAL CONSIDERATIONS

Ethical considerations to the research were guided by the University of Nottingham's guidance on ethics, along with consultation with the BPS (2014), DECP (2002) and HCPC (2016) code of ethics and conduct. An ethical checklist from the University of Nottingham was used to guide decision making. An overview of the key ethical issues and strategies employed to minimise these are described below. Ethical approval was granted by the University of Nottingham in March 2018.

3.11.1 Obtaining informed and valid consent

Since participants were under 16 years of age and may or may not be able to freely give their free and informed consent due to their receptive or expressive language, valid consent was sought from a range individuals including: relevant school staff (Head Teacher, SENCo, Class Teacher and Intervention facilitator), the child's parents and the child. Consent was achieved through letters detailing the nature of the research, measures to be used, along with researcher contact details and opportunities to ask question or clarify details (see section 3.7.2)

3.11.2 Deception

In the information and consent letters sent to parents, details of the research were provided regarding why their child had been identified as being potentially suitable for participation. In order to avoid causing alarm or concern about the nature of the research, the researcher was cautious over the wording in this letter. Some of the language used in these letters may be perceived as vague, and therefore there may have been potential for deception in these letters to parents outlining the research. However, the letters were discussed with the key contact in school, and the researcher was given reassurance that parents were already aware that their child experiences difficulties with social communication and anxiety. Furthermore, parents were provided with the researcher's contact details and were given the opportunity to ask question or clarify details of the study should they wish.

3.11.3 Protection from harm

The researcher recognised two areas of potential risk which could lead to a negative impact or change in participant's mood; it was also acknowledged that the intervention could also positively change participant mood:

1) Risks associated with the Lego-based Therapy intervention: due to sessions involving a change in the normal school day, participants were allowed to leave sessions freely at any time if they wished (procedures for this were discussed with each individual school). Sessions were run by an adult known to the children which increased familiarity for the children.
2) Risks associated with the research measures: the researcher recognised that participants may experience distress when completing questionnaires about their anxiety. To manage this potential risk, participants were asked if they were happy to complete the questionnaire and they were also told of their right to withdraw and how they can do this. Support was also offered to the schools and parents if any participant showed distress after a measure.

3.11.4 Confidentiality

Since questions regarding personal experiences were avoided, possible disclosures of confidential information were an unlikely occurrence. However, had a disclosure of confidential information occurred, all safeguarding policies including those of the Local Authority, University and School were to be strictly followed.

Due to the nature of the case-study design information about an individual was needed to create a description of the context. However, all personal and identifiable information was anonymised; names were replaced with pseudonyms and school names were replaced by numbers. Any personal information shared in this write-up is descriptive and for the purpose of research only.

All data was stored either electronically and password protected, or stored in a locked cabinet within a Local Authority office.

3.11.5 Right to withdraw

All stakeholders in the research were informed that they had the right to withdraw from the research at any point during the research up until April 2019, without question or prejudice.

3.11.6 Debriefing

At the end of the research, all key individuals were debriefed by the researcher by letter (see appendix 16). Due to the nature of the research i.e. exploring the impact of Lego-based Therapy on anxiety, the researcher was able to provide outside agency information

and details for the child, the children's parents and school, if they felt they required further support on any issues raised.

3.12 CHAPTER SUMMARY

This chapter has presented a clear rationale for the theoretical paradigm which guided the methodological decisions used to respond to the research questions in this study.

After careful consideration, a multiple-embedded case-study design was selected using a mixed-method approach. Quantitative data from an embedded SCED was used to explore the causal relationship between Lego-based Therapy and its impact on anxiety in children with social communication difficulties. Qualitative data from semi-structured interviews were employed to explore perceptions of the intervention. The researcher acknowledged the potential drawbacks of adopting this design.

A critical account of the research procedure has been presented. All details were presented with a full consideration of the position of this research within real world research.

4 RESULTS

4.1 INTRODUCTION

This section begins with further consideration of how multiple-embedded case-study designs can be analysed. A look at suitable approaches for analysing pre- and post-scores will be followed by a critical account of visual analysis in SCEDs.

Quantitative data analysis will be presented against each subsidiary research question within each case-study first. Each case-study will then conclude with an interpretation of the data against the principal research question in order to establish the impact of Lego-based Therapy on the anxiety experienced by children with social communication difficulties. The quantitative data analysis will end with a cross-case conclusion.

Qualitative data analysis will follow. Using content analysis, the semi-structured interviews with the child participants will be analysed, then the Lego-based Therapy facilitator interviews. This section will end with a consideration of the data against the corresponding subsidiary research question.

This section ends with a critical consideration of the integrity and reliability of the data analysis.

4.2 ANALYSIS OF RESULTS

A brief description of data analysis methods was presented in section 3.9. A more critical look at the chosen analysis methods is considered here

4.2.1 Pre- and post- score analysis: Reliable Change Index

The employment of a multiple-embedded case-study design makes establishing meaningful intervention change challenging. The absence of experimental groups means makes using statistical analysis of pre- and post- scores, as seen in more fixed control group designs, incongruous (see Dugard and Todman, 1995).

A mechanism for establishing intervention change using two single points gained from one person has been proposed, this is referred to as the ‘Reliable Change Index’ (RCI; Jacobson and Truax, 1991). The RCI is celebrated in EBP for its ability to detect change at an individual level; a feature key within the paradigm of this study.

RCI is able to determine the amount of change a client must go through on a psychometric instrument, from pre-intervention to post-intervention, for that change to be deemed reliable. Jacobson and Truax (1991) state that the change must be larger than that which would be reasonably expected due to error alone; a score above 1.96 indicates that the change could not have occurred by chance (Jacobson and Truax, 1991). This calculation, therefore, is able to establish if the observed change is reliable enough to determine a practical or significant difference.

The RCI champions an idiographic approach to EBP as it values the heterogeneous nature of populations that exist. However, Speer (1992) has criticised the use of RCI stating is could misrepresent findings by not acknowledging other sources of error such as regression to the mean from pre-to post-scores; a view supported by Wise (2004). Contrasting this view, Speer and Greenbaum (1995) later conducted a review of different pre- and post-test methods and concluded that concerns about regression to the mean were overstated. They therefore recommended the use of RCI in single point comparison studies, arguing that it is a practical and well-evidenced calculation which avoids an overgeneralised view offered in other statistical analyses.

The formula for calculating RCI is presented in figure 4.1. The RCI calculator developed by the University of Leeds was used to calculate the RCI in this study (Agnostinis, Morley and Dowzer, 2008).

$$RCI = \frac{X_{post} - X_{pre}}{\sqrt{2(S_{pre}\sqrt{1-R_{xx}})^2}}$$

X *post* = The post intervention participant score

X *pre* = The pre intervention participant score

S *pre* = The standard deviation

r xx = Measure of reliability for the pre intervention result

Figure 4-1 Reliable Change Index formula

The measure of reliability used to calculate standard error for the RCI was 'Cronbach's alpha co-efficient'. Psychometric data for the Spence Child Anxiety Scale; child (Spence, 1997) and parent (Spence, 1999) versions were required for the RCI. These were obtained from the Spence Child Anxiety Scale website (https://www.scaswebsite.com/1_1_.html).

4.2.2 Visual analysis of SCEDs

Visual analysis, from line graphs, is a hallmark method for interpreting the effects of an intervention from data collected using a SCED (Kennedy, 2005; Cooper et al., 2007; Spriggs and Gast, 2010). Typically, researchers employing methods of visual analysis will evaluate line graphs with reference to: trend (progress over time), level (magnitude of the data) and stability (or variability), of the data (Wolery and Harris, 1982; Gast, 2005). According to Cooper et al. (2007) these three components can assist in answering two critical questions in SCED visual analysis: "(1) Did behaviour change in a meaningful way, and (2) if so, to what extent can that change in behaviour be attributed to the independent variable" (p. 149).

Whilst there is not a uniform approach to visual analysis, Lane and Gast (2014) recommend evaluating the trend, level and stability of the data using both a within- and between-condition analysis. By considering within- and between-condition analysis, it was hoped a more thorough and systematic approach to data analysis would be facilitated (Gast, 2005; Lane and Gast, 2014).

4.2.2.1 Within-condition Analysis

Within-condition analysis refers to the evaluation of data patterns within a single condition during a study. Typically, researchers begin by analysing data in the baseline phase before moving to the intervention phase (Gast and Spriggs, 2010; Kennedy, 2005; Wolery and Harris, 1982).

To analyse the trend, level and stability of data within-conditions, Lane and Gast (2014) outline the following steps:

1. Letter each condition (A- baseline, B– intervention)
2. Number of sessions by condition
3. Calculate measures of central tendency (mode, median, mean) and dispersion (range and standard deviation)
4. Calculate relative level of change for each condition: split data in half and identify median for each half, subtract smallest value from largest value and note direction of change
5. Calculate absolute level of change: identify first and last value within each condition, subtract smallest value from largest value and note direction of change

6. Estimate trend: using the split-middle method, create a trend estimation for each phase and place on graph as a linear line
7. Trend stability: calculate how many points fall within +/- 25% of the mean (80% would indicate a stable set of data)
8. Evaluate data paths within trend to determine direction and stability

These steps were employed in the visual analysis of the line graphs for the child PI-ED scores and teacher SAS-TR scores for each case-study. For the PI-ED and SAS-TR scores, a decreasing/decelerating score or level would indicate that the reported anxiety was falling.

4.2.2.2 Between-condition Analysis

Between-condition analysis of data refers to the comparisons across adjacent conditions during a study i.e. baseline and intervention phases (Gast and Spriggs, 2010; Kennedy, 2005; Wolery and Harris, 1982).

To analyse the trend, level and stability of data between conditions, Lane and Gast (2014) outline the following steps:

1. Determine number of variables that changed between-condition
2. Change in trend direction; noting change in trend direction across adjacent conditions
3. Change in trend stability; noting change in trend direction and stability
4. Evaluate level change between-conditions, calculating: relative, absolute, median, and mean level change
5. Calculate overlap of data between-conditions, including the percent of non-overlapping data (PND) and percent of overlapping data (POD; Scruggs, Mastropieri, and Casto, 1987); identify the lowest value in the baseline data series, then identify the number of data points within the intervention phase which exceed this. Then you divide the number of values below the line by the total number of sessions and multiply by 100.

These steps were used in the visual analysis of the line graphs for the child PI-ED scores and teacher SAS-TR scores for each case-study. As stated above, a decreasing/decelerating score or level from these measures would indicate that the reported anxiety was falling.

4.2.2.3 Reliability of visual analysis

Visual analysis of graphs can be criticised for lacking validity and reliability due to variables such as human error and bias (Lane and Gast, 2014). Type I and Type II errors can be present in the visual analysis of SCEDS.

Type I errors can be made in visual analysis due to a phenomenon known as 'autocorrelation' (Matyas and Greenwood, 1990). Robey et al. (1999) refer to autocorrelation as the degree of predictability, or lack of independence, between one observation and a subsequent observation. Jones et al. (1978) state when autocorrelation occurs, validity of visual analysis can be reduced to nearly chance levels. Whilst there are conflicting findings about the extent to which autocorrelation is present in single-case designs (see Huitema, 1985), Brossart et al. (2006) highlight that what might look like a change across the phases, could be due to inherent correlation.

Researchers such as Parsonson and Baer (1986), Kazdin (2003), Parker, Hagan-Burke and Vannest (2007) argue type II errors are prominent in visual analysis because detection of intervention effects may be missed due to the researcher lacking a sensitive approach to analysis. According to Parsonson and Baer (1986): "…insensitivity ought to generate more conservative judgments that behaviour *has* changed in correlation with experimental variables" (p.158).

Two approaches have been taken to increase the reliability of the visual analysis: interrater agreement and calculation of effect size.

4.2.2.3.1 Effect size

Although the absence of a large sample size in single-case designs restricts the ability to employ inferential statistics (Gulliford, 2015), a growing number of researchers are looking to improve the objectivity of their research through the inclusion of statistical methods as opposed to visual analysis on its own.

According to Brossart et al. (2014), researchers employing a single-case design should employ visual analysis with an effect size calculation. Parker, Vannest and Brown (2009) see effect size as an important tool in determining practical significance within applied educational research. Brossart et al. (2006) describe effect size as providing "an index of the strength of association between intervention and outcome, from which we may infer how much of the outcome variable can be explained, controlled, and predicted

by the intervention" (p.541). Brossart et al. (2006) outline, critically, various methods of calculating effect size which can be considered and employed in research.

Due to issues related to autocorrelation mentioned, Manolov and Solanas (2008) state 'percentage of non-overlapping data indices' as being least affected by autocorrelation. Parker et al. (2011) discuss the usefulness and ease of this method as well as its ability to complement visual analyses approaches, including those outlined by Lane and Gast (2014). Scruggs, Mastropieri and Casto (1987) approach to calculating percentage of non-overlapping data (PND) has been adopted (see section 4.2.2.2 for description).

4.2.2.3.2 Interrater agreement

To reduce type II errors interrater agreement can be sought. Several researchers exploring the reliability of visual analysis of SCED line graphs have reported figures between 0.40 and 0.6, indicating low-to-moderate interrater scores (DeProspero and Cohen, 1979; Harbst, Ottenbacher, and Harris, 1991; Park, Marascuilo, and Gaylord-Ross, 1990). Whilst graph design and training can increase the reliability of visual analysis, 100% agreement is an unreasonable and, perhaps, unrealistic goal (Brossart et al., 2006). According to Lane and Gast (2014) most researchers strive for an agreement between 80-100%, a figure supported by Kennedy (2005).

To calculate interrater agreement during visual analysis, Brossart et al. (2006) recommend using a rating scale in response to the following question:

"How convinced are you that the child's responses underwent a practical and significant improvement during each of the phases?"

Responders then give a score from 1 (not at all convinced) to 5 (very convinced). Using the responses, a weighted Cohen's Kappa (Cohen, 1968) can be calculated to determine the degree of agreement. A weighted Cohen's Kappa is typically used when an ordinal scale has been employed and the researcher wants to determine agreement and size of the agreement. Altman's (1991) categories are used to define the level of agreement:

- < 0.20 Poor
- 0.21 - 0.40 Fair
- 0.41 - 0.60 Moderate
- 0.61 - 0.80 Good
- 0.81 - 1.00 Very good

Brossart et al.'s (2006) approach to interrater agreement and a weighted Cohen's kappa, along with Altman's (1991) categories were used to determine interrater agreement of graphs, in order to increase the reliability of the data analysis. SPSS v24 was used to carry out statistical calculations.

4.2.3 Content analysis of semi-structured interviews

A description of content analysis and its aims are presented in section 3.9.2. This section will outline the actions taken by the researcher to analyse the semi-structured interviews in this study.

Each interview was individually transcribed into a word document (see Appendix 17 for an example of one of the transcripts). According to Forman and Damscroder (2008), it is essential that a researcher recognises "that any transcription of spoken word will be incomplete" (p.45). Content analysis concerns itself with the informational content of data, and therefore the analysis focuses on the verbatim representation of the words, compared to other qualitative approach which also analyse other aspects of discourse including pauses and intonation etc. (Forman and Damscroder, 2008). Once the scripts were transcribed, it was recommended that the researcher verified the accuracy of the transcripts by listening to the interview again alongside the transcription. Once the transcription was complete, the analysis could begin.

Firstly, a decision had to be made between whether an inductive or deductive approach to content analysis was adopted, this should be determined by the aim of the study and research questions. Since the research question that guided the interviews aimed to produce a general understanding of the mechanisms of Lego-based therapy, moving from the specific views of individuals to a more holistic understanding, along with an attempt to generate knowledge of a relatively new and evolving intervention, an inductive approach was selected (Lauri and Kyngäs, 2005).

The approach taken to conduct a content analysis can vary, however most researchers who adopt this approach conduct their analysis in three phases: preparation, organisation and reporting (Elo and Kyngäs, 2007). Figure 4.2 displays the inductive approach to these phases.

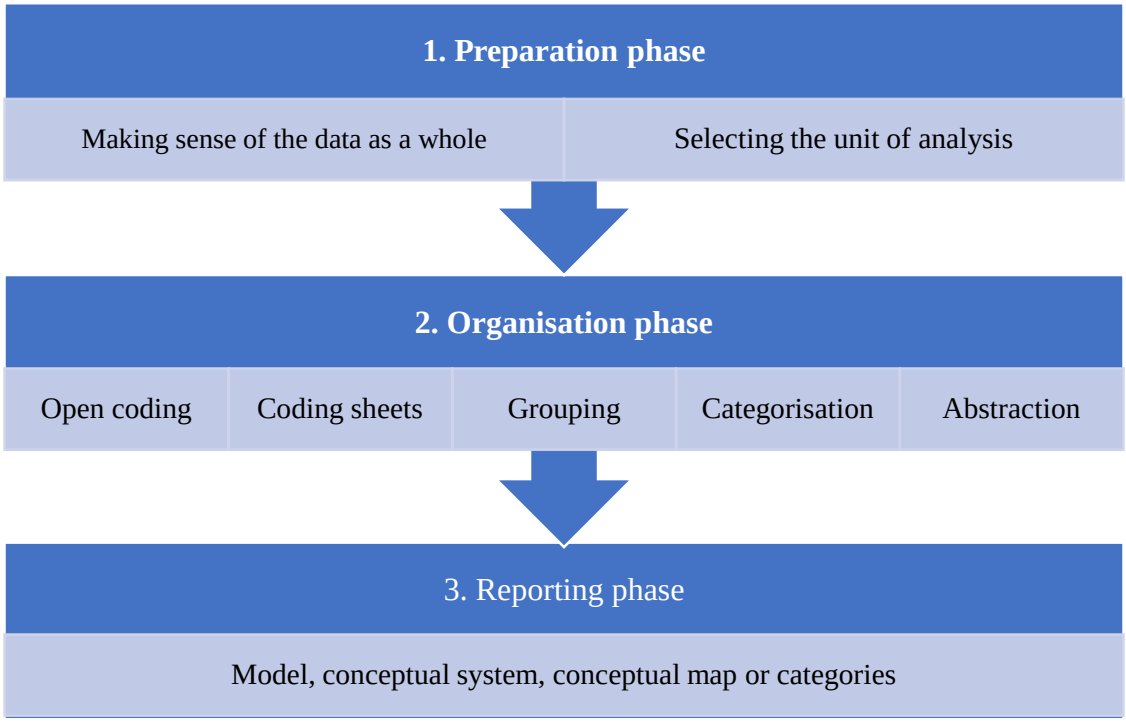


Figure 4-2 Phases of inductive content analysis (adapted from Elo and Kyngäs, 2007, p110)

These three phases were followed by the researcher, the next few sections describe the actions taken.

4.2.3.1 Preparation phase

During the preparation phase the researcher immersed herself in the data and engaged with the content of the interviews. Using knowledge gained from the literature review the researcher made sense of the data, drawing similarities and comparisons across interviews in a holistic manner, this enabled the selection of units for analysis (Elo and Kyngäs, 2007; Forman and Damschroder, 2008). Units of analysis can be words, phrases or full sentences, and are determined by the research questions. In this study the units for analysis were made up of a combination of words and phrases shared by the interviewees.

4.2.3.2 Organisation phase

During this phase the researcher engaged with the data and conducted open coding, this involved making notes and headings about the content of the text. These notes are then transferred onto coding sheets (Cole, 1988; Downe-Wamboldt, 1992). The researcher in this study created these by hand, an example of a coding sheet is presented in appendix 18. Using the coding sheets, the researcher then began to group together the units of analysis.

The aim of grouping was to collapse the information into categories based on similarities and differences; the focus here, according to Dey (1993), is to look at data which belongs together. The categories needed to describe the phenomenon and details of the original data. A word-frequency count was conducted in this step as a way of grouping and guiding the formulation of categories; this ultimately supported the more holistic understanding of the interviews (Stemler, 2001).

The final step in this phase was abstraction, this meant "formulating a general description of the research topic through generating categories" (Elo and Kyngäs, 2007, p.112). Here, each category was named using "content-characteristic words" (Elo and Kyngäs, 2007, p.112).

4.2.3.3 Reporting phase

Once the data had been organised, the grouping, categorisation and abstraction needed to be presented in a way that would allow the researcher to communicate what the data may mean; there are various ways in which this can be done (Forman and Damschroder, 2007). In this study, because interviews were combined to conduct the content analysis, it was important that the process was presented in a systematic way in which the reader was able to recognise patterns in the content (Miles and Huberman, 1994). The researcher therefore decided to present the content analysis in tabular displays in order to facilitate the interpretation of the data.

4.2.3.3.1 Clarification on process

Whilst each child interview and each facilitator interview was transcribed individually, two content analyses were conducted. One content analysis was conducted on the child interviews and one content analysis was conducted on the Lego-based therapy facilitators. The researcher wanted to represent the valuable views of both participants. Specifically, the researcher, as a researcher-practitioner, did not want to lose the voice of the child (DfEE, 2014).

4.2.4 Summary of analysis within current study

		Data collection	Phase of research	Measurement tool	Chosen Analysis
Principal Research Question	For children with social communication difficulties, does Lego-based Therapy have an effect on anxiety?	- Pre and Post Measures - Repeated Measures - Semi-structured interviews	- Pre and post intervention - Baseline and intervention - Post intervention	- PI-ED - SCAS (Child report) - SCAS (Parent report) - SAS-TR	- Reliable Change Index - Visual Analysis - Content Analysis
Subsidiary Research Questions	**A.** For children with social communication difficulties, does Lego-based Therapy have an effect on a child's self-reported anxiety?	- Pre and Post Measures - Repeated Measures	- Pre and Post intervention - Baseline and Intervention - Post intervention	- PI-ED - SCAS (Child report)	- Reliable Change Index - Visual Analysis
	B. For children with social communication difficulties, does Lego-based Therapy have an effect on a parent's report of their children's anxiety?	- Pre and Post Measures	- Pre and Post intervention	- SCAS (Parent report)	- Reliable Change Index
	C. For children with social communication difficulties, does Lego-based Therapy have an effect on a teacher's report of a child's anxiety?	- Pre and Post Measures - Repeated Measures	- Baseline and Intervention	- SAS-TR	- Visual Analysis
	D. If positive changes were perceived, what within the Lego-based Therapy could have helped bring these about?	- Semi-structured interviews	- Post intervention	- Prepared questions	- Content Analysis

Table 4-1 A tabular display of the selected analysis methods to respond to the principal and subsidiary research questions

4.3 DESCRIPTION OF PARTICIPANTS

A description of participants is presented using information collected from schools during the pre-baseline phase. Table 4.2 displays the demographics of the three participants before more detailed descriptions are presented.

Case-studies[1]	School	Age at start of intervention	Involvement from outside agencies	Participation in other targeted interventions for social communication or emotional wellbeing
1. Harry	One	6years 6months	None stated	None stated
2. Joshua	Two	7years 4months	None stated	None stated
3. Nathan	Two	7years 9months	None stated	None stated

Table 4-2 Personal demographics of the three participating children

4.3.1 Case-study one: 'Harry'

Harry lives at home with his parents and younger sister. Harry was selected for Lego-based Therapy to improve his social communication; his primary target was to be able to initiate conversation. Prior to Lego-based Therapy, Harry would not initiate any conversation and would only speak when spoken to. Harry would often 'dance or jiffle' to gain attention rather than ask verbally for support. Harry was described as "often" looking nervous, especially when people spoke to him in school, or when he was speaking to others.

4.3.2 Case-study two: 'Joshua'

Joshua lives at home with his parents and younger sister. Joshua was selected for Lego-based Therapy to improve his social communication and interaction; a primary goal was to increase his confidence in being able to talk to others and being able to talk about how he is feeling. Although described as a "happy boy", when Joshua spoke in class, he would often stammer. This stammer would be more noticeable when he was worried or anxious about the lesson topic. Joshua would often communicate with his parents that he was worried about school, however, he would not always communicate this with an adult in school.

[1] Pseudonyms have replaced the real names of the children in each case-study to maintain their anonymity

4.3.3 Case-study three: 'Nathan'

Nathan lives at home with his parents and younger sister. Nathan was selected for Lego-based Therapy to support his social communication. Nathan is an able child who is working at greater depth across all areas of the curriculum. The primary goal of Lego-based Therapy was to increase Nathan's confidence in social situations. Prior to Lego-based Therapy, Nathan would rarely speak in front of the class; the only exception would be in Maths where he would speak when he was confident he knew the answer. Nathan appears more relaxed when on the playground; he has a close friendship group and prefers to play with a few children rather than in a large group. However, in the classroom, adults describe Nathan as "very anxious" and "extremely quiet"; he hates to be selected for anything or to be asked to show something, and can often "look like he is about to cry".

4.4 CASE-STUDY ONE: 'HARRY'

4.4.1 Subsidiary research question A

For children with social communication difficulties, does Lego-based Therapy have an effect on a child's self-reported anxiety?

4.4.1.1 Analysis of pre- and post- SCAS measures: Harry's self-report scores

	Pre Score	**Post Score**
Panic attack and agoraphobia	11	9
Separation anxiety	18	9
Physical injury fears	9	7
Social phobia	9	6
Obsessive compulsive	11	7
Generalized anxiety disorder / overanxious disorder	13	10
Total Score	**71**	**48**
Total Score Difference	**-23**	
RCI	**3.93** ***Reliable change***	

Table 4-3 Harry's Pre- and Post- intervention scores from the SCAS child report measure

Results from table 4.3 show the total anxiety score decreased by 23; the reliable change calculation indicated this was significant. A score of 3.93 is higher than 1.96, indicating that the change could not have occurred by chance and therefore can be reliably linked to the intervention (Jacobson and Truax, 1991). As the change was significant, it is likely Lego-based Therapy did have some positive impact on a Harry's self-reported anxiety.

4.4.1.2 Analysis for PI-ED: Harry's weekly self-report scores

4.4.1.2.1 Within-condition analysis

		Baseline	Intervention
Number of data points collected		5	9
Mode		24	19, 21
Median		24	19
Mean		23	19
Range		5	5
Standard Deviation		2.2	1.9
Relative level change		-3.5 (decreasing)	0 (stable)
Absolute level change		-4 (decreasing)	+2 (increasing)
Trend estimate		*See figure 4.2 for linear trend lines*	
Trend stability		100%	89%
Evaluation of data path	Direction?	Decelerating	Decelerating
	Stability?	Stable	Stable

Table 4-4 Within-condition analysis of Harry's PI-ED scores collected during baseline and intervention phases

The measures of central tendency for Harry's PI-ED scores within the baseline phase are, overall, higher than in the intervention phase, suggesting Harry's emotional distress (i.e. anxiety) was lower following the intervention.

The trend stability score during the intervention phase was lower (89%) than during the baseline phase (100%), suggesting there was less stability during the intervention phase. However, both phases had more than 80% of their scores fall within +/-25% of the mean score, suggesting both data sets were stable.

The within-condition analysis of Harry's PI-ED scores provide some evidence to suggest his self-reported anxiety scores were lower following Lego-based Therapy.

4.4.1.2.2 Between-condition analysis

Making reference to figure 4.3, a between-condition analysis will be conducted. The analysis will make reference to changes in: trend, level, stability, as well as point overlap, between the baseline and intervention phase. This analysis will be displayed in table 4.5.

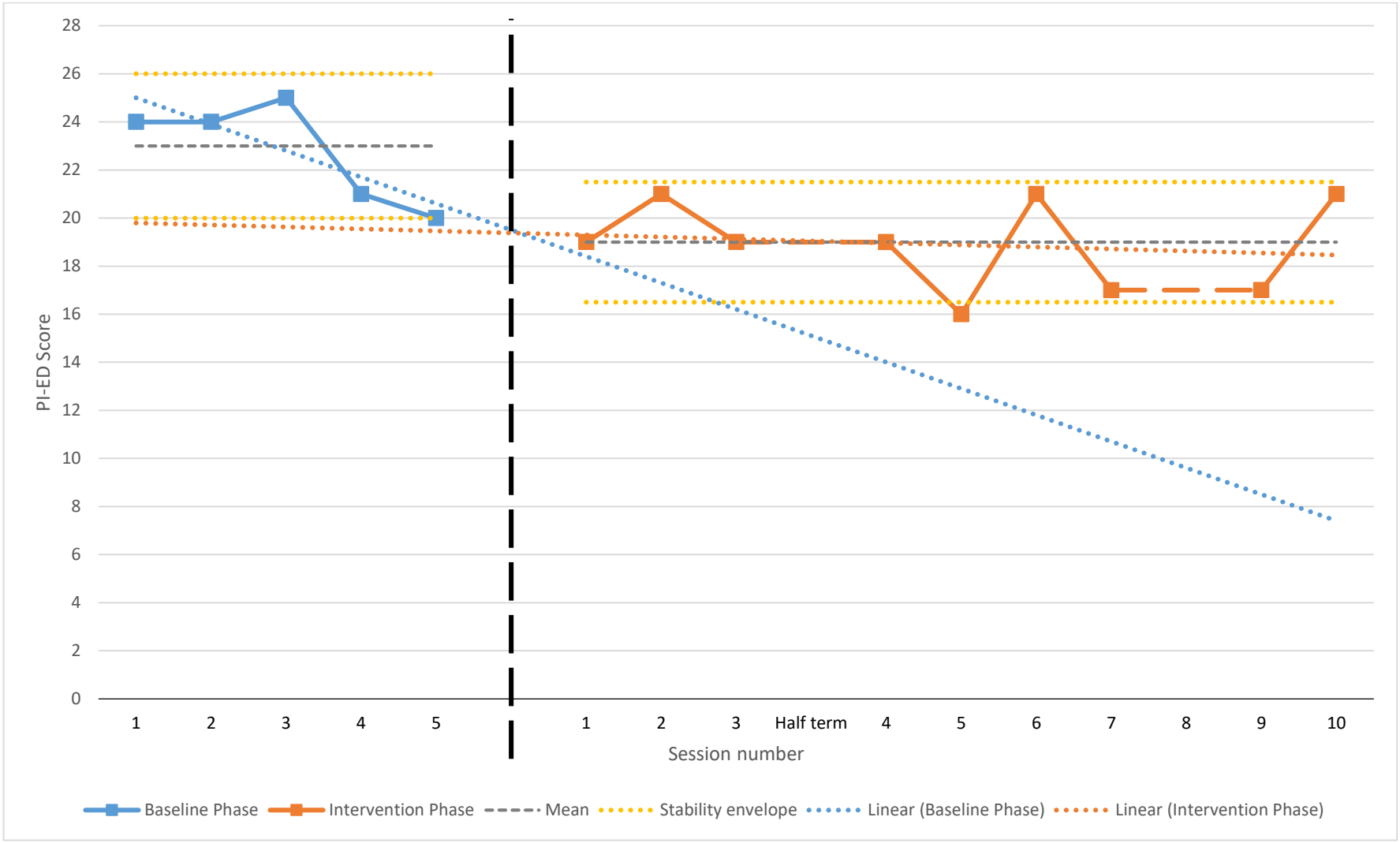


Figure 4-3 Harry's weekly total PI-ED scores collected during baseline and intervention phases

		Evaluation
Determine number of variables that changed between-condition		Only one variable changed from baseline to introduction of the intervention during the intervention condition.
Change in trend direction		No change from a deteriorating trend in baseline to a deteriorating trend during intervention
Change in trend stability		In the baseline phase there is a variable decelerating trend towards the therapeutic direction. Upon introduction of the intervention, there was a more stable decelerating trend in a thereapeutic direction.
Evaluate level change between-conditions	*Relative level change*	-1.5 (decreasing)
	Absolute level change	-1 (decreasing
	Median level change	-5 (decreasing)
	Mean level change	-4 (decreasing)
Calculate overlap of data between-conditions	*Percentage of non-overlapping data (PND)*	67%
	Percentage of overlapping data (POD)	33%

Table 4-5 Between-condition analysis of Harry's PI-ED scores collected during baseline and intervention phases considering trend, level and stability

The between-condition analysis of Harry's PI-ED scores show, that whilst there was no change in the trend direction following the introduction of the intervention, the trend was more stable.

The level change analysis indicates there was an overall decrease in emotional distress scores i.e. anxiety, following the introduction of the intervention.

Finally, the PND is higher than the POD highlighting that more scores were lower than the lowest baseline value. Overall, this analysis suggests Lego-based Therapy did have some positive impact on Harry's self-report of his anxiety.

4.4.1.3 Summary of quantitative analysis for Harry's self-report anxiety scores

The pre and post analysis, along with the within and between-condition analysis, indicate Harry's levels of self-reported anxiety decreased and became more stable following the introduction of Lego-based Therapy intervention.

4.4.2 Subsidiary research question B

For children with social communication difficulties, does Lego-based Therapy have an effect on a parent's report of their children's anxiety?

4.4.2.1 Analysis of pre- and post SCAS measures: Harry's parent's scores

	Pre Score	**Post Score**
Panic attack and agoraphobia	4	2
Separation anxiety	13	14
Physical injury fears	11	9
Social phobia	12	9
Obsessive compulsive	8	4
Generalized anxiety disorder / overanxious disorder	5	7
Total Score	**53**	**45**
Total Score Difference	**-8**	
RCI	**1.84** ***No Reliable change***	

Table 4-6 Harry's parent's Pre- and Post- intervention scores from the SCAS parent report measure

4.4.2.2 Summary of findings Harry's parents pre- and post-scores

Results from table 4.6 indicate whilst the total anxiety score decreased by 8, the reliable change calculation indicated it was not significant. A score of 1.84 is lower than 1.96 indicating the change could have occurred by chance and therefore cannot be reliably linked to the intervention (Jacobson and Truax, 1991). Since the change was not significant, it is likely Lego-based Therapy did not have a significant impact on Harry's parent's report of Harry's anxiety.

4.4.3 Subsidiary research question C

For children with social communication difficulties, does Lego-based Therapy have an effect on a teacher's report of the child's anxiety?

4.4.3.1 Analysis for SAS-TR: Harry's teacher's weekly report scores

4.4.3.1.1 Within-condition analysis

		Baseline	Intervention
Number of data points collected		**5**	**9**
Mode		31	31
Median		31	31
Mean		30	33
Range		12	17
Standard Deviation		4.8	5.6
Relative level change		-5.5 (decreasing)	+0.5 (increasing)
Absolute level change		-7 (decreasing)	-1 (decreasing)
Trend estimate		*See figure 4.3 for linear trend lines*	
Trend stability		60%	67%
Evaluation of trend path	Direction?	Decelerating	Decelerating
	Stability?	Variable	Variable

Table 4-7 Within-condition analysis of Harry's teacher's SAS-TR scores collected during baseline and intervention phases

The mode and median are identical for the baseline and intervention phases. The mean score for the SAS-TR is higher during the intervention phase, suggesting Harry's teacher reported, on average, he was more anxious.

The standard deviation and range for both baseline and intervention phases are large, indicating there is variability in both data sets. The trend stability is higher in the intervention phase (67%) than in the baseline phase (60%). This means more data points lay outside the stability envelop during the baseline phase, suggesting more stability following the introduction of the intervention. However, for both data sets, less than 80% of scores fell within the +/-25% of the mean, suggesting both lack stability. The

within-condition analysis for Harry's teacher's SAS-TR scores provide some evidence to suggest Lego-based Therapy did not have a positive impact on Harry's anxiety.

4.4.3.1.2 Between-condition analysis

With reference to figure 4.4, a between-condition analysis will be conducted. The analysis makes reference to changes in: mean, level, trend, variability, as well as point overlap; analysis is displayed in table 4.8.

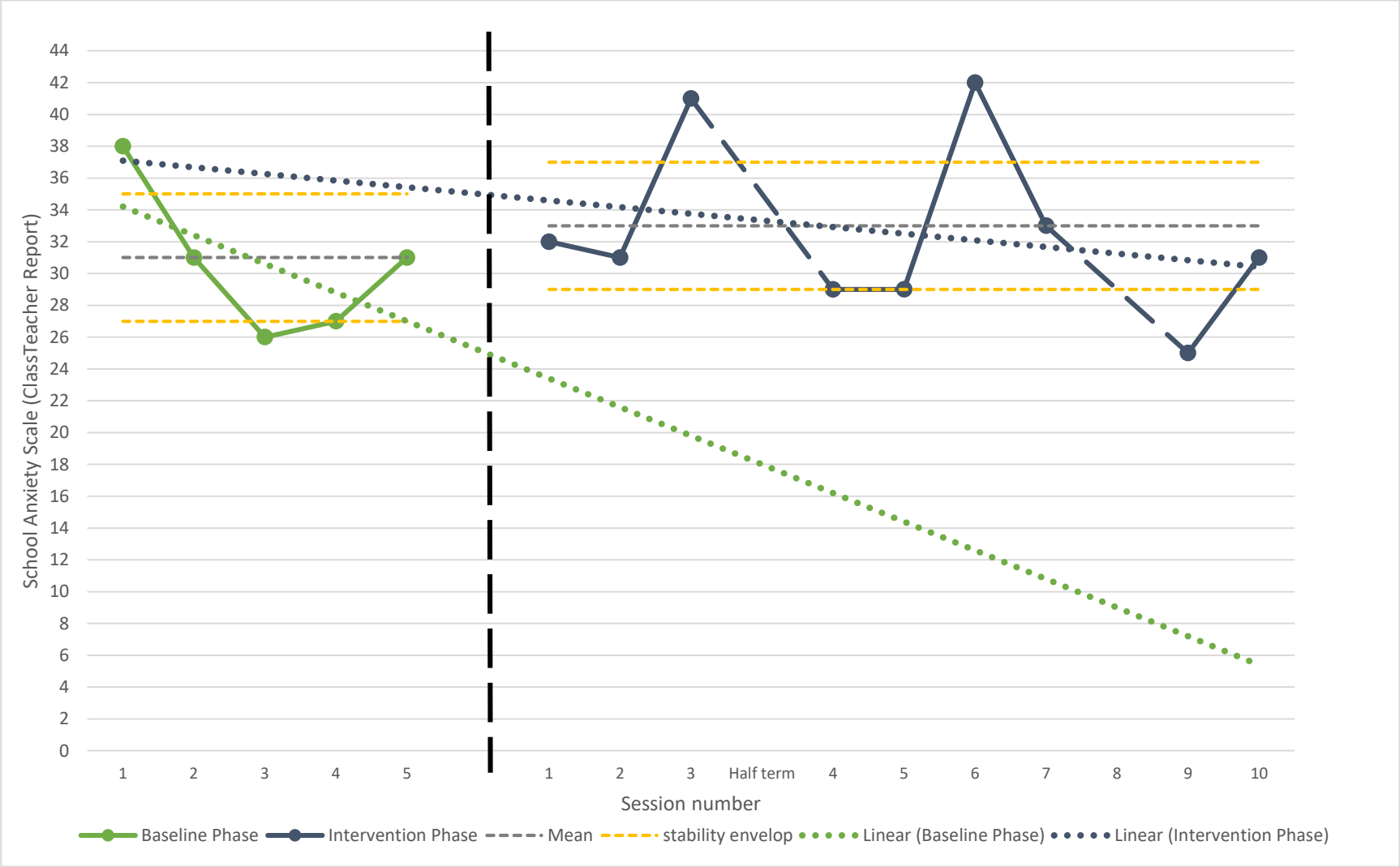


Figure 4-4 Harry's teacher's weekly total SAS-TR scores collected during baseline and intervention phases

		Evaluation
Determine number of variables that changed between-condition		Only one variable changed from baseline to introduction of the intervention during the intervention condition.
Change in trend direction		No change from a deteriorating trend in baseline to a deteriorating trend during intervention
Change in trend stability		In the baseline phase there is a variable decelerating trend towards the therapeutic direction. Upon introduction of the intervention, there was a more stable decelerating trend in a thereapeutic direction.
Evaluate level change between-conditions	*Relative level change*	-2.5 (decreasing)
	Absolute level change	-1 (decreasing
	Median level change	0 (stable)
	Mean level change	+3 (increasing)
Calculate overlap of data between-conditions	*Percentage of non-overlapping data (PND)*	11%
	Percentage of overlapping data (POD)	89%

Table 4-8 Between-condition analysis of Harry's teacher's SAS-TR scores collected during baseline and intervention phases considering trend, level and stability

The between-condition analysis of Harry's teacher's SAS-TR scores show, whilst there was no change in the trend direction following the introduction of the intervention, the stability of this trend was more stable.

The level change analysis shows the relative and absolute level change of anxiety scores were decreasing, but median and mean level change were stable or increasing.

Furthermore, the PND is lower than the POD highlighting more scores were higher than the lowest baseline value. Overall, this analysis suggests Lego-based Therapy did not have an impact on a Harry's Teacher's report of Harry's anxiety.

4.4.3.2 Summary of quantitative analysis of Harry's teacher's SAS-TR scores

The within and between-condition analyses both indicate Harry's teacher did not report improvements in Harry's level of anxiety following the introduction of Lego-based Therapy.

4.4.4 Principal research question

For children with social communication difficulties, does Lego-based Therapy have an effect on anxiety?

		Interpretation of analyses
Subsidiary Research Questions	**A.** For children with social communication difficulties, does Lego-based Therapy have an effect on a child's self-reported anxiety?	Yes
	B. For children with social communication difficulties, does Lego-based Therapy have an effect on a parent's report of their children's anxiety?	No
	C. For children with social communication difficulties, does Lego-based Therapy have an effect on a teacher's report of a child's anxiety?	No

Table 4-9 A summary of the quantitative analyses for the subsidiary research questions within Harry's case-study

Table 4.9 indicates two out of three of the quantitative analyses provided evidence to suggest Lego-based Therapy did not reduce Harry's anxiety, however, analysis of Harry's self-reported measures provides contradicting evidence. Triangulating the data, it is possible, for children with social communication difficulties, like Harry, Lego-based Therapy does not have a positive effect on anxiety.

4.5 CASE-STUDY TWO: 'JOSHUA'

4.5.1 Subsidiary research question A

For children with social communication difficulties, does Lego-based Therapy have an effect on a child's self-reported anxiety?

4.5.1.1 Analysis of pre- and post- SCAS measures: Joshua's self-report scores

	Pre Score	**Post Score**
Panic attack and agoraphobia	*7*	*2*
Separation anxiety	*4*	*1*
Physical injury fears	*0*	*2*
Social phobia	*4*	*0*
Obsessive compulsive	*8*	*3*
Generalized anxiety disorder / overanxious disorder	*5*	*0*
Total Score	**28**	**8**
Total Score Difference	**-20**	
RCI	**3.42 Reliable change**	

Table 4-10 Joshua's Pre- and Post- intervention scores from the SCAS child report measure

4.5.1.2 Summary of Joshua's pre- and post- score analysis

Results from table 4.10 show the total anxiety score decreased by 20, the reliable change calculation indicated this was significant. A score of 3.42 is higher than 1.96, indicating the change could not have occurred by chance and therefore can be reliably linked to the intervention (Jacobson and Truax, 1991). As the change was significant, it is likely Lego-based Therapy did have some positive impact on a Joshua's self-reported anxiety.

4.5.1.3 Analysis for PI-ED: Joshua's weekly self-report scores

4.5.1.3.1 Within-condition analysis

		Baseline	Intervention
Number of data points collected		4	7
Mode		7	3
Median		7	3
Mean		7	3
Range		6	11
Standard Deviation		2.5	3.8
Relative level Change		0 (stable)	-2 (decreasing)
Absolute level change		+3 (increasing)	-10 (decreasing)
Trend estimate		*See figure 4.4 for linear trend lines*	
Trend stability		50%	42%
Evaluation of data path	Direction?	Increasing	Decreasing
	Stability?	Variable	Variable

Table 4-11Within-condition analysis of Joshua's PI-ED scores collected during baseline and intervention phases

The measures of central tendency for Joshua's PI-ED scores within the baseline phase are, overall, higher compared to the intervention phase, suggesting Joshua's emotional distress i.e. anxiety was lower following the intervention.

The trend stability score during the intervention phase was lower (42%) than during the baseline phase (50%), suggesting there was less stability during the intervention phase. However, both phases had less than 80% of their scores fall within +/-25% of the mean score, suggesting both data sets were variable.

Altogether, the within-condition analysis of Joshua's PI-ED scores provides some evidence to suggest his self-report anxiety scores were lower following the Lego-based Therapy, but the scores were not stable.

4.5.1.3.2 Between-condition analysis

Making reference to the graph in figure 4.5, a between-condition analysis will be conducted. The analysis will make reference to changes in: mean, level, trend, variability, as well as point overlap; analysis is displayed in table 4.12.

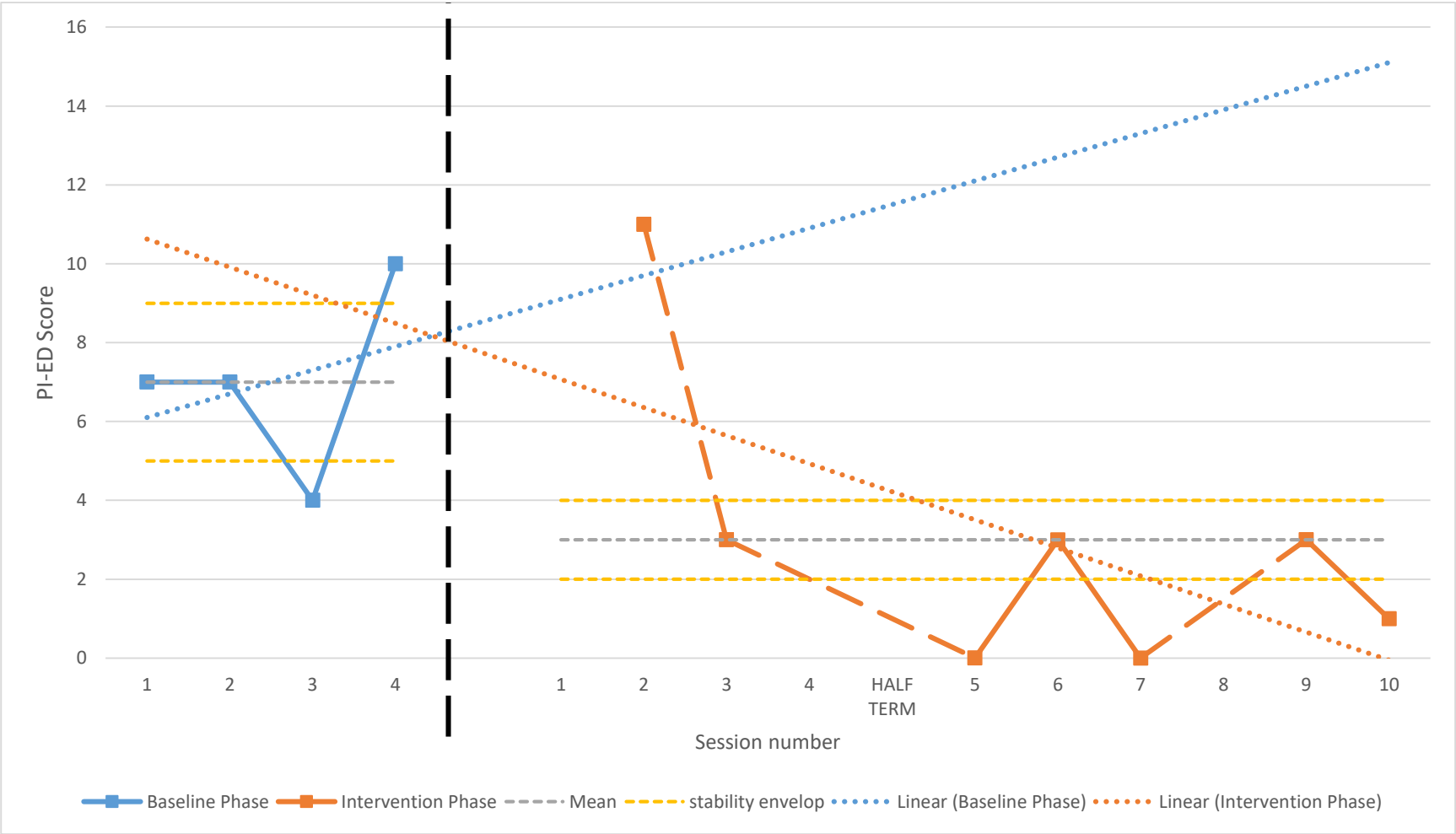


Figure 4-5 Joshua's weekly total PI-ED scores collected during baseline and intervention phases

		Evaluation
Determine number of variables that changed between-condition		Only one variable changed from baseline to introduction of the intervention during the intervention condition.
Change in trend direction		A change from an increasing trend in baseline to a decreasing trend during intervention
Change in trend stability		A variable accerlating trend in a contra-therapeutic direction in the baseline phase. Upon introduction of the intervention, there was a change in direction to a variable decelerating trend in a therapeutic direction.
Evaluate level change between-conditions	*Relative level change*	-4 (decreasing)
	Absolute level change	-1 (decreasing)
	Median level change	-4 (decreasing)
	Mean level change	-4 (decreasing)
Calculate overlap of data between-conditions	*Percentage of non-overlapping data (PND)*	86%
	Percentage of overlapping data (POD)	14%

Table 4-12 Between-condition analysis of Joshua's PI-ED scores collected during baseline and intervention phases considering trend, level and stability

The between-condition analysis of Joshua's PI-ED scores show there was a change in the trend direction and stability following the introduction of the intervention.

The level change analysis indicates there was an overall decrease in emotional distress scores i.e. anxiety following the introduction of the intervention.

Finally, the PND is higher than the POD highlighting more scores were lower than the lowest baseline value. Overall, this analysis suggests Lego-based Therapy did have an impact on Joshua's self-report of his anxiety.

4.5.1.4 Summary of quantitative analysis for Joshua's self-report anxiety scores

The pre and post analysis along with the within and between-condition analysis indicate Joshua's levels of self-reported anxiety decreased following the introduction of Lego-based Therapy intervention.

4.5.2 Subsidiary research question B

For children with social communication difficulties, does Lego-based Therapy have an effect on a parent's report of their children's anxiety?

4.5.2.1 Analysis of pre- and post- SCAS measures: Joshua's parent's scores

	Pre Score	**Post Score**
Panic attack and agoraphobia	*3*	*1*
Separation anxiety	*7*	*6*
Physical injury fears	*7*	*6*
Social phobia	*7*	*4*
Obsessive compulsive	*2*	*2*
Generalized anxiety disorder / overanxious disorder	*5*	*6*
Total Score	**31**	**25**
Total Score Difference	**-6**	
Reliable Change Index	**1.38** ***No Reliable Change***	

Table 4-13 Joshua's parent's Pre- and Post- intervention scores from the SCAS parent report measure

4.5.2.2 Summary of findings of Joshua's parents pre- and post- scores

Results from table 4.13 indicate whilst the total anxiety score decreased by 6, the reliable change calculation indicated it was not significant. A score of 1.36 is lower than 1.96 indicating the change could have occurred by chance and therefore cannot be reliably linked to the intervention (Jacobson and Truax, 1991). Since the change was not significant, it is likely Lego-based Therapy did not have a significant impact on a Joshua's parent's report of his anxiety.

4.5.3 Subsidiary research question C

For children with social communication difficulties, does Lego-based Therapy have an effect on a teacher's report of the child's anxiety?

4.5.3.1 Analysis for SAS-TR: Joshua's teacher's weekly report scores

4.5.3.1.1 Within-condition analysis

		Baseline	Intervention
Number of data points collected		4	7
Mode		7	1
Median		10	2
Mean		10	3
Range		7	5
Standard Deviation		3.8	2.4
Relative level Change		-0.5 (decreasing)	-1 (decreasing)
Absolute level change		-1 (decreasing)	-4 (decreasing)
Trend estimate		*See figure 4.5 for linear trend lines*	
Trend stability		0%	0%
Evaluation of data path	Direction?	Decelerating	Decelerating
	Stability?	Variable	Variable

Table 4-14 Within-condition analysis of Joshua's teacher's SAS-TR scores collected during baseline and intervention phases

The measures of central tendency are lower in the intervention phase than in the baseline phase suggesting Joshua's teacher reported lower levels of anxiety in Joshua during this phase.

The standard deviation and range for the intervention phase is lower than in the baseline phase, indicating there is less variability in this data set, however, the trend stability for both phases was 0%. This means no scores for either phases fell within +/-25% of the mean, indicating a lack of stability in the data sets.

The within-condition analysis for Joshua's teacher's SAS-TR scores provide some evidence to suggest Lego-based Therapy did have a positive impact on Joshua's teacher's report of Joshua's anxiety.

4.5.3.1.2 Between-condition analysis

With reference to figure 4.6, a between-condition analysis is conducted. The analysis will make reference to changes in: mean, level, trend, variability, as well as point overlap; analysis is displayed in table 4.15.

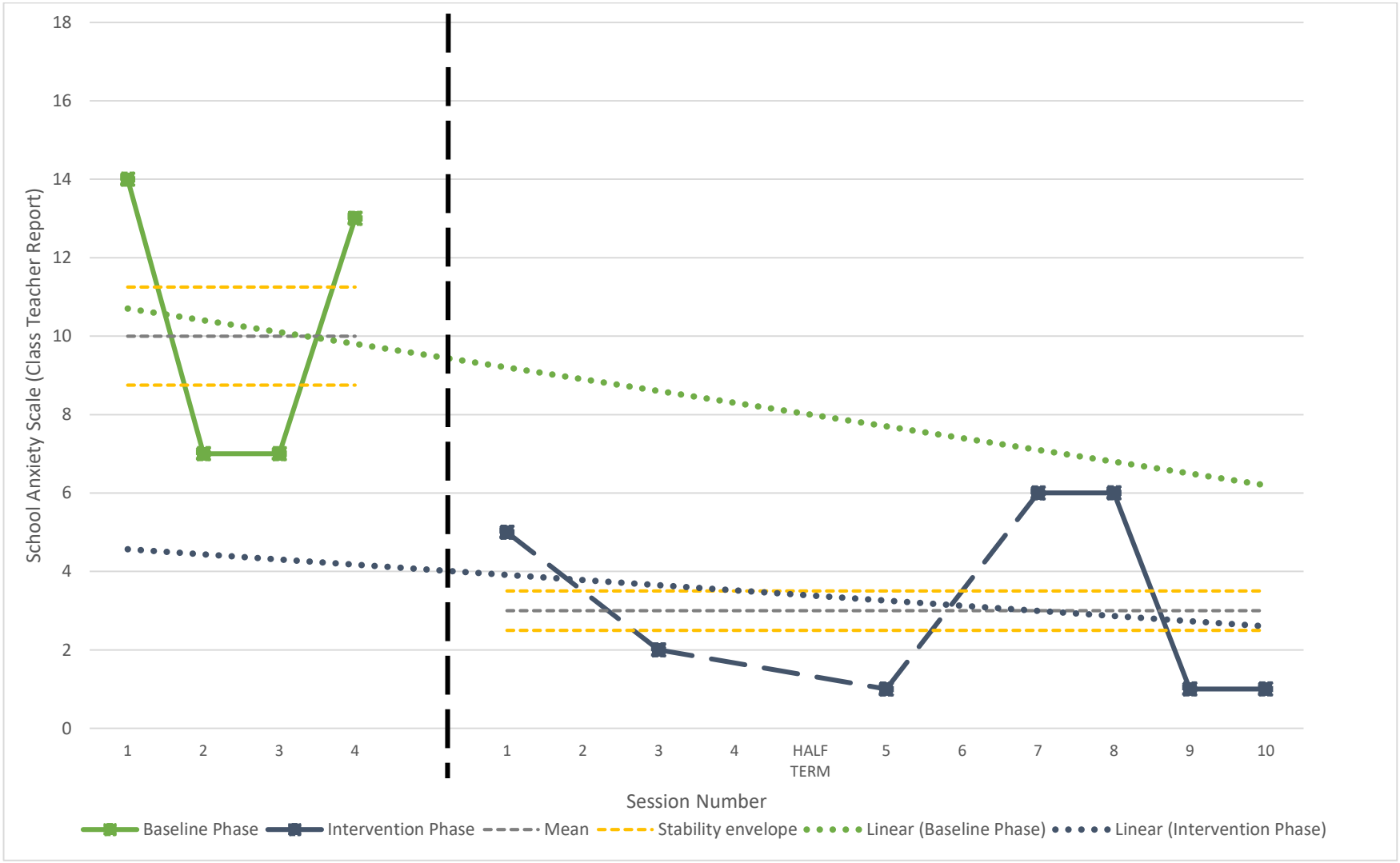


Figure 4-6 Joshua's teacher's weekly total SAS-TR scores collected during baseline and intervention phases

		Evaluation
Determine number of variables that changed between-condition		Only one variable changed from baseline to introduction of the intervention during the intervention condition.
Change in trend direction		No change from a deteriorating trend in baseline to a deteriorating trend during intervention
Change in trend stability		In the baseline phase there is a variable decelerating trend towards the therapeutic direction. Upon introduction of the intervention, there was a more stable decelerating trend in a therapeutic direction.
Evaluate level change between-conditions	*Relative level change*	-8 (decreasing)
	Absolute level change	-8 (decreasing
	Median level change	-8 (decreasing)
	Mean level change	-7 (decreasing)
Calculate overlap of data between-conditions	*Percentage of non-overlapping data (PND)*	100%
	Percentage of overlapping data (POD)	0%

Table 4-15 Between-condition analysis of Joshua's teacher's SAS-TR scores collected during baseline and intervention phases considering trend, level and stability

The between-condition analysis of Joshua's Teacher's SAS-TR scores show, whilst there was no change in the trend direction following the introduction of the intervention, the stability of this trend was more stable.

The level change analysis indicates there was an overall decrease in reported anxiety following the introduction of the intervention.

Finally, the PND is his higher than the POD highlighting that more scores were lower than the lowest baseline value.

Overall, this analysis suggests Lego-based Therapy did have an impact on a Joshua's teacher's report of Joshua's anxiety.

4.5.3.2 Summary of quantitative analysis of Joshua's teacher's SAS-TR scores

The within and between-condition analyses both indicate Joshua's teacher did report improvements in Joshua's level of anxiety following the introduction of Lego-based Therapy.

4.5.4 Principal research question

For children with social communication difficulties, does Lego-based Therapy have an effect on anxiety?

		Interpretation of analyses
Subsidiary Research Questions	**A.** For children with social communication difficulties, does Lego-based Therapy have an effect on a child's self-reported anxiety?	Yes
	B. For children with social communication difficulties, does Lego-based Therapy have an effect on a parent's report of their children's anxiety?	No
	C. For children with social communication difficulties, does Lego-based Therapy have an effect on a teacher's report of a child's anxiety?	Yes

Table 4-16 A summary of the quantitative analyses for the subsidiary research questions within Joshua's case-study

Table 4.16 shows two out of the three quantitative analyses indicate Lego-based does have a positive effect on the anxiety experienced by children with social communication difficulties, like in Joshua's case.

4.6 CASE-STUDY THREE: 'NATHAN'

4.6.1 Subsidiary research question A

For children with social communication difficulties, does Lego-based Therapy have an effect on a child's self-reported anxiety?

4.6.1.1 Analysis of pre- and post- SCAS measures: Nathan's self-report scores

	Pre Score	**Post Score**
Panic attack and agoraphobia	*12*	*10*
Separation anxiety	*11*	*7*
Physical injury fears	*3*	*3*
Social phobia	*7*	*5*
Obsessive compulsive	*8*	*8*
Generalized anxiety disorder / overanxious disorder	*8*	*8*
Total Score	**49**	**41**
Total Score Difference	**-8**	
Reliable Change index	**1.37** ***No Reliable Change***	

Table 4-17 Nathan's Pre- and Post- intervention scores from the SCAS child report measure

Results from table 4.17 show whilst the total anxiety score decreased by 8, the reliable change calculation indicated this was not significant. A score of 1.37 is lower than 1.96, indicating the change could have occurred by chance and therefore cannot be reliably linked to the intervention (Jacobson and Truax, 1991). As the change was not significant, it is likely Lego-based Therapy did not have a positive impact on a Nathan's self-reported anxiety.

4.6.1.2 Analysis for PI-ED: Nathan's weekly self-report scores

4.6.1.2.1 Within-condition analysis

		Baseline	Intervention
Number of data points collected		4	7
Mode		14	12, 9
Median		14.5	12
Mean		15	13
Range		2	14
Standard Deviation		0.9	4.8
Relative level Change		+1.5 (increasing)	+2 (increasing)
Absolute level change		+2 (increasing)	-3 (decreasing)
Trend estimate		*See figure 4.6 for linear trend lines*	
Trend stability		100%	43%
Evaluation of data path	Direction?	Accelerating	Accelerating
	Stability?	Stable	Variable

Table 4-18 Within-condition analysis of Nathan's PI-ED scores collected during baseline and intervention phases

The measures of central tendency for Nathan's PI-ED scores within the baseline phase are higher than in the intervention phase, suggesting Nathan's emotional distress i.e. anxiety was lower following the intervention. However, the standard deviation and range during the intervention phase were both higher, suggesting there was greater variability in the scores.

The relative change increased in the intervention phase but the absolute change decreased, providing some evidence that some positive changes may have occurred.

The trend stability score during the intervention phase was lower (43%) than during the baseline phase (100%). Because less than 80% of scores fell within +/-25% of the mean during the intervention, the data path is variable. However, because more than 80% of the baseline scores fell within +/-25% this data path was more stable.

The within-condition analysis of Nathan's PI-ED scores provides some tentative evidence to suggest Nathan's self-reported anxiety was lower following the Lego-based Therapy, however, this analysis demonstrates greater variability in the self-report scores.

4.6.1.2.2 Between-condition analysis

With reference to figure 4.7, a between-condition analysis will be conducted. The analysis will make reference to changes in: mean, level, trend, variability, as well as point overlap; analysis is displayed in table 4.19.

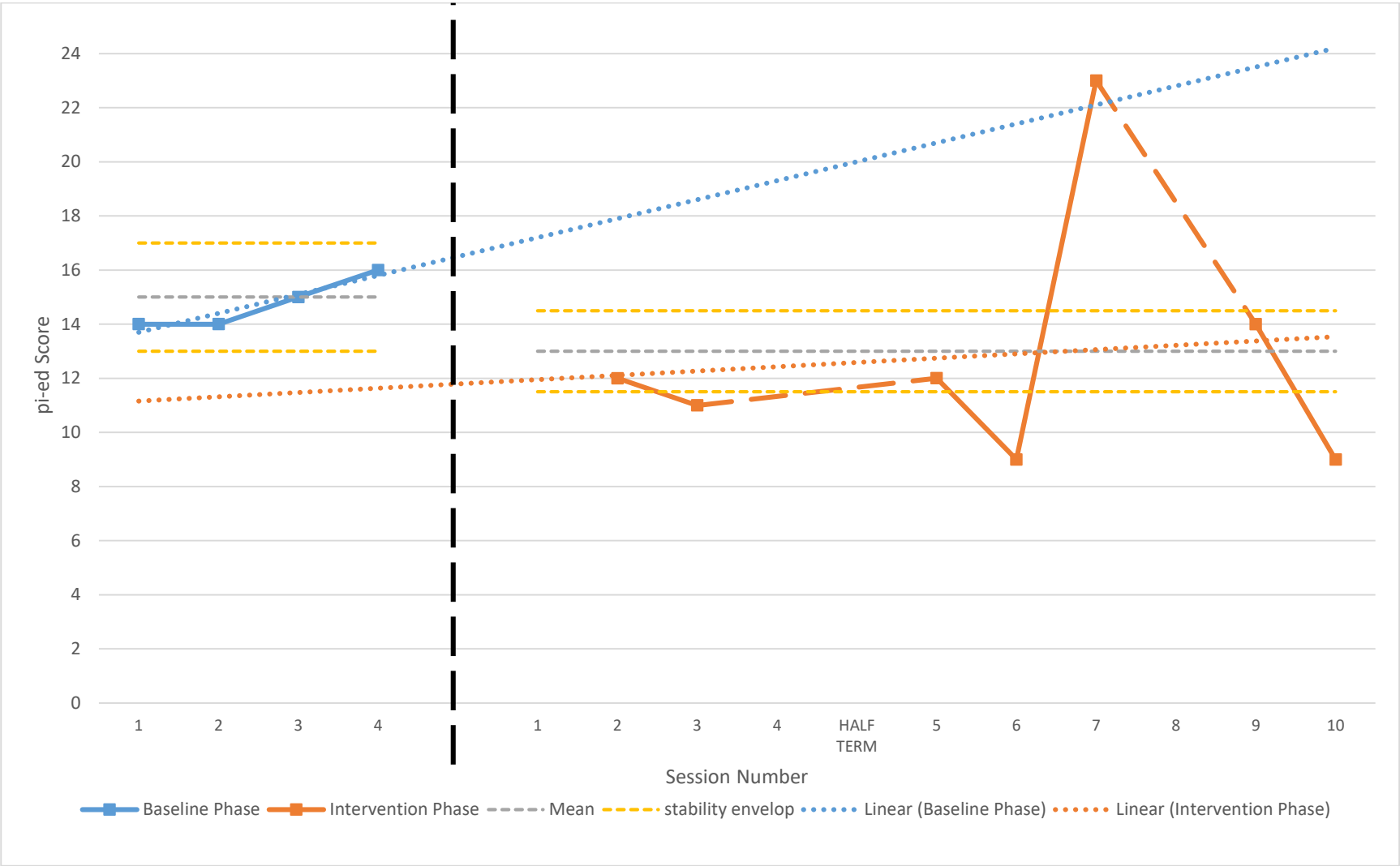


Figure 4-7 Nathan's weekly total PI-ED scores collected during baseline and intervention phases

		Evaluation
Determine number of variables that changed between-condition		Only one variable changed from baseline to introduction of the intervention during the intervention condition.
Change in trend direction		No change from an increasing trend in baseline to a increasing trend during intervention
Change in trend stability		In the baseline phase there is an accelerating trend in a contra-therapeutic direction. Upon introduction of the intervention, there was no change in trend direction; an accelerating trend in a contra-thereapeutic direction was still observed.
valuate level change between-conditions	*Relative level change*	-3.5 (decreasing)
	Absolute level change	-4 (decreasing)
	Median level change	-2.5 (decreasing)
	Mean level change	-2 (decreasing)
Calculate overlap of data between-conditions	*Percentage of non-overlapping data (PND)*	71%
	Percentage of overlapping data (POD)	29%

Table 4-19 Between-condition analysis of Nathan's PI-ED scores collected during baseline and intervention phases considering trend, level and stability

Table 4.19 shows there was no change in the trend direction following the introduction of the intervention. On figure 4.6, at week 7 during the intervention phase there is an anomaly. This anomaly appears to be affecting the trend line and may therefore be able to explain the continuing contra-therapeutic trend direction.

The level change analysis indicates there was an overall decrease in emotional distress scores following the introduction of the intervention. This indicates that Nathan's emotional distress scores i.e. anxiety may be decreasing.

Finally, the PND is his higher than the POD highlighting that more scores were lower than the lowest baseline value. Although there was an anomaly within Nathan's data, the level change analysis, along with the effect size calculation, makes it possible that Lego-based Therapy did have a positive impact on a Nathan's self-report of his anxiety.

4.6.1.3 Summary of findings

The pre and post analysis along with the within and between-condition analysis indicate Nathan's levels of self-reported anxiety did tentatively decrease enough to suggest Lego-based Therapy intervention is able to reduce the anxiety reported by a child with social communication difficulties.

4.6.2 Subsidiary research question B

For children with social communication difficulties, does Lego-based Therapy have an effect on a parent's report of their children's anxiety?

4.6.2.1 Analysis of pre- and post- SCAS measures: Nathan's parent's scores

	Pre Score	**Post Score**
Panic attack and agoraphobia	*1*	*5*
Separation anxiety	*12*	*10*
Physical injury fears	*2*	*3*
Social phobia	*8*	*6*
Obsessive compulsive	*3*	*1*
Generalized anxiety disorder / overanxious disorder	*10*	*10*
Total Score	**36**	**35**
Total Score Difference	**-1**	
Reliable Change Index	**0.23** ***No Reliable Change***	

Table 4-20 Nathan's parent's Pre- and Post- intervention scores from the SCAS parent report measure

4.6.2.2 Summary of findings from Nathan's parent's pre- and post- scores

Results from table 4.20 show Nathan's parents score only decreased by 1, therefore, the reliable change calculation indicated it was not significant. A score of 0.23 is lower than 1.96 indicating the change could have occurred by chance and therefore cannot be reliably linked to the intervention (Jacobson and Truax, 1991). Since the change was not significant, it is likely Lego-based Therapy does not have a significant impact on Nathan's parent's report of Nathan's anxiety.

4.6.3 Subsidiary research question C

For children with social communication difficulties, does Lego-based Therapy have an effect on a teacher's report of the child's anxiety?

4.6.3.1 Analysis for SAS-TR: Nathan's teacher's weekly report scores

4.6.3.1.1 Within-condition analysis

		Baseline	Intervention
Number of data points collected		4	7
Mode		n/a	n/a
Median		28.5	16
Mean		27	18
Range		6	24
Standard Deviation		5.5	7.8
Relative level Change		-8.5 (decreasing)	-7 (decreasing)
Absolute level change		-12 (decreasing)	+4 (increasing)
Trend estimate		*See figure 4.7 for linear trend lines*	
Trend stability		25%	14%
Evaluation of data path	Direction?	Decelerating	Decelerating
	Stability?	Variable	Variable

Table 4-21 Within-condition analysis of Nathan's teacher's SAS-TR scores collected during baseline and intervention phases

The median and mean are both lower in the intervention phase than in the baseline phase, suggesting Nathan's teacher reported lower levels of anxiety for Nathan during this phase.

The standard deviation and range for the intervention phase is higher than in the baseline phase, indicating there is more variability in this data.

The trend stability is higher in the baseline phase (25%) than in the intervention phase (14%), this means more data points lay outside the stability envelop during the intervention phase. However, because less than 80% of scores fell within 25%+/- of mean, both phases display a variable data path.

The within-condition analysis for Joshua's teacher's SAS-TR scores provide some evidence to suggest Lego-based Therapy did have a positive impact on Joshua's anxiety, however the inconsistency and variability of the scores affect the extent to which this can be stated.

4.6.3.1.2 Between-condition analysis

Making reference to figure 4.8, a between-condition analysis will be conducted. The analysis will make reference to changes in: mean, level, trend, variability, as well as point overlap; analysis is displayed in table 4.22.

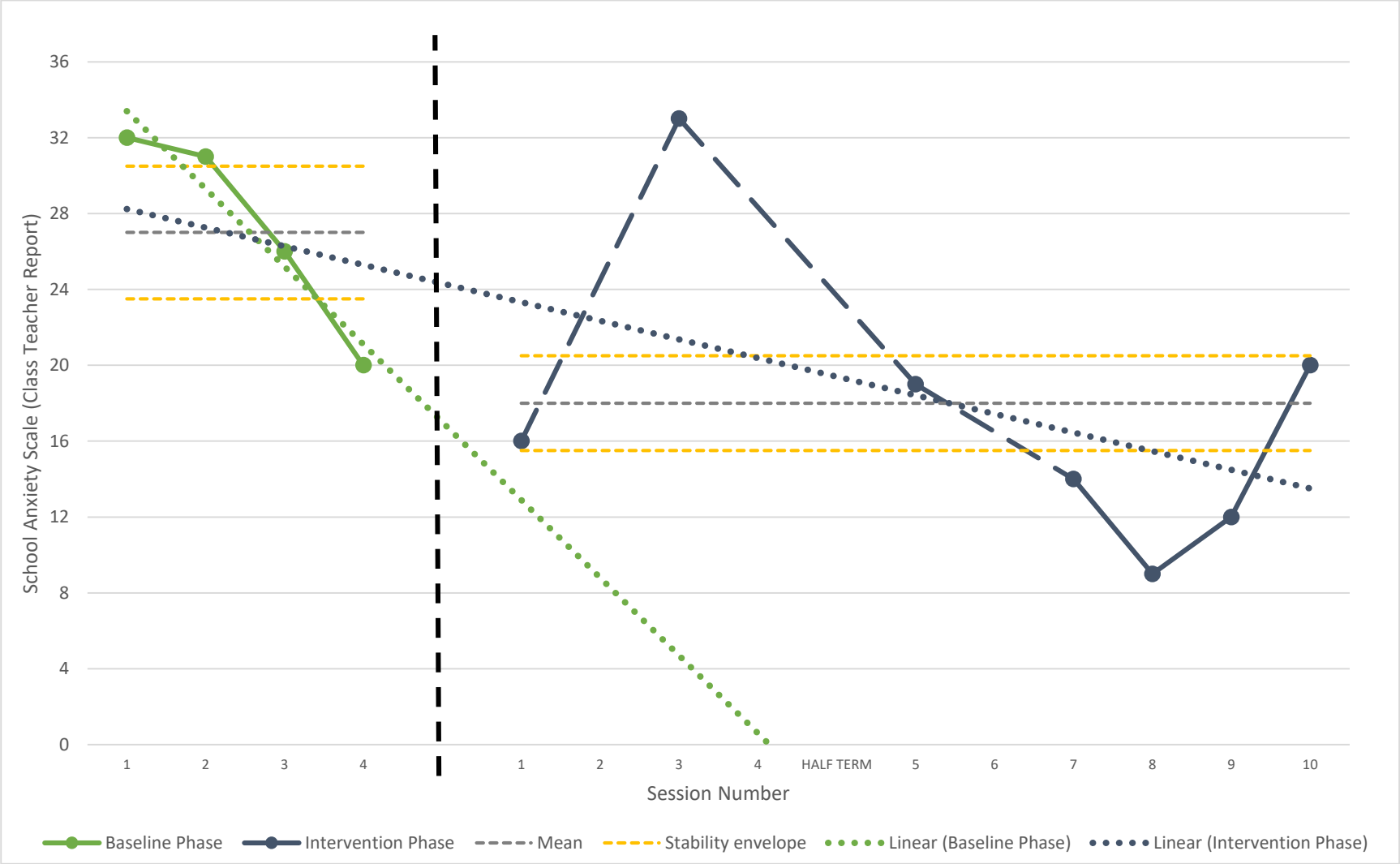


Figure 4-8 Nathan's teacher's weekly total SAS-TR scores collected during baseline and intervention phases

		Evaluation
Determine number of variables that changed between-condition		Only one variable changed from baseline to introduction of the intervention during the intervention condition.
Change in trend direction		No change from a decreasing trend in baseline to a decreasing trend during intervention
Change in trend stability		In the baseline phase there is a variable decelerating trend towards the therapeutic direction. Upon introduction of the intervention, there was a more stable decelerating trend in a therepeutic direction.
Evaluate level change between-conditions	Relative level change	-4 (decreasing)
	Absolute level change	-4 (decreasing)
	Median level change	-12.5 (decreasing)
	Mean level change	-9 (decreasing)
Calculate overlap of data between-conditions	Percentage of non-overlapping data (PND)	86%
	Percentage of overlapping data (POD)	14%

Table 4-22 Between-condition analysis of Nathan's teacher's SAS-TR scores collected during baseline and intervention phases considering trend, level and stability

The between-condition analysis of Nathan's teacher's SAS-TR scores show, that whilst there was no change in the trend direction following the introduction of the intervention, the stability of this trend was more stable.

The level change analysis indicates there was an overall decrease in reported anxiety following the introduction of the intervention.

Finally, the PND is higher than the POD highlighting that more scores were lower than the lowest baseline value.

Overall, this analysis suggests that Lego-based Therapy did have an impact on Nathan's teacher's report of Nathan's anxiety.

4.6.3.2 Summary of findings of Nathan's teacher's SAS-TR scores

The within and between-condition analyses both indicate that Nathan's teacher did report improvements in Nathan's level of anxiety following the introduction of Lego-based Therapy.

4.6.4 Principal research question

For children with social communication difficulties, does Lego-based Therapy have an effect on anxiety?

		Interpretation from analysis
Subsidiary Research Questions	**A.** For children with social communication difficulties, does Lego-based Therapy have an effect on a child's self-reported anxiety?	Tentative, yes
	B. For children with social communication difficulties, does Lego-based Therapy have an effect on a parent's report of their children's anxiety?	No
	C. For children with social communication difficulties, does Lego-based Therapy have an effect on a teacher's report of a child's anxiety?	Tentative, yes

Table 4-23 A summary of the quantitative analyses for the subsidiary research questions within Nathan's case-study

Table 4.23 shows two out of the three quantitative analyses indicate Lego-based does have some effect on anxiety. However, when triangulating the quantitative data analysis factors such as who reports on the child's behaviour, may be confounding variables on the size of its impact. Therefore, there is some tentative evidence to suggest that for children with social communication difficulties, like Nathan, Lego-based Therapy does have some effect on anxiety.

4.7 CROSS-CASE ANALYSIS

According to Yin (2009) when a multiple case-study design is used, the researcher should aim to draw out a cross-case conclusion through a cross-case analysis. Typically, a cross-case analysis will be the second level of analysis associated with the case-study approach. This analysis provides an opportunity for the researcher to mobilize knowledge and delineate a combination of factors present amongst the presented case-studies (Khan and VanWynsberghe, 2008). The aim of this analysis is to seek or construct an explanation about why the perceived effects of Lego-based Therapy of the three cases are similar or different from each other.

Whilst different approaches to cross-case analysis exist (see Khan and VanWynsberghe, 2008), a qualitative approach uses a visual display to showcase the similarities and difference across cases. A qualitative approach, using a visual display was employed to support a cross-case analysis (table 4.24).

Factors		Case-studies		
		Harry	**Joshua**	**Nathan**
Personal characteristics	Gender	Male	Male	Male
	Age at start of intervention	6years 6months	7years 4months	7years 9months
	Family demographic	Lives with parents and a younger sister	Lives with parents and a younger sister	Lives with parents and a younger sister
	School	One	Two	Two
	School year (Key stage; KS)	Year Two (KS1)	Year Three (KS2)	Year Three (KS2)
	Target behaviour for Lego-based Therapy	To be able to initiate conversation	To increase his confidence in being able to talk to others and being able to talk about how he is feeling	To increase confidence in social interactions
Presentation of anxiety before intervention	Anxiety-related behaviour	Stutters / ”jiffles” / looks nervous	Stammers / tells parents he is worried	Very quiet / nervous in large group
	Anxiety score pre intervention (child report, SCAS)	71	28	49
	Anxiety scores pre intervention (parent report, SCAS)	53	31	36
	Anxiety score pre intervention (teacher mean score, SAS)	30	10	27
Quantitative Research findings	Effect on child’s self-report?	Some positive effects reported	Some positive effects reported	Some positive effects reported
	Effect on Parental report?	No positive effect determine	No positive effect determine	No positive effect determine
	Effect on teacher’s report?	No positive effect determine	Some positive effects reported	Some positive effects reported

Table 4-24 Visual display of cross-case analysis on the impact of Lego-based Therapy

4.7.1 Cross-case conclusion

All three children were male, living at home with their parents and one younger sibling. Two of the children (Joshua and Nathan) were in Year 3, KS 2 and attending the same school, whereas Harry was in Year 2, KS 1 and attending a different school.

All three children were invited to participate in Lego-based Therapy by their schools, with the aim of improving their social skills. All three children, prior to Lego-based Therapy found it difficult to initiate and maintain social communication.

According to teacher, parental and child reports prior to the intervention, anxiety scores were elevated for all three children; Harry scored the highest across all measures, and Joshua scored the lowest across all measures.

Following the completion of Lego-based Therapy, analysis suggests Harry, Nathan and Joshua all reported, to some degree, decreases in their self-report of anxiety. Conversely, the parents of the three children reported no difference in their reports of their child's anxiety. Furthermore, only Joshua and Nathan's teachers reported decreases in the child's anxiety after Lego-based Therapy, but Harry's teacher did not.

This cross-case analysis has highlighted the following factors as warranting further exploration. These factors may help to construct a possible explanation, within the discussion, for the perceived effects of Lego-based Therapy on anxiety in children with social communication difficulties:

- Child perceptions of their own anxiety
- Parental perceptions of their child's anxiety
- Teacher perceptions of children's anxiety

4.8 QUALITATIVE DATA ANALYSIS

4.8.1 Subsidiary research question D

If positive changes were perceived, what within the Lego-based Therapy could have helped bring these about?

4.8.2 Content analysis of child interviews

4.8.2.1 Participation in interviews

Harry and Joshua participated in semi-structured interviews with the researcher. However, when Nathan was asked if he would like to participate in the interview by his teacher, Nathan declined, stating he did not want to talk about Lego or his feelings. Due to the ethical principle, "right to withdraw", Nathan did not participate. Therefore, only two transcripts were used in the analysis of the child's perceptions of Lego-based Therapy.

4.8.2.2 Summary of content analysis of child interviews

The content analysis of the children's interviews is presented in table 4.25.

Three categories emerged from the interviews with Harry and Joshua: 'Enjoyment of Lego club', 'Building Lego', and 'Resources'. Comments made regarding the 'Enjoyment of Lego Club' were referred to the most throughout the interview (n=17); see extracts *i* and *ii* in table 4.25.

Extracts *iii* and *iv* show that reference was made to building Lego throughout the interviews (n=11), Harry and Joshua both shared that being the builder during structured play was their favourite role (n=3).

Comments made about 'Resources' were made throughout both interviews (n=5). Harry and Joshua made positive comments about liking the different types of Lego® models and different Lego® pieces. Extract *v* shows that Harry particularly liked finding the dog Lego® piece and Joshua enjoyed building the Batman Lego® model (see extract vi).

Category	Codes	Frequency	Extract [location]
1. Enjoyment of the intervention	1.1 Enjoyed Lego Club 1.2 Would like to participate in Lego Club again 1.3 Happy face to show how Lego club made him feel 1.4 Liked getting better at describing pieces 1.5 Liked building with others 1.6 Liked making the models together	5 2 2 5 1 2	*i.* *I: And is there anything that you didn't like about Lego Club? [line 19]* *Harry: Oh, I didn't like ... when I went home [line 20]* *ii.* *I: … Is there anything else that you really liked about Lego Club? [line 21]* *Joshua: Ermmm… Describing it and building it together [line 22]*
	Total frequency	17	
2. Building Lego	2.1 Building Lego 2.2 Favourite role is builder 2.3 Like learning how to build 2.4 Would like to do more building	5 3 2 1	*iii.* *Harry: I liked the builder! [line 10]* *I: You liked the Builder and why did you like the Builder? can you tell me? [line 11]* *Harry: Oh, I like the building the bricks. [line 12]* *iv.* *I: What did you enjoy about it (Lego club)? [line 5]* *Joshua: Building [line 6]*
	Total frequency	11	
3. Resources	3.1 Liked looking for the different pieces 3.2 Liked the different models	2 3	*v.* *I: Is there anything that you enjoyed in the freestyle part? [line 13]* *Harry: Er, finding the erm the dorky…there's a doggy in the Lego [line 14]* *I: ahhhh, the dog, I see, did you like having the dog? [line 15]* *Harry: yeah! [line 16]* *vi.* *I: And what sort of things did you enjoy building? [line 31]* *Joshua: The last pack of the day [line 32]* *I: …. Was it Batman? [line 35]* *Joshua: I think so, yeah. [line 36]*
	Total frequency	5	

Table 4-25 Content analysis of the semi-structured interviews with Harry and Joshua

4.8.3 Content analysis for the facilitator interviews

Category	Codes	Frequency	Extracts [location]
1. Child's progress following Lego-based therapy	1.1 Talking more 1.2 More independent 1.3 Working with others 1.3 Looks more comfortable 1.5 Interacting with children and adults in group 1.6 Reported difference in class by 1:1 1.7 Reduced anxiety	16 1 2 1 7 1 5	*i.* *(about Harry) "when I first got introduced to Harry, I was told not to have any direct contact with him. I was told to go just be in his area and certainly don't ask him any questions, don't talk to him to start with, so to actually see him sat here with you, like that, it's amazing! [line 2]* *ii.* *(about Joshua) "I think he's lost his stutter a bit. Yes. He's just better, he used to stutter dreadfully, but now I haven't noticed it at all in his talking [line 2]* *iii.* *(about Joshua) "He seems much calmer" [line16]*
	Total frequency	**33**	
2. Positive Features of Lego-based therapy	2.1 Principles of Lego Club 2.2 Protected time for the children 2.3 Play-based 2.4 Non-formal 2.5 Time to practice 2.6 Structured section 2.7 Freestyle play to process skills 2.8 Different roles 2.9 It's fun 2.10 Makes children feel special	2 5 2 8 2 3 6 5 8 3	*iv.* *"It's the putting into practice with something that they think is fun. If you like, to a certain degree, it's a bit like going back to where they started in foundation where they did learning through play [Line 70; Harry's facilitator]* *v.* *"…it's fun…yeah…but it's very much like being in foundation for them, through play. They have no concept that they're learning" [line 20, Joshua's facilitator]* *vi.* *"…you can really see a new side to them. They feel more relaxed and they don't feel like they're being watched." [line 12, Nathan's facilitator]*
	Total frequency	**44**	

3. Skills developed through participation of Lego-based therapy	3.1 Cooperation 3.2 Listening 3.3 Social interaction with peers 3.4 Social approval 3.5 Patience 3.6 Regulating frustration 3.7 Confidence 3.8 Vocabulary	1 4 5 3 3 2 2 5	vii. *"Well obviously, you've got the cooperation, you've got the listening you've got… "[line 61, Harry's facilitator]* viii. *"So it's working together as a team and helping each other. I noticed they were singing together in that session; it was lovely…Yeah they are interacting better now. " [line 49, Nathan's facilitator]*
Total frequency		**25**	
4. Importance of group Dynamics	4.1 Getting the right children working together 4.2 Age of children 4.3 Personality	6 2 2	ix. *"when you've got challenging Behaviour as addition. You've got to be very very careful to balance and ensure that what they get out of the group doesn't actually impact negatively on the other ones in the group" [line 153, Harry's facilitator]*
Total frequency		**10**	
5. Improving Lego-based Therapy	5.1 Swapping roles around in the cycle 5.2 Swapping members between groups 5.3 Try a little and often approach	2 1 2	x. *"Whether you could interswap the group, but it's whether you then take away from that 10 weeks of building familiarity." [line 145, Harry's facilitator]* xi. *"…because once a week to him, for 40 minutes or however long, Is probably, for someone like Nathan, enough"[line 114, Nathan's facilitator]*
Total frequency		**5**	

Table 4-26 Content *analysis of the semi-structured interviews with the Lego-based Therapy facilitators*

4.8.3.1 Summary of content analysis of facilitator interviews

Table 4.26 displays five categories that emerged from the interviews with the Lego-based Therapy facilitators: 'child's progress'; 'positive features of Lego-based Therapy'; 'skills developed through Lego-based Therapy'; 'importance of group dynamics'; and, 'improving Lego-based Therapy'.

The category 'Positive features of Lego-based Therapy' had the highest frequency total (n=44). The most common codes referred to across all three interviews within this theme were: 'protected time for the children' (n=5), 'free-style play to process skills' (n=6), 'non-formal' (n=8) and, 'it's fun' (n=8). Extract *iv* in table 4.26 describes how the play-based nature of Lego-based Therapy had been attributed to how the children to learn new skills in a fun way.

Comments were made about the 'Child's progress' following Lego-based Therapy; the second most talked about theme. Reference to children 'Talking more' and having 'Reduced anxiety' as a result of the intervention was made regularly through the interviews; extracts *i* and *ii* capture these views. This analysis suggests, children make positive progress following Lego-based Therapy, and that this progress can be observed within social and emotional domains.

The content analysis revealed a wide range of skills the facilitators believed to be enhanced through participation in Lego-based Therapy, including: 'listening', 'vocabulary' and 'social interaction with peers'. Extract *viii* indicates that social interaction within the Lego groups became more spontaneous as the intervention progressed.

The category 'Importance of Group Dynamics' appeared 10 times across the interviews, comments were made regarding 'Getting the right children working together' (n=6), 'Age of children' (n=2) and 'Personality' (n=2). Extract *x* in table 4.26 infers children who display challenging behaviour can have a negative impact on group dynamics.

All three interviewees were able to reflect on ways of 'Improving Lego-based Therapy'. Codes included: 'Swapping roles around in the cycle', 'Swapping members between groups' and 'Try a little and often approach'. These ideas were often made in reference to why some children show greater progress than others; extract *xi* captures this view with specific reference to Nathan.

4.8.4 Summary of qualitative analysis

In response to subsidiary research question D, the content analyses from both the child and facilitator interviews suggest building Lego® is implicitly fun and enjoyable for the children. Simultaneously, the facilitators can see how the play-based and fun nature of building Lego® help to develop the children's social interaction skills. Furthermore, providing children with the time to develop and practice these skills outside of the classroom appears to increase their confidence; an increase in confidence may then be having some impact on the level of experienced anxiety.

For adults working with the children, when positive effects have not been perceived following participation in Lego-based Therapy, factors relating to group dynamics have been referred to.

The content analyses have been useful in elucidating possible explanations to explore further in the discussion (see chapter 5).

4.9 RELIABILITY MEASURES

4.9.1 Interrater agreement: Weighted Cohen's Kappa

The degree of agreement across the visual analysis as indicated by the weighted Cohen's kappa was kappa=0.77, ($p<.05$) indicating the agreement was not due to chance. A Kappa score of 0.77, according to Altman's (1991) interpretation scale, indicates a good level of agreement. This increases the reliability of the visual analysis judgements made by the researcher.

4.9.2 Lego-based Therapy: intervention fidelity and integrity checks

The researcher attended School One and Two three times at regular intervals during the 10-week delivery of the Lego-based Therapy. Using the fidelity checklist developed during the pilot phase, the researcher made comments on the environment, adult activity, child activity and task, during both the structured and free-style section of the intervention. After each fidelity check the researcher gave a score from 1-5 on the overall integrity of the intervention delivery, where 1=aims not met and 5=aims met extremely well. Table 4.27 displays analysis of this.

	Fidelity check	Rating score	Mean rating	Description
School One	One	4	**4.3**	**Aims met well**
	Two	5		
	Three	4		
School Two	One	4	**4.6**	**Aims met well**
	Two	5		
	Three	5		

Table 4-27 Analysis of the fidelity of Lego-based Therapy across school one and two

The fidelity checks reveal the integrity of the intervention was maintained across both schools; this increases the ability to draw inferences about the Lego-based Therapy's impact (Gutkin, 1993).

4.10 CHAPTER SUMMARY

The qualitative and quantitative approaches to analysis have been presented across all three case-studies. A systematic approach was adopted throughout to ensure a valid and reliable account of the numerical data. The analysis of data has provided some tentative evidence to suggest, for children with social communication difficulties, Lego-based Therapy does have some effect on their anxiety. The content analyses have been able to complement the quantitative analyses and provide insight into the possible mechanisms of the Lego-based Therapy. A discussion will now critically explore possible explanations behind these findings in order to guide the researcher towards a conclusion.

5 DISCUSSION

5.1 INTRODUCTION

The aim of this chapter is to consider this study's findings, presented in chapter four, with the theoretical and research literature presented within the literature review and methodology sections; chapters two and three respectively.

The discussion begins by exploring possible interpretations of the findings in relation to each research question, starting with the subsidiary questions and ending with the principal question. To support this process, each question will be interpreted systematically against each case-study; this will continue to complement the idiographic nature of the study's research design. This approach will allow the researcher to draw possible inferences and conclusions about Lego-based Therapy and its impact on anxiety in children with social communication difficulties.

A review of the chosen research design will then take place in order to assess the reliability and validity of conclusions. This will be followed by a consideration of the implications of the study, including implications for future research as well as for the Educational Psychology profession.

5.2 INTERPRETATION OF KEY FINDINGS RELATED TO EACH RESEARCH QUESTION

5.2.1 Subsidiary research question A

For children with social communication difficulties, does Lego-based Therapy have an effect on a child's self-reported anxiety?

5.2.1.1 Key findings

5.2.1.1.1 Pre- and Post- analysis

For all three participants raw scores taken before and after Lego-based Therapy indicated to some degree a decrease in self-reported anxiety scores. However, only two (Harry and Joshua) of the three participants displayed significant reductions in anxiety as indicated by the RCI calculation (Jacobson and Truax, 1991).

5.2.1.1.2 Visual analysis

Harry's mean PI-ED score was lower following the intervention, and the standard deviation was lower. The baseline was stable and indicated an already decelerating trend. The PND was higher than the POD, indicating Lego-based Therapy did have some effect on Harry's anxiety scores.

Joshua's mean PI-ED score was lower following the intervention, but the standard deviation was higher. The baseline was not stable and indicated an increasing trend. The PND was higher than the POD, indicating Lego-based Therapy did have some effect on Joshua's anxiety scores.

Nathan's mean PI-ED score was lower following the intervention, but the standard deviation was higher. The baseline was stable and indicated an increasing trend. The PND was higher than the POD, indicating Lego-based Therapy did have some effect on Nathan's anxiety scores.

5.2.1.2 Possible interpretation of findings using existing research literature

All three cases indicated, to some degree, a positive effect of Lego-based Therapy on the child's self-reported anxiety score. To the researcher's knowledge, previous studies have not explored the impact of Lego-based Therapy on a child's self-report of anxiety. However, the broader positive impact reported by children following Lego-based Therapy has been reflected in the research literature (Andras, 2012; Owens et al. 2008). Boyne (2014) found five out of six participants in her study reported an increase in their perceptions of their social skills. Although the dependent variables are different across studies, the results show that children report positive effects following their participation in Lego-based Therapy.

The finding that a social skills intervention can have a positive impact on a child's wellbeing, and more specifically their self-report of anxiety, has also been reported within the literature (Kuehnal et al., 2013; Laugeson et al., 2014; Schohl et al., 2014; Yoo et al., 2014; Loudon, 2008). However, key differences exist between the samples used in previous studies compared to the current study, this could raise questions about the validity of the outcomes observed here. For example, the children in the presented study were younger than those who were recruited in previous studies. Some researchers raise questions about the link between age and ability to accurately

report on one's own anxiety (Berg-Nielsen, Vika, and Dahl, 2003; Choudhury, Pimental, and Kendall, 2003; Dirks et al. 2012; Grills and Ollendick, 2003).

Becker et al. (2016) hypothesise that younger children may not have the self-awareness to recognise and accurately comment on their anxiety. However, Niditch and Varela (2011) disagree with Becker et al.'s (2006) view, suggesting younger children demonstrate higher reliability in self-report measures, since it is possible they are more willing to share their thoughts and feelings than older children.

This position is further complicated when looking specifically at the population of children with social communication difficulties, where it is observed that they can experience further difficulties in processing and sharing their own and other people's thoughts (Baron-Cohen et al., 1993; Castelli, 2005; Uljarevic and Hamilton, 2013; NHS, 2015). Schleismann and Gillis (2011) suggest self-reported measures of anxiety with children with Autism may be less reliable due to communication and cognitive difficulties that are characteristic of the diagnosis.

So, do the results of this study lack validity because of the age and characteristics of the participants? De Los Reyes et al. (2015) conducted a meta-analysis of informant agreement and age and reported a null effect. And, Ozsivadjian, Hibberd and Hollocks (2014) found children with social communication difficulties are able to accurately report their anxious cognitions. Therefore, it is possible the finding, Lego-based Therapy can positively effect a child's report of anxiety, can be tentatively supported.

Although data indicates a positive effect of Lego-based Therapy on children's anxiety, two of the children (Harry and Joshua) displayed a stable, decreasing trend in their anxiety scores prior to the intervention. This observation contradicts other research findings. According to Neil and Christensen (2009) it is not uncommon for anxiety scores to elevate when anxiety-related measures are given to children, because these measures raise conscious awareness of thoughts and feelings. Whilst this may have occurred for one of the children (Nathan), this did not appear to happen in the other two cases (Harry and Joshua). It could therefore be predicted that if the baseline phase was to be conducted over a longer period, Harry and Joshua's anxiety scores could have continued to decrease without the presence of the intervention, suggesting the presence of another variable.

Although in two of the cases there was already a decreasing trend prior to intervention, Lego-based Therapy did still continue to reduce their anxiety scores overall. One could tentatively hypothesise, using this finding, that Lego-based Therapy is able to, in some way, accelerate the development of particular social and/or emotional skills; skills which take longer for children with social communication difficulties to learn (Botting, Crutchley and Conti-Ramsden, 1998; Whitehouse, Watt, Line, and Bishop, 2009; Adams et al., 2012). Legoff and Sherman (2006) found that whilst statistically significant gains were observed across social behaviour measures in the control group, gains in the Lego-based Therapy group were greater. This may provide some support that Lego-based Therapy is able to accelerate the learning and development of children with social communication difficulties in a manner that can have some impact on their emotional well-being. However, further research is needed to explore this hypothesis.

5.2.2 Subsidiary research question B

For children with social communication difficulties, does Lego-based Therapy have an effect on a parent's report of their children's anxiety?

5.2.2.1 Key findings

Analysis of pre- and post- scores taken from parental reports of their child's anxiety revealed there were no significant reductions following the completion of Lego-based Therapy across all three case-studies.

5.2.2.2 Possible interpretation of findings using existing research literature

Parental scores taken pre-and-post Lego-based Therapy using the SCAS-parental version indicate, from the perspective of the parent, that Lego-based Therapy does not have an effect on their child's anxiety. Whilst literature within the existing evidence-base for Lego-based Therapy has also reported no significant changes in parental views on their child's development following the intervention (e.g. Owens et al., 2008), these evaluative studies did not use measures of anxiety as their dependent variable. Therefore, it is important to consider the research literature which explores social skills interventions in children's well-being, specifically in respect of anxiety, more closely.

The finding that Lego-based Therapy does not change parental report of their child's anxiety contradicts findings reported within research literature exploring social skills interventions on children's well-being. Beaumont et al. (2015) reported significant improvements in parent's scores of their child's anxiety in the experimental condition. Similar findings were also reported by Laugeson et al. (2011); Kuehnel et al. (2013); Schohl et al. (2014); Yoo et al. (2014); Laugeson et al. (2014); and, Lei et al. (2017).

One possible explanation to account for the difference may be that of parental involvement. Both Schohl et al. (2014) and Laugeson et al. (2012) evaluated interventions where parents were a part of the intervention. The presence of the parents may have confounded their findings because, if parents are involved in the intervention, there is increased risk of bias which could negatively affect the validity of the conclusions. The delivery of Lego-based Therapy in this current study did not involve parents; this could be viewed as a strength. The parents may have been less likely to display bias in their questionnaire responses and therefore parental reports indicating that their child's anxiety did not decrease may be more valid.

Whilst the finding that parental ratings did not change following Lego-based Therapy challenges previous research, researchers have acknowledged the disparity that occurs in parental reports of their child's anxiety. Literature indicates that parents report greater levels of emotional distress than children on self-report measures (Kazdin, Esveldt-Dawson, Unis and Ramcurello, 1983; Kazdin, French and Unis, 1983). Research also suggests this disagreement is higher for children who have internalising symptoms, like anxiety (Loeber et al., 1989). However, the evidence is mixed and more research is needed to explore this relationship in parents of children with social communication difficulties (Achenbach et al., 1987).

If parents do report higher levels of emotional distress than their children, this might be able to explain why the children in this study reported reduced levels of anxiety but their parents did not.

An alternative explanation for poor parent-child agreement comes from the idea that both informants may be assessing different constructs when they respond to a questionnaire. If the children in this study were conceptualising their anxiety differently to their parents it is likely that this will have led to a disparity in responses

(Nauta, 2005). The Attribution Bias Context (ABC) model by De Los Reyes and Kazdin (2005) offers a theoretical perspective to support this. It postulates that discrepancies are due to the unique perspectives the parent and child have on behaviour and the attributions they make about these behaviours. This could suggest the parents in this study made more, or different, attributions about the child's behaviour and anxiety compared to their children, resulting in higher accounts of anxiety.

5.2.3 Subsidiary research question C

For children with social communication difficulties, does Lego-based Therapy have an effect on a teacher's report of the child's anxiety?

5.2.3.1 Key findings

Harry's teacher's mean SAS-TR scores were higher following the intervention and the standard deviation was higher. The baseline was not stable and an already decreasing trend in the anxiety scores were observed. The POD was higher than the PND, indicating that Lego-based Therapy did not have an effect on Harry's teacher's report of Harry's anxiety.

Joshua's teacher's mean SAS-TR scores were lower following the intervention and the standard deviation was lower. The baseline was not stable and an already decreasing trend in the anxiety scores was observed. However, the PND was 100% indicating that Lego-based Therapy did have some effect on Joshua's teacher's report of Joshua's anxiety.

Nathan's teacher's mean SAS-TR scores were lower following the intervention, but the standard deviation was higher. The baseline was not stable and an already decreasing trend in the anxiety scores was observed. The PND was higher than the POD, indicating that Lego-based Therapy did have some effect on Nathan's teacher's report of Nathan's anxiety.

5.2.3.2 Possible interpretation of findings using existing research literature

Two out of the three case-studies provide some evidence to suggest, for children with social communication difficulties, that Lego-based Therapy can have a tentative positive impact on teacher's report of the child's anxiety (i.e. Joshua and Nathan). However, caution is needed when interpreting the extent of this finding.

Although five data points were collected during the baseline phase for one case study (Harry) and four data points for the other two (Gulliford, 2015), none of the baselines were stable. According to Kratochwill et al. (2010) a lack of stability in baseline makes it difficult to establish if changes which occurred during the intervention phases were due to the intervention or to a confounding or extraneous variable. This needs to be acknowledged when interpreting the findings here.

The positive effects of Lego-based Therapy reflected by two of the children's teachers' reports, agree with other Lego-based Therapy research. Boyne (2014) and Andras (2012) reported improvements in teacher reports across a range of social skills measures. Contradicting these findings, Cheng (2016) reported no significant differences across all social responsive measures based on teacher report. Whilst there is some agreement, that for children with social communication difficulties, Lego-based Therapy can improve teacher's perception of the child's social skills, none of the existing research literature explored anxiety as the dependent variable, as in the current study.

Changes in a teacher's report of a child's anxiety following a social skills intervention have been previously reported in the literature. Laugeson et al. (2012) found overall improvements in a range of social responsive measures, including anxiety and avoidance behaviours, following intervention. Similar findings were reported by Beaumont et al. (2016) who found significant improvements in teacher report measures following intervention on emotional regulation skills. The findings of these two studies are in agreement with the results of the present study.

For two of the cases (Joshua and Nathan), teacher report measures appear to show greater congruence with the child's rating compared to the parental ratings on child anxiety. Kolko and Kazdin (1993) also found that child-parent ratings displayed lower agreement than child-teacher, especially in internalising symptoms like anxiety, with parents reporting higher than both teacher and child; a finding also supported by Mesman and Koot (2000). Briggs-Gowan et al. (1996) also reported that parents are more likely to rate anxiety higher than teachers; a finding consistent with this study. A possible hypothesis to account for this difference may be related to the informant's level of anxiety. It is possible that a parent will experience a higher level of anxiety/worry themselves if they believe their child is experiencing emotional

distress than perhaps a teacher would. Becker et al. (2016) highlights parental psychopathology as a variable which can confound the correlation between child and parent report of anxiety.

Other research reports better agreement between adult informants than child and adult (Keogh, Juvonen and Bemheimer, 1989; Phares, Compas and Howell, 1989). This finding may explain the agreement in Harry's case, where both teacher and parent reported minimal change in Harry's anxiety following Lego-based Therapy. Whereas in Joshua's and Nathan's case, the discrepancies in ratings on anxiety may be accounted for by the different constructs and attributions held about the child's behaviour by different raters (Nauta, 2005; De Los Reyes and Kazdin, 2005).

Interestingly, a study by Mayes and Lockridge (2018) provides some evidence for poor agreement between parent and teacher when it comes to a child's Autism symptoms, therefore indicating that one perspective on its own could be misleading. This finding highlights the importance of considering all perspectives on the children's anxiety in this study before responding to the principal research question.

5.2.4 Subsidiary research question D

If positive changes were perceived, what within Lego-based Therapy could have helped bring these about?

5.2.4.1 Key findings

5.2.4.1.1 Children's views on Lego-based Therapy

Two of the three children, Harry and Joshua, agreed to participate in an interview with the researcher. Both children spoke positively about Lego-based Therapy, and commented on their enjoyment of it. Building the Lego® was referred to by both as something they liked about Lego-based Therapy.

5.2.4.1.2 Lego-based Therapy facilitator views on Lego-based Therapy

All three facilitators shared positive views on Lego-based Therapy, and its ability to nurture social and emotional skills in children with social communication difficulties. Reference was made to an increase in talking and a reduction in anxiety. Key to these views were comments made about the play-based and fun nature of the intervention. All three commented on how the more informal environment in which Lego-based Therapy is delivered contributes to the positive responses and development they see

in children. The structured approach of the Lego-based Therapy i.e. structured play followed by free-style, was referred to as being beneficial for the children who participate in Lego-based Therapy.

5.2.4.2 Possible interpretation of findings using existing research literature

Only two studies evaluating Lego-based Therapy have employed a mixed-method design to explore the views of Lego-based Therapy using interviews (Cheng, 2016; Brett, 2013). Similar to the findings in this study, Cheng (2016) found that themes relating to positive changes and enjoyment were noted by teaching assistants delivering the intervention. Brett (2013) carried out interviews with the children following Lego-based Therapy and also found that building Lego® was something that the children inherently enjoyed and which contributed to the fun of the intervention. To the researcher's knowledge, no other study has carried out interviews with both facilitators and children to gather views on Lego-based Therapy; a unique feature of the current study.

During the interviews, the facilitators commented on the broad skills the children developed through their participation in Lego-based Therapy. Many of the skills were linked to social development. The perception that the children showed an increase in their verbal communication following intervention is supported by Murdock et al. (2007). They identified verbal initiation and response, along with nonverbal communication and joint attention, as four behaviours which are commonly fostered in social skills interventions.

The facilitators attributed the informal and relaxed environment to the development of the social and emotional skills. The facilitators commented on the children bonding during the Lego-based Therapy. Kohler et al. (2001) also found that when the environment is more naturalistic, more spontaneous interactions were likely to occur resulting in positive reinforcement from peers.

The fun and play-based nature of Lego-based Therapy reported by the children and facilitators in this study were two of the motivating reasons that led LeGoff (2014) to create Lego-based Therapy. It is frequently reported that children who have difficulties with social communication do not experience enjoyment in social interactions and consequently struggle to engage in social situations (LeGoff et al., 2014). Therefore, interventions which build on the interests of children are believed

to be more impactful (Delprato, 2001; Attwood, 1998). The rationale for developing Lego-based Therapy and the observations made about child enjoyment in this study are congruent.

The positive reflections shared regarding the systematic approach of Lego-based Therapy has also been supported by other researchers, including Attwood (1998). A common behaviour seen in children with social communication difficulties is their preference for routine and predictability. Lego® building offers the predictability this population like (Baron-Cohen, 2006; Baron-Cohen et al., 2003).

Comments made about the overall progress following Lego-based Therapy referenced the children talking more and appearing less anxious. According to developmental models of anxiety in children with social communication difficulties, like the 'Transactional Developmental Pathways model' by Vasey and Dadd (2001), social anxiety develops through an interaction between experiences of social difficulties and withdrawal behaviours. Withdrawal behaviours act as negative reinforcement where avoidance strategies are maintained over time, leading to more anxiety and more difficulties with social communication. It could be hypothesised, using the findings observed in this study, that Lego-based Therapy may disrupt negative interactions by providing opportunities to experience success in social interactions.

Whilst there is some tentative support for this hypothesis, some may argue that this position is oversimplified. Children with social communication difficulties are a heterogeneous group (Baron-Cohen et al., 2009), and some position the interaction between social communication difficulties and anxiety as being far more complex (Chang, Quan and Wood, 2012; Wood and Gadow, 2010;). Bellini (2006) highlights a range of predisposing and protective factors that correlate with the development of anxiety in children with social communication difficulties.

Since this research employed a small sample size and did not employ an independent groups design, it is difficult to determine whether there was something specific to Lego-based Therapy that led to any positive changes, or whether it was due to another extraneous variable. Interestingly, LeGoff and Sherman (2009) found positive changes in a non-Lego-based Therapy group highlighting that protected time to

nurture social competence, can still lead to positive progress. Moving forward it will be important for research to explore and disentangle this further.

5.2.5 Principal research question

For children with social communication difficulties, does Lego-based Therapy have an effect on anxiety?

5.2.5.1 Key findings

5.2.5.1.1 Quantitative analysis

Across the three case-studies there is tentative evidence from the children's pre- and post-scores and visual analysis, along with the teacher reports, that Lego-based Therapy is able to reduce levels of anxiety experienced by children with social communication difficulties. However, parental reports provide contradictory evidence, since none of the analyses revealed a reliable change from pre-to-post scores.

5.2.5.1.2 Qualitative analysis

From the three interviews conducted with the Lego-based Therapy facilitators, and two with the children, positive effects were reported across the interviews. The children reported enjoyment of the intervention, and the facilitators commented on the positive progress made and skills nurtured through participation in Lego-based Therapy.

5.2.5.2 Possible interpretation of findings using existing research literature

Triangulating the data, positive effects of Lego-based Therapy are consistent with the existing evidence-base for this intervention (LeGoff, 2004; LeGoff and Sherman, 2006; Owens et al., 2008; Andras, 2012; Brett, 2013; Boyne, 2014, Cheng, 2016).

The positive effects of the intervention were present even though the intervention was delivered over a relatively shorter time frame (10 weeks) compared to other's research (Owens et al., 2008; LeGoff, 2004; LeGoff and Sherman, 2006). The positive, although tentative, effects observed over such a short amount of time should therefore be noted. However, it is important to highlight the variety of research designs employed and different settings used within the current evidence-base, and how each encompass their own limitations. Therefore, the ability to generalise

conclusions about Lego-based Therapy's impact across studies, including this study, is limited.

Despite LeGoff et al.'s (2014) assertion that Lego-based Therapy may be helpful for children with anxiety, no previous study has, to the researcher's knowledge, evaluated this claim. This study is the first to have a dependent variable focusing on child anxiety; other researchers employed measures concerning subsets of social development. The different target behaviours again make it difficult to conclusively state that this study's findings are supportive of previous findings. Therefore, it is important to compare with other intervention studies with a similar objective.

The ability of a social skills intervention to have a positive impact on anxiety has been reported prior to this study (Shohl et al., 2014; Yoo et al., 2014; Kuehnal, 2013, Laugeson et al., 2014; Beaumont et al., 2016; Laugeson et al., 2014; Tse et al., 2007; Loudon, 2008; Lei et al., 2017). Although research designs varied from the current study's design they were all, to some degree, experimental allowing for some causation to be established between the intervention and anxiety.

This study employed three different perspectives to explore the impact of Lego-based Therapy on anxiety; child, parent and teacher. A similar approach was adopted by five previous studies (Loudon, 2008; Laugeson et al., 2012; Shohl et al., 2014; Laugeson et al., 2014; Beaumont et al., 2016). Whilst some may argue that the disparities in the reports held by parent, teachers and child on the child's anxiety undermine the reliability of this study's findings (Kolko and Kazdin, 1993; Becker et al., 2016). Other researchers agree that collecting the views of parents, teachers and the child offer a more holistic view of anxiety (Nauta et al., 2004). Therefore, one can maintain that the triangulation of views in this study actually offers a more reliable and valid perspective of Lego-based Therapy compared to what would have been achieved by adopting one view alone. Furthermore, Mayes and Lockridge (2018) conclude that combining different perspectives facilitates an ecologically valid insight into presentation of anxiety.

Unlike previous research, this study is the first to employ qualitative methods that explicitly explored the potential mechanisms of Lego-based Therapy. Whilst previous researchers have speculated on what the mechanisms for success are (e.g. LeGoff and Sherman, 2006) this study has been able to elucidate meaning from first-

hand experiences of Lego-based Therapy (Vygotsky, 1987; Wildeman, 1990; Seidman, 2006; Ferrarotti, 1981). The interviews revealed factors which the children and facilitators perceived to be important mechanisms for Lego-based Therapy's success. The fun and informal, yet structured nature of Lego-based Therapy seemed to correlate with the enjoyment experienced by the children, as well as the development of their social and emotional skills.

5.2.6 Summary of discussion

A critical discussion has taken place using the current study's findings along with the existing research literature. A range of possible explanations has been offered in relation to each research question to establish the impact of Lego-based Therapy on the anxiety experienced by children with social communication difficulties. Table 5.1 displays the outcome of the critical discussion and its implication for each hypothesis.

	Research Hypothesis	Outcome
Primary Research hypotheses	**For children with social communication difficulties, Lego-based Therapy does have an effect on anxiety**	**Tentative evidence to support hypothesis**
Subsidiary Research Hypotheses	For children with social communication difficulties, Lego-based Therapy does have an effect on a child's self-reported anxiety	Tentative evidence to support hypothesis
	For children with social communication difficulties, Lego-based Therapy does have an effect on a parent's report of their child's anxiety	Evidence to infer this hypothesis can be refuted
	For children with social communication difficulties, Lego-based Therapy does have an effect on a teacher's report of the child's anxiety	Tentative evidence to support hypothesis

Table 5-1 Summary of hypothesis outcomes following discussion

Throughout the discussion, the author has highlighted unique contributions of this study to the evidence-base for, not only Lego-based Therapy, but also the impact social skills interventions can have on the anxiety experienced by children with social communication difficulties.

5.3 REVIEW OF METHODS

The discussion will now move on to a review of the methodology and methods employed in this study. A critical account, considering strengths and limitations, will be presented with close consideration of the threats to validity and reliability that were

discussed in section 3.10; and how, now that the study has ended, they are perceived to have impacted on the trustworthiness of the findings and conclusions.

5.3.1 Research design

5.3.1.1 Pragmatic paradigm

The researcher adopted the pragmatic paradigm in order to respond to the research questions. The researcher argued in section 3.4.1 that a pragmatic approach to this research was most appropriate due to its ability to not only establish some causality between Lego-based Therapy and its effects, but also account for the "inter-individual differences" observed within the target population of the study; children with social communication difficulties (Gulliford, 2015, p.41).

The pragmatic paradigm, unlike other dominant paradigms in educational and psychological research, values mixed-method design. Employing the mixed-method design enabled the researcher to determine the most appropriate way to respond to the subsidiary and principal research questions (Saunders et al., 2009).

The current study explored an unresearched area of Lego-based Therapy's evidence-base and the pragmatic paradigm facilitated this through the adoption of a mixed-method approach. Such an approach has helped to provide a comprehensive understanding of Lego-based Therapy's broader impact (Creswell and Clark, 2011; Morse and Niehaus, 2009). The mixed-method approach not only allowed the researcher to explore the question 'does it work?' through the use of quantitative methods, but also explore the 'what works?' through qualitative methods. The pragmatic and mixed-method approach to this research has facilitated a rich account of Lego-based Therapy and its impact on anxiety experienced by children with social communication difficulties. This was a position facilitated by Johnson and Onwuegbuzie (2014) regarding the benefits of employing a mixed-method design.

5.3.1.2 Case-study

The nature of the research questions led to the researcher's decision to employ a multiple-embedded case-study design. The three case-studies in this study were conducted within the context of two mainstream primary schools. The case-study approach allowed the researcher to acknowledge the limited control over variables,

whilst still being able to offer a fascinating account of Lego-based Therapy within a real life context; a view advocated by Yin (2003).

Originally, the researcher aimed to recruit 6 case-studies, but due to factors outside of the researcher's control, the study ended with three. Whilst more case-studies would have provided the researcher with more data upon which to form conclusions, Herriot and Firestone (1983) and Yin (2003) still support the usefulness of three cases in being able to provide a compelling account. The presence of three cases still allowed for a cross-case analysis. This supported the criticality of the researcher and provided a foundation to draw out possible discussions and explanations for the findings (Willig, 2013; Creswell, 2007; Yin, 2009). However, it was acknowledged that whilst cross-case conclusions could be tentatively established, the ability to generalise any conclusions beyond this study would be restricted.

The aim of this study was to evaluate the effectiveness of Lego-based Therapy, therefore an embedded case-study design was selected over a holistic case-study; embedded case-studies are popular in evaluative research (McClintock, 1985; Yin 2003). An embedded case-study design complemented the research paradigm and methodology as it allowed the researcher to employ both quantitative and qualitative data collection methods (Sandelowski, 2011).

5.3.1.2.1 AB SCED

An AB single-case experimental design (SCED) was the chosen quantitative method to be embedded within the case-studies (see section 3.6.2). The researcher acknowledged that children with social communication difficulties are not a homogeneous group and therefore selecting a quantitative method which accounted for this variability was important. SCEDs were deemed by the researcher as the most appropriate method, due to its idiographic approach and its ability to establish causation at the individual level; a view supported by Barlow, Nock and Hersen (2009).

An AB design was used over an ABA/ABAB design in this study due to the researcher's view, and hope, that any positive effects observed during the intervention would not return to baseline levels following Lego-based Therapy (Sindelar et al., 1985; Winn et al., 2004). This was further supported by concerns, that removing an intervention from a child would be unethical, especially if Lego-based Therapy was

having a positive effect (Kazdin, 1980). Because the SCED data indicated that positive effects were occurring during the intervention phase for all three participants, the selection of the AB design over other designs can be justified. However, the researcher continues to recognise that the AB design does impact on the internal validity. It is difficult to infer if it was the intervention that led to the positive effects or another variable occurring simultaneously (Kratochwill et al., 2010).

Threats to internal validity may have also arisen from history and maturation effects. Whilst the researcher made attempts to reduce such threats. For example, the inclusion criteria stating that a child must not have been a part of another targeted intervention for their social or emotional development. It was not possible for the researcher to control the effects of other changes or natural maturation in the child's life during the study. The researcher also acknowledges that any positive effects following Lego-based Therapy could be accounted for by other factors, such as the Hawthorne effect (Landsberger, 1958). These additional threats to the internal validity of SCEDs must be considered when formulating conclusions.

5.3.1.2.2 Semi-structured interviews

The second unit of analysis within the case-studies was semi-structured interviews to provide the researcher with qualitative data (see section 3.6.3). The aim of the qualitative data was to help contextualise the changes that occurred following the completion of Lego-based Therapy.

Five interviews were conducted in total, three with the facilitators and two with the children. The semi-structured nature of the interviews facilitated an opportunity to build rapport with the interviewees and allowed each interviewee to open up and offer insight into their individual perspectives on Lego-based Therapy (Pathak and Intratat, 2016). However, it is possible that the semi-structured nature in some way restricted the interviewee's thinking, it is possible more naturalistic methods to interviews could have reduced bias, increased validity, and even generated more information that could have been relevant to the analysis (Joffe, 2012).

Due to the inherent difficulties and age of the children in each case-study, the researcher adapted the language used in each interview and employed visual aids to support each child's thinking and communication. However, with the researcher as the interviewer, and being an unknown adult to the child, it could have been even

more difficult for the child to open up. Researchers, such as Laenen (2009) recommend that staff should be used where possible to within the research. This is something to consider for future studies. Despite adaptations, the researcher recognises the limitations that are encountered when carrying out interviews with young children.

5.3.2 Data collection measures: defining and measuring Anxiety

This study employed measures exploring different constructs of anxiety. It is therefore important to explore possible threats to validity and reliability that have been incurred within the selected data collection measures.

There has already been discussion concerning the discrepancies that can occur between the reports of different informants concerning child anxiety (refer to section 5.2.1, 5.2.2 and 5.2.3). The focus of this section, therefore, is to review the selected measures and how the researcher attempted to manage issues with validity and reliability.

5.3.2.1 Child self-report

5.3.2.1.1 Pre- and post- measure: Spence Children's Anxiety Scale (SCAS)

The SCAS (Spence, 1994) is a newer behaviour rating which has been able to address some of the shortcomings of earlier anxiety measures (Whiteside and Brown, 2008). Research has also reported good internal validity and reliability across a range of samples (Spence, Barrett and Turner, 2003; Wang et al., 2016; Orgiles et al., 2011). However, the language used within the questionnaire uses American phrasing, and despite support from teachers to translate the words, there was not always a direct translation. Furthermore, the questionnaire involves 45 items, and it is possible that the children got tired or bored during it. Both of these factors pose possible threats to the internal validity of questionnaire outcomes.

5.3.2.1.2 Repeated measure: Paediatric index for emotional distress (PI-ED)

The PI-ED (O'Connor et al., 2010) was selected as the repeated measure during the SCED. Whilst the researcher explored other measures, the PI-ED appeared to be the most child-friendly. It was the simplest to understand and quickest to complete, as well as being psychometrically robust (O'Connor et al., 2016). The researcher hoped this would increase validity because the children would be more likely to engage with

the questionnaire. However, the researcher recognises that the PI-ED involves constructs of both anxiety and depression, therefore only 7 of the 16 items provided data specific to anxiety, which could impact on the validity of findings.

5.3.2.2 Parental report measure: Spence Children's Anxiety Scale, parent version (SCAS-P)

The SCAS-P (Spence, 2000) was used to allow for comparison with the SCAS, child version. It was hoped by using both versions that this would provide a more holistic and reliable overview of any changes that might have occurred to the child's anxiety following Lego-based Therapy (Nauta et al., 2004; Kolko and Kazdin, 1993; Mayes and Lockridge, 2018).

The SCAS-P was used because, not only did research support its validity and reliability in measuring child anxiety (Whiteside and Brown, 2008; Essau, 2003), it had practical benefits too (Nauta, 2005). Compared to other measures, the SCAS-P was shorter and therefore quicker for parents to complete, the researcher considers that this successfully facilitated the completion of the questionnaires.

However, the validity of SCAS-P could have been compromised in this study. The researcher did not take into account the parent's level of anxiety when completing the questionnaire; research has shown that caregiver stress and anxiety levels can compromise validity measures (Ooi et al., 2016). Future research could obtain data on this in order to reduce this threat.

5.3.2.3 Teacher report measure: School Anxiety Scale- Teacher report (SAS-TR)

It was important that the researcher selected a measure that the children's teachers could complete quickly on weekly basis. The SAS-TR involved 16 questions and research indicated its validity and reliability (Sariçam and Çetintaş, 2015; Lyneham et al., 2005). Although efforts were made to increase the convenience of the weekly measure, across all three cases there were missing data points which will have had an impact on the sensitivity of the findings. Missing data points reflects the challenges that exist within real world research (Jensen, Hoagwood and Trickett, 1999; Frederickson, 2002; Spring, 2007; Cline, Gulliford and Birch, 2015; Robson and McCarten, 2016).

5.3.3 Intervention

5.3.3.1 Delivery

Delivery of Lego-based Therapy was similar across the three case-studies. Each school utilised one teaching assistant to deliver the intervention to 6 children across a period of 10 weeks, beginning in September 2018 and ending in December 2018.

The two schools recruited in the study were both trained by the same Local Authority, following guidance from LeGoff (2014); this supported the fidelity and reliability in the intervention delivery. However, Lego-based Therapy is not manualised which poses a significant threat to the study's internal validity, although fidelity checks were conducted as a way to negate some of the researcher's concerns.

5.3.3.2 Integrity

Using information from LeGoff (2014) a fidelity measure was used to assess intervention integrity, and the objectives of the intervention were met well. However, the researcher's involvement introduces potential bias which may undermine these checks. It is possible, due to the researcher's investment in the research, *that* confirmation bias could have occurred. Future research should look to employ an independent observer in order to minimise opportunity for confirmation bias and increase integrity and therefore validity. Future research could to look to employ an independent observer to minimise opportunity for confirmation bias and so increase integrity and therefore validity.

5.3.4 Data analysis

5.3.4.1 Pre- and post- data analysis

Using a multiple-embedded case-study design in the current study meant establishing causation of Lego-based Therapy was challenging. However, in an attempt to increase the internal validity of analysis, the researcher calculated the RCI (Jacobson and Truax, 1991) with the pre- and post-scores for each child and parent. Using the RCI reduced the chance of type one error. Whilst limitations of this method are acknowledged (see section 4.2.1), the researcher found the RCI to be the most useful for detecting practical and significant change at the individual level. Furthermore, the results from this analysis were used in conjunction with other analyses, increasing the reliability and validity.

5.3.4.2 Visual analysis

There is not a standardised approach to visual analysis of SCED data reflected by the different approaches offered by researchers (Manolov, Gast, Perdices and Evans, 2014; Manolov and Moeyaert, 2017). In order to increase the validity of the analysis in this study, Lane and Gast's (2014) approach, considering both within and between-condition data, was employed. By employing a systematic approach to the visual analysis in this study a more objective interpretation was facilitated.

To reduce the chance of 'autocorrelation' in the analysis of the SCED data it was important that an effect size calculation was conducted (see section 4.2.2.2). 'Percentage of non-overlapping data indices' was selected (Manolov and Solanas, 2008). This method not only offered practical convenience, it also complemented and increased the reliability of the visual analysis (Parker et al., 2011). However, it is possible another effect size calculation would have increased the reliability further, as well as reducing autocorrelation. According to Brossart et al. (2014), Tau-U is better at performing non-parametric analysis in single-case data than other methods. Future research could look to employ more sensitive statistical methods to increase the reliability of single-case design analysis.

Another key threat to the reliability of the visual analysis was the lack of stability in one of the child's baselines and in all three of the teacher baselines (Brossart et al., 2006). The researcher aimed to collect five baseline data points in this study in an attempt to achieve stability (Gulliford, 2015). In the end only one case study achieved this (Harry) and the other two were only able to gather four; the researcher recognises this as a limitation. Even with five data points collected, stability was not always achieved which compromises the internal validity of the analysis (Kratochwill et al., 2010). Furthermore, in order to collect the baseline data points without delaying the start of Lego-based Therapy, a view the researcher deemed unethical, some data points were collected before the summer holiday and some collected after. Delay in collecting the points may have contributed to the instability observed in some of the baselines. However, according to Barlow et al. (2009) it is common to observe variable baselines in applied research due to the complex context in which the research is conducted.

5.3.4.3 Qualitative analysis

The researcher employed a systematic approach to the content analysis for the semi-structured interviews (see section 4.2.3 for description) supported by literature (Forman and Damschroder, 2008; Elo and Kyngäs, 2007). Using a structured approach helped to increase the content validity of the qualitative analysis by removing ambiguity in how categories were derived.

Furthermore, once the interviews were transcribed anonymised scripts were shared with a colleague, who was independent of the research, to consider the data and see if there was agreement in the codes and categories identified; it was hoped this would further increase the validity of the analysis. However, despite efforts of the researcher to reduce bias in this process, personal investment in the study means this would have been almost impossible to avoid. Future research may look to explore the use of IT in the content analysis in order to minimise these threats (Forman and Damschroder, 2008).

5.3.5 Summary of method review

The methodology and methods employed in this study have been reviewed through a critical lens, and thorough consideration has been given to a range of variables which may have adversely affected the intervention, as well as the validity and reliability of the findings and analysis. Although suggestions for future research have been indicated in this section, the next section will turn to the wider implications of this study, including for the Educational Psychology profession.

5.4 IMPLICATIONS OF RESEARCH

5.4.1 Implications of findings

This section will consider the implications of the current study's findings on the key stakeholders.

5.4.1.1 For children with social communication difficulties, their families and schools

Four in ten children are predicted to have a social communication difficulty; some will have a formal diagnosis and others will not (Baron-Cohen et al., 2009). Of these children, it is estimated up to 84% will experience high levels of anxiety which will impede their ability to make progress socially and academically (White et al., 2010;

Adams et al., 2012; Botting et al., 1998; Whitehouse et al., 2009). With such alarming statistics, this study was motivated to contribute to the evidence-base for a school-based intervention, Lego-based therapy, and its potential to impact on the anxiety experienced by primary school-aged children with social communication difficulties.

Whilst other studies have evaluated the impact of social skills interventions on anxiety levels, these studies have focused on secondary school-aged children (Shohl et al., 2014; Yoo et al., 2014; Kuehnal, 2013, Laugeson et al., 2014; Beaumont et al., 2016; Laugeson et al., 2014; Tse et al., 2007; Loudon, 2008; Lei et al., 2017). With an emphasis on preventative approaches for social, emotional and mental health in the SEND Code of Practice (DfEE, 2014), a study which looked specifically at primary school-aged children would offer value to children and their families.

The evidence-base for Lego-based Therapy is developing and shows some promising findings for children with social communication difficulties. However, to the knowledge of the researcher, no studies have yet explored its impact on anxiety. Therefore, the findings of this study are unique. This study has been able to provide some tentative evidence that, for primary school-aged children with social communication difficulties, Lego-based Therapy does reduce the anxiety experienced by the child. Although only three case-studies were used in this study, the findings are encouraging. This study highlights that a fun and enjoyable intervention is able to have a wider impact on a child's development; not just socially but emotionally too.

Furthermore, very few researchers have gathered the views of a range of key stakeholders e.g. the child, parent and teacher. This meant that a wider perspective of an intervention's effectiveness was not supported. This study combined the views of all three stakeholders in order to establish Lego-based Therapy's effectiveness.

Because very few studies had been conducted outside of a clinical setting, there was a need to gauge how effective an intervention could be in a school setting, something this study explored. With such high numbers of children experiencing difficulties with their well-being (Care Quality Commission, 2017), along with an under-resourced CAMHS (YoungMinds, 2017); an intervention which is relatively low cost and that can easily be carried out within the school context is appealing and offers hope to children, their families and schools.

5.4.2 Implications for future research

As stated, some recommendations for future research have been indicated in section 5.3. This section will present these suggestions with greater clarity and consideration.

5.4.2.1 *Adaptations to design*

Although the researcher was able to justify the use of case-studies, future researchers may wish to explore more rigorous group designs such as quasi-experimental trials and RCTs (Scott, Shaw and Joughin, 2001). Adopting such designs will increase the internal and external validity of Lego-based Therapy's evidence-base.

5.4.2.2 *Use of statistical measures in visual analysis*

To improve the reliability of visual analysis, more sensitive approaches to SCED analysis could be conducted through the use of statistical methods. Tau-U, as a calculation of effect size, is reported to decrease the chance of autocorrelation and is a more sensitive approach than 'percentage of non-overlapping data' (Brossart et al., 2014).

5.4.2.3 *Researcher involvement*

Although attempts were made to decrease effects of researcher bias, the involvement of the researcher throughout the study meant effects such as confirmation bias were inevitable. The researcher has highlighted the following areas future research could explore to further minimise these effects: use of an independent observer to carry out fidelity checks and use of IT programmes during the content analysis. More independent and objective approaches in both the data collection and qualitative analysis would decrease instances of confirmation bias.

5.4.2.4 *Maintenance of scores*

Lack of follow-up measures in this study meant that it is not known whether any of the perceived changes made following Lego-based Therapy were maintained after the intervention had finished. This is something future research should endeavour to do.

5.4.2.5 *Further questions to explore*

This study was the first to explore Lego-based Therapy's impact on anxiety experienced by primary-school aged children with social communication difficulties. Whilst more research is needed to explore this question further, there is also a need

to explore it within the context of other samples, for example, secondary school-aged children and children in specialist provision with social communication difficulties. Furthermore, as the evidence-base for Lego-based Therapy evolves, it will be fascinating to explore its impact on typically developed children, and whether it can have positive effects on their well-being too.

5.4.3 Implications for the Educational Psychology profession

This study hoped to contribute to the evidence-base for interventions that support children with social communication difficulties. Evidence-based practice (EBP) has been described in sections 3.2 and 3.3 where its position in Educational Psychologist (EP) practice is highlighted and emphasised (Burnham, 2013).

The current study has drawn upon key theoretical and research frameworks in psychology and applied it to a relevant and important area within education; intervention.

According to the SEND Code of Practice (DfEE, 2014), EPs play an important role in supporting a school's selection of an appropriate intervention. The following questions should guide EP decision making: "what works?" "for whom?" and "why?" (Frederickson, 2002; Stoiber and Waas, 2002; Spring, 2007; Hattie, 2008; Lilienfeld et al., 2013). The findings of the present study have gone some way to provide tentative answers to these questions with regards to Lego-based Therapy and its impact on anxiety in children with social communication difficulties.

Whilst the findings of this study are promising, the evaluation of Lego-based Therapy's impact on anxiety is still in its infancy. Therefore, the researcher would recommend that EPs interpret the findings with caution, using them as a guide when working with children who have social communication difficulties and who are anxious.

This research has highlighted the accessibility and practicality of delivering Lego-based Therapy in schools. This is likely to appeal to teachers and is something EPs can draw upon when planning with schools (Stoiber and Waas, 2002; Wagner, 2002).

Furthermore, the use of an embedded SCED within each case-study enabled the schools and researcher to evaluate changes following the Lego-based Therapy for each individual (Barlow and Nock, 2009). The idiographic nature of this approach

highlights the potential utility of SCEDS in helping EPs evaluate a child's progress during individual casework.

Finally, this study has also highlighted the disparity in reports of a child's anxiety from three perspectives: child, teacher and parent; a finding supported by previous research (Nauta et al., 2004). Whilst the different views contributed to the mixed results in this study, each view is still important and tell us something about the nature of a child's anxiety; a position supported by Mayes and Lockridge (2018). These findings should continue to encourage an interactionist and holistic approach in EP practice, where perspectives of all key stakeholders are triangulated in the decision making for children. This is a conclusion which continues to support the integrative and inclusive approach championed within the SEND Code of Practice (DfEE, 2014).

6 CONCLUSION

This final section summarises the main findings reported in this thesis, presenting distinctive contributions of the research to theory and practice.

6.1 MAIN FINDINGS

This study evaluated the impact of Lego-based Therapy on the anxiety experienced by primary school-aged children with social communication difficulties. To respond to the research questions, a pragmatic research paradigm was adopted leading to a mixed-method approach, where three embedded case-studies were employed.

Quantitative analysis from embedded SCEDs and pre-and-post analysis indicated that, according to all three children, Lego-based Therapy does have some tentative, positive effects on their reported anxiety, a similar finding was also reported by two of the three teachers. However, the pre-and-post analysis of scores from the child's parents indicated that Lego-based Therapy did not have an effect on their child's anxiety.

The qualitative analysis revealed that Lego-based Therapy is fun and appealing to the target population. It appears to work by engaging children through the medium of Lego® building, whilst using the structured and predictable nature of Lego® to allow children to experience success in their social interactions with peers. The researcher has hypothesised that the experience of successful interactions appears to positively reinforce social engagement, which subsequently impacts on levels of anxiety.

Triangulating the data, it appears that Lego-based Therapy can have an impact on the anxiety experienced by primary school-aged children with social communication difficulties. However, when considering this conclusion, several key limitations to the study's design and implementation must be acknowledged. Particularly relevant to this study was the lack of stability in SCED baselines and a lack of follow-up measures, both of which have implications to the study's internal validity. Furthermore, the employment of a case-study design means that any attempt to generalise findings must be done so cautiously.

Despite the study's limitations, this study showcases the potentially positive effects Lego-based Therapy can have on a child with social communication difficulties' anxiety. The promising findings of this study warrant future exploration.

6.2 UNIQUE CONTRIBUTIONS

This study has described an evaluation of the Lego-based Therapy intervention; its findings have contributed to two evidence-bases.

The first, is the evidence-base for the capacity of social skills intervention to positively impact on anxiety in children with social communication difficulties. This study has provided initial findings that Lego-based Therapy, as a social skills intervention, can have a wider impact on the emotional wellbeing of children with these difficulties.

Secondly, this study makes contributions to the evidence-base for Lego-based Therapy. Whilst claims about Lego-based Therapy's ability to reduce anxiety have been stated by the intervention's creator (LeGoff et al., 2014), no study to the researcher's knowledge has evaluated this claim. Therefore, the unique contributions of this study to the evidence-base for Lego-based Therapy are three-fold. It has highlighted some positive effects of the intervention within a mainstream primary school population and setting; it has explored possible mechanisms which may have contributed to the findings; and finally, this study has provided preliminary evidence to suggest that, for children with social communication difficulties Lego-based Therapy can have an effect on anxiety.

REFERENCES

Achenbach, T. M., and Dumenci, L. (2001). Advances in empirically based assessment: Revised cross-informant syndromes and new DSM-oriented scales for the CBCL, YSR, and TRF: Comment on Lengua, Sadowski, Friedrich, and Fisher (2001).

Achenbach, T. M., McConaughy, S. H., and Howell, C. T. (1987). Child/adolescent behavioral and emotional problems: implications of cross-informant correlations for situational specificity. *Psychological bulletin*, *101*(2), 213.

Adams, C. (2005). Social communication intervention for school-age children: Rationale and description. In *Seminars in Speech and Language* (Vol. 26, No. 03, pp. 181-188). Copyright© 2005 by Thieme Medical Publishers, Inc., 333 Seventh Avenue, New York, NY 10001, USA.

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

Agnostinis, Morley and Dowzer (2008) *University of Leeds Reliable Change Indicator Calculator.* http://www.leeds.ac.uk/lihs/psychiatry/dclin/rcic.html.

Altman, D. G. (1990). *Practical statistics for medical research*. CRC press.

Aman, M. G., Tassé, M. J., Rojahn, J., and Hammer, D. (1996). The Nisonger CBRF: A child behavior rating form for children with developmental disabilities. Research in developmental disabilities, 17(1), 41-57.

Andras, M. (2012). The value of LEGO® Therapy in promoting social interaction in primary aged children with autism. *Good autism practice*, *13*(2), 17-24.

Andrews, R. (2005) The place of systematic reviews in education research. British Journal of educational studies. 53(4), doi: 10.1111/j.1467-8527.2005.00303.x.

APA 1994 American Psychiatric Association. (1994). Diagnostic and statistical manual of mental disorders (DSM-IV).

Ashburner, J., Ziviani, J., and Rodger, S. (2010). Surviving in the mainstream: Capacity of children with autism spectrum disorders to perform academically and regulate their emotions and behavior at school. *Research in Autism Spectrum Disorders*, *4*(1), 18-27.

Attwood, A. J. (1998). Asperger's syndrome: A guide for parents and professionals. London, UK: Jessica Kingsley.

Attwood, T. (2000). Strategies for improving the social integration of children with Asperger syndrome. *Autism*, *4*(1), 85-100.

Attwood,T. (2006) The Complete Guide to Asperger's Syndrome. London: Jessica Kingsley Publishers.

Baird, G., and Norbury, C. F. (2015). Social (pragmatic) communication disorders and autism spectrum disorder. *Archives of disease in childhood*, archdischild-2014.

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). *The lancet*, *368*(9531), 210-215.

Baldwin, M. W. (1992). Relational schemas and the processing of social information. *Psychological Bulletin*, 112(3), 461–484.

Barlow, D. H., and Nock, M. K. (2009). Why can't we be more idiographic in our research? *Perspectives on Psychological Science*, 4, 19 –21.

Barlow, *D.*, Nock, M., and Hersen, M. (2009). Single-case Experimental Designs: Strategies for studying behaviour change (3rd Ed.). Boston, MA: Allyn and Bacon.

Barnhill, G. P., and Myles, B. S. (2001). Attributional style and depression in adolescents with Asperger syndrome. *Journal of Positive Behavior Interventions*, *3*(3), 175-182.

Baron- Cohen, S. (1987). Autism and symbolic play. British journal of developmental psychology, 5(2), 139-148.

Baron-Cohen, S. (2006). Two new theories of autism: hypersystemising and assortative mating. Archives of Disease in Childhood, 91, 2–5.

Baron-Cohen, S., Richler, J., Bisarya, D., Gurunathan, N., and Wheelwright, S. (2003). The systemizing quotient: an investigation of adults with Asperger syndrome or high–functioning autism, and normal sex differences. *Philosophical Transactions of the Royal Society of London B: Biological Sciences*, *358*(1430), 361-374.

Baron-Cohen, S., Scott, F. J., Allison, C., Williams, J., Bolton, P., Matthews, F. E., and Brayne, C. (2009). Prevalence of autism-spectrum conditions: UK school-based population study. *The British Journal of Psychiatry*, *194*(6), 500-509.

Baron-Cohen, S., Spitz, A., and Cross, P. (1993). Do children with autism recognise surprise? A research note. Cognition and Emotion, 7(6), 507-516.

Barrett, P., Turner, C., and Lowry-Webster, H. (2000). *Friends for Children Group Leader's Manual*. Australian Academic Press.

Bates, E., Bretherton, I., and Snyder, L. S. (1991). *From first words to grammar: Individual differences and dissociable mechanisms* (Vol. 20). Cambridge University Press.

Bauminger- Zviely, N., Karin, E., Kimhi, Y., and Agam- Ben- Artzi, G. (2014). Spontaneous peer conversation in preschoolers with high- functioning autism spectrum disorder versus typical development. Journal of Child Psychology and Psychiatry, 55(4), 363-373.

Baxter J, Miyahara M, Mirfin-Veitch B and Hunter J. (2017) Social Anxiety Disorder in Autism Spectrum Disorder: Principles and Challenges of Clinical Assessment. Austin Journal of Autism and Relative Disabilities. 3(2): 1042.

Beaumont, R., Rotolone, C., and Sofronoff, K. (2015). The secret agent society social skills program for children with high- functioning autism spectrum disorders: A comparison of two school variants. *Psychology in the Schools*, *52*(4), 390-402.**

Becker, E. M., Jensen-Doss, A., Kendall, P. C., Birmaher, B., and Ginsburg, G. S. (2016). All anxiety is not created equal: Correlates of parent/youth agreement vary across subtypes of anxiety. *Journal of psychopathology and behavioral assessment*, *38*(4), 528-537.

Bellini, S. (2004). Social skill deficits and anxiety in high-functioning adolescents with autism spectrum disorders. *Focus on Autism and Other Developmental Disabilities*, *19*(2), 78-86.

Bellini, S. (2006). The Development of Social Anxiety in Adolescents with Autism Spectrum Disorders. Focus on Autism and Other Developmental Disabilities, 21(3),138–145. https://doi.org/10.1177/10883576060210030201

Bellini, S., Peters, J. K., Benner, L., and Hopf, A. (2007). A meta-analysis of school-based social skills interventions for children with autism spectrum disorders. *Remedial and Special Education*, *28*(3), 153-162.

Benner, P. (1985). Quality of life: A phenomenological perspective on explanation, prediction, and understanding in nursing science. Advances in Nursing Science, 8(1), 1-14.

Berg- Nielsen, T. S., Vika, A., and Dahl, A. A. (2003). When adolescents disagree with their mothers: CBCL- YSR discrepancies related to maternal depression and adolescent self- esteem. *Child: care, health and development*, *29*(3), 207-213.

Bishop, D. V. (2014). Ten questions about terminology for children with unexplained language problems. International Journal of Language and Communication Disorders, 49(4), 381-415.

Bishop, D.V.M., (2013) *Uncommon Understanding: Development and disorders of language comprehension in children*. Psychology Press Classic Edition.

Botting, N., Crutchley, A., and Conti- Ramsden, G. (1998). Educational transitions of 7- year- old children with SLI in language units: a longitudinal study. *International journal of language and communication disorders*, *33*(2), 177-197.

Boyd, B. A., Hume, K., McBee, M. T., Alessandri, M., Gutierrez, A., Johnson, L., ... and Odom, S. L. (2014). Comparative efficacy of LEAP, TEACCH and non-model-specific special education programs for preschoolers with autism spectrum disorders. *Journal of Autism and Developmental Disorders*, *44*(2), 366-380.

Boyne, S. E. (2014). *An evaluation of the 'Lego® Therapy' intervention used to support children with social communication difficulties in their mainstream classroom* (Doctoral dissertation, University of Nottingham).

Brent, E., Rios, P., Happé, F., and Charman, T. (2004). Performance of children with autism spectrum disorder on advanced theory of mind tasks. *Autism*, *8*(3), 283-299.

Brett, E. (2013). Lego Therapy: Developing social competence in children with Asperger syndrome through collabforative play. Unpublished Doctoral Dissertation. Exeter: Exeter University.

Briesch, A. M., Sanetti, L. M. H., and Briesch, J. M. (2010). Reducing the prevalence of anxiety in children and adolescents: An evaluation of the evidence-base for the FRIENDS for Life program. *School Mental Health*, *2*(4), 155-165.

Briggs-Gowan, M. J., Carter, A. S., and Schwab-Stone, M. (1996). Discrepancies among mother, child, and teacher reports: Examining the contributions of maternal depression and anxiety. *Journal of abnormal child psychology*, *24*(6), 749-765.

Brinton, B., Fujiki, M., and McKee, L. (1998). Negotiation skills of children with specific language impairment. *Journal of Speech, Language, and Hearing Research*, *41*(4), 927-940.

British Psychological Society. (2014). *Code of Human Research Ethics*. Leicester: BPS. Retrieved 12th December 2018 from: http://www.bps.org.uk/system/files/Public%20files/code_of_human_research_ethics_dec_2014_inf180_web.pdf.

Brossart, D. F., Parker, R. I., Olson, E. A., and Mahadevan, L. (2006). The relationship between visual analysis and five statistical analyses in a simple AB single-case research design. *Behavior Modification*, *30*(5), 531-563.

Brossart, D. F., Vannest, K. J., Davis, J. L., and Patience, M. A. (2014). Incorporating nonoverlap indices with visual analysis for quantifying intervention effectiveness in single-case experimental designs. *Neuropsychological Rehabilitation*, *24*(3-4), 464-491.

Brown, A. B., and Elder, J. H. (2014). Communication in autism spectrum disorder: a guide for pediatric nurses. *Pediatric nursing*, *40*(5).

Burnham, S. (2013). Realists or pragmatists? "Reliable evidence" and the role of the educational psychologist. *Educational Psychology in Practice*, *29*(1), 19-35.

Buysse, V., and Bailey Jr, D. B. (1993). Behavioral and developmental outcomes in young children with disabilities in integrated and segregated settings: A review of comparative studies. *The Journal of Special Education*, *26*(4), 434-461.

Campbell, D. T., and Stanley, J. C. (1963). Experimental designs for research on teaching. *Handbook of research on teaching*, 171-246.

Care Quality Commission (2017) Review of children and young people's mental health services. Retrieved 21st July 2018 from: https://www.cqc.org.uk/sites/default/files/20171027_cypmhphase1_literaturereview.pdf.

Carr, J. E., and Burkholder, E. O. (1998). Creating single- subject design graphs with Microsoft Excel™. *Journal of Applied Behavior Analysis*, *31*(2), 245-251.

Castelli, F. (2005). Understanding emotions from standardized facial expressions in autism and normal development. Autism, 9(4), 428-449.

Chan, J. M., Lang, R., Rispoli, M., O'Reilly, M., Sigafoos, J., and Cole, H. (2009). Use of peer-mediated interventions in the treatment of autism spectrum disorders: A systematic review. *Research in Autism Spectrum Disorders*, *3*(4), 876-889.

Chang, Y. C., Quan, J., and Wood, J. J. (2012). Effects of anxiety disorder severity on social functioning in children with autism spectrum disorders. *Journal of Developmental and Physical Disabilities*, *24*(3), 235-245.

Charman, T., Swettenham, J., Baron-Cohen, S., Cox, A., Baird, G., and Drew, A. (1997). Infants with autism: An investigation of empathy, pretend play, joint attention, and imitation. *Developmental psychology*, *33*(5), 781.

Cheng, Y. F. S. (2016). *The effectiveness of the Lego® Therapy intervention in promoting the social interaction of children with Autism Spectrum Condition in the playground: An evaluation study* (Doctoral dissertation, UCL (University College London).

Choudhury, M. S., Pimentel, S. S., and Kendall, P. C. (2003). Childhood anxiety disorders: parent–child (dis) agreement using a structured interview for the DSM-IV. *Journal of the American Academy of Child and Adolescent Psychiatry*, *42*(8), 957-964.

Clarke, A. M. (2011). *An evaluation of Zippy's Friends, an emotional wellbeing programme for children in primary schools* (Doctoral dissertation).

Cohen, J. (1968). Weighted kappa: Nominal scale agreement provision for scaled disagreement or partial credit. *Psychological bulletin*, *70*(4), 213.

Cohen, L., Manion, L., and Morrison, K. (2011). *Research methods in education*. Routledge.

Cole F.L. (1988) Content analysis: process and application. *Clinical Nurse Specialist* 2(1), 53–57.

Communication Trust. (2011) All Together Now: A toolkit to help you plan your involvement in Hello, the national year of communication.

Constantino, J. N., and Gruber, C. P. (2012). Social Responsiveness Scale: SRS-2 Software Kit. Western Psychological Services.

Constantino, J.N., and Gruber, C.P. (2005). Social Responsiveness Scale (SRS). Los Angeles, CA: Western Psychological Services

Cook, T. P. (1985) 'Postpositivist Critical Multiplism', in R. L. Shortland and M. M. Mark (eds) Social Science and Social Policy, pp. 129–46. Newbury Park, CA: Sage

Cooper, J. O., Heron, T. E., and Heward, W. L. (2007). *Applied behavior analysis* (2nd ed.). Columbus, OH: Pearson.

Creswell, J. W. (2007). *Qualitative inquiry and research method: Choosing among five approaches* (2nd. ed.). Thousand Oaks, CA: Sage.

Creswell, J. W., and Clark, V. L. P. (2017). *Designing and conducting mixed-methods research*. Sage publications.

Creswell, J. W., and Poth, C. N. (2017). *Qualitative inquiry and research design: Choosing among five approaches*. Sage publications.

Crotty, M. (1998). *The foundations of social research: Meaning and perspective in the research process*. Sage.

CSIE. (2013). More information about human rights. Retrieved November 18, 2016, from http://www.csie.org.uk/inclusion/human-rights.shtml

Cumming J, Dickson E and Webster AA (2013) Reasonable adjustments in assessment: Putting law and policy into practice in Australia. *International Journal of Disability Development and Education 60(4):* 295-311.

De Los Reyes, A., and Kazdin, A. E. (2005). Informant discrepancies in the assessment of childhood psychopathology: a critical review, theoretical framework, and recommendations for further study. *Psychological bulletin*, *131*(4), 483.

De Los Reyes, A., Augenstein, T. M., Wang, M., Thomas, S. A., Drabick, D. A., Burgers, D. E., and Rabinowitz, J. (2015). The validity of the multi-informant approach to assessing child and adolescent mental health. *Psychological bulletin*, *141*(4), 858.

Delli, C. K. S., Polychronopoulou, S. A., Kolaitis, G. A., and Antoniou, A. S. G. (2018). Review of interventions for the management of anxiety symptoms in children with ASD. *Neuroscience and Biobehavioral Reviews*.

Delprato, D. J. (2001). Comparisons of discrete-trial and normalized behavioral language intervention for young children with autism. *Journal of autism and developmental disorders*, *31*(3), 315-325.

Denzin, N. K., and Lincoln, Y. S. (2005). Introduction: The Discipline and Practice of Qualitative Research. In N. K. Denzin and Y. S. Lincoln (Eds.), *The Sage handbook of qualitative research* (pp. 1-32). Thousand Oaks, CA, : Sage Publications Ltd

Department for Education and Employment. (1997) *Excellence for All Children Meeting Special Educational.* London: HMSO.

Department for Education and Employment. (2014) *Special educational needs and disability code of practice: 0 to 25 years.* London: HMSO.

Department for Education and Skills (2001) *Inclusive Schooling: Children with Special Educational Needs*. London: HMSO.

Department for Education. (2014) Special educational needs in England: January. London: HMSO.

Department for Education. (2017) Permanent and fixed-period exclusions in England: 2015 to 2016. London: HMSO.

Department for Education. (2019) Special educational needs in England: January 2019. London: HMSO.

DeProspero, A., and Cohen, S. (1979). Inconsistent visual analyses of intrasubject data. *Journal of Applied Behavior Analysis*, *12*(4), 573-579.

Dewey, D., Lord, C., and Magill, J. (1988). Qualitative assessment of the effect of play materials in dyadic peer interactions of children with autism. *Canadian Journal of Psychology/Revue canadienne de psychologie*, *42*(2), 242.

Dey I. (1993) *Qualitative Data Analysis. A User-Friendly Guide for Social Scientists*. Routledge, London

Dirks, M. A., De Los Reyes, A., Briggs-Gowan, M., Cella, D., and Wakschlag, L. S. (2012). Embracing not erasing contextual variability in children's behavior: Theory and utility in the selection and use of methods and informants in developmental psychopathology. *Journal of child psychology and psychiatry, and allied disciplines*, *53*(5), 558.

Division of Child and Educational Psychologists. (2002). *Professional Practice Guidelines*. Leicester: BPS. Retrieved 12th December 2018 from: http://www.bps.org.uk/sites/default/files/documents/professional practice guidelines - division of educational and child psychology.pdf.

Downe- Wamboldt, B. (1992). Content analysis: method, applications, and issues. *Health care for women international*, 13(3), 313-321.

Dugard, P., and Todman, J. (1995). Analysis of pre- test- post- test control group designs in educational research. *Educational Psychology*, *15*(2), 181-198.

Dybvik, A. C. (2004). Autism and the inclusion mandate. *Education Next*, *4*(1).

Eaves, L. C., and Ho, H. H. (1997). School placement and academic achievement in children with autistic spectrum disorders. *Journal of Developmental and Physical Disabilities*, *9*(4), 277-291.

Educational Research. London: Routledge.

Eldar, E., Talmor, R., and Wolf- Zukerman, T. (2010). Successes and difficulties in the individual inclusion of children with Autism Spectrum Disorder (ASD) in the eyes of their coordinators. *International Journal of Inclusive Education*, *14*(1), 97-114.

Elo, S. & Kyngäs, H. (2007). The qualitative content analysis process. *Journal of Advanced Nursing*, 62 (1), 107-115.

EPPI-CENTRE (2002) EPPI-Reviewer® (Version 2.5.4) (London, EPPI-Centre, Social Science Research Unit).

Erlingsson, C., & Brysiewicz, P. (2017). A hands-on guide to doing content analysis. *African Journal of Emergency Medicine*, 7(3), 93-99.

Essau, C. A. (2003). Comorbidity of anxiety disorders in adolescents. *Depression and Anxiety*, *18*(1), 1-6.

Essau, C. A., Muris, P., and Ederer, E. M. (2002). Reliability and validity of the Spence Children's Anxiety Scale and the Screen for Child Anxiety Related emotional disorders in German children. *Journal of behavior Therapy and experimental psychiatry*, *33*(1), 1-18.

Ferrarotti, F. (1981). On the autonomy of the biographical method. In D. Bertaux (Ed.), Biography and society: The life history approach in the social sciences (pp. 19–27). Beverly Hills, CA: Sage.

Forman, J., & Damschroder, L. (2008*). Qualitative Content Analysis, Empirical Methods for Bioethics: a primer* (Advances in Bioethics; vol. 11).

Frederickson, N. (2002). Evidence-based practice and educational psychology. Educational and Child Psychology, 19:3, 96-111.

Freeman, S. F., and Alkin, M. C. (2000). Academic and social attainments of children with mental retardation in general education and special education settings. *Remedial and Special Education*, *21*(1), 3-26.

Gadow, K. D., and Sprafkin, J. N. (2002). Child symptom inventory 4: Screening and norms manual. Checkmate Plus.

Gast, D. L. (2005). Visual analysis of graphic data. In G. Sugai and R. Horner (Eds.), *Encyclopedia of behavior modification and cognitive behavior Therapy: Educational applications* (Vol. 3, pp. 1595–1599). Thousand Oaks, CA: Sage.

Gast, D. L., and Spriggs, A. D. (2010). Visual analysis of graphic data. In D. L. Gast (Ed.), Single subject research methodology in behavioral sciences (pp. 199–233). New York, NY:Routledge.

Gelo, O., Braakmann, D., and Benetka, G. (2008). Quantitative and qualitative research: Beyond the debate. *Integrative psychological and behavioral science*, *42*(3), 266-290.

Gerring, J. (2007). The case-study: what it is and what it does. In *The Oxford handbook of comparative politics*.

Gersten, R., Fuchs, L. S., Compton, D., Coyne, M., Greenwood, C., and Innocenti, M. S. (2005). Quality indicators for group experimental and quasi-experimental research in special education. Exceptional Children, 71, 149–164.

Ghaziuddin, M. (2005). *Mental health aspects of autism and Asperger syndrome*. Jessica Kingsley Publishers.

Glennon, B., and Weisz, J. R. (1978). An observational approach to the assessment of anxiety in young children. Journal of Consulting and Clinical Psychology, 46(6), 1246.

Gough, D. (2007). Weight of evidence: a framework for the appraisal of the quality and relevance of evidence. *Research papers in education*, *22*(2), 213-228.

Green, H., McGinnity, Á., Meltzer, H., Ford, T., and Goodman, R. (2005). Mental health of children and young people in Great Britain, 2004.

Greene, J. C. (1990). Three views on the nature and role of knowledge in social science. *The paradigm dialog*, 227-245.

Gresham, F. M., and Elliott, S. N. (1990). Social skills rating system (SSRS). American Guidance Service.

Grills, A. E., and Ollendick, T. H. (2003). Multiple informant agreement and the anxiety disorders interview schedule for parents and children. *Journal of the American Academy of Child and Adolescent Psychiatry*, *42*(1), 30-40.

Grix, J. (2004). The foundations of research. London: Palgrave Macmillan.

Guba, E. G., and Lincoln, Y. S. (1994). Competing paradigms in qualitative research. *Handbook of qualitative research*, *2*(163-194), 105.

Gulliford, A. (2015). Evidence-based practice in Educational Psychology. In Cline, T., Gulliford, A. and Birch, S. (2015) *Educational Psychology: Topics in Applied Psychology*. 2nd Ed. Routledge.

Gutkin, T.B. (1993) Conducting consultation research. In J.E.Zins, T.R. Hagiwara, T. and Myles, B.S. (1999) A multimedia social story intervention: teaching skills to children with autism. Focus on Autism and Other Developmental Disabilities, 14:2, 82-95

Happé, F., and Ronald, A. (2008). The 'fractionable autism triad': a review of evidence from behavioural, genetic, cognitive and neural research. *Neuropsychology review*, *18*(4), 287-304.

Harbst, K. B., Ottenbacher, K. J., and Harris, S. R. (1991). Interrater reliability of therapists' judgments of graphed data. *Physical Therapy*, *71*(2), 107-115.

Harley, T.A. (2008). *The Psychology of Language: From data to theory*. 3rd Ed. Psychology Press.

Harris, S. L., Handleman, J. S., Kristoff, B., Bass, L., and Gordon, R. (1990). Changes in language development among autistic and peer children in segregated and integrated preschool settings. *Journal of Autism and Developmental Disorders*, *20*(1), 23-31.

Harwood, T. G., & Garry, T. (2003). An overview of content analysis. *The marketing review*, 3(4), 479-498.

Hattie, J. (2008). *Visible learning: A synthesis of over 800 meta-analyses relating to achievement*. Routledge.

HCPC. (2016). *Guidance on conduct and ethics for students.* Retrieved 3rd December May 2017 from: http://www.hpc-uk.org/assets/documents/10002c16guidanceonconductandethicsforstudents.pdf.

HCPC. (2016). *Guidance on conduct and ethics for students.* Retrieved 12th December 2018 from: http://www.hpc-uk.org/assets/documents/10002c16guidanceonconductandethicsforstudents.pdf.

Herriott, R. E., and Firestone, W. A. (1983). Multisite qualitative policy research: Optimizing description and generalizability. *Educational researcher*, *12*(2), 14-19.

Higgins, J.T.P, and Green, S. (2011) Cochrane Handbook for Systematic Reviews of Interventions. Accessed from: http://handbook.cochrane.org/front_page.htm [December 20th 2016]

Hitchcock, J. H., Horner, R. H., Kratochwill, T. R., Levin, J. R., Odom, S. L., Rindskopf, D. M., and Shadish, W. R. (2014). The What Works Clearinghouse single-case design pilot standards: Who will guard the guards?. Remedial and Special Education, 35(3), 145-152.

Hood, B. M., Willen, J. D., and Driver, J. (1998). Adult's eyes trigger shifts of visual attention in infants. PsychologIcal Science, 9, 131-134.

Horner, R. H., Carr, E. G., Halle, J., McGee, G., Odom, S., Wolery, M. (2005). The use of single-subject research to identify Evidence-based practice in special education. *Exceptional Children*, 71, 165–179.

Howe, K. R. (1988). Against the quantitative-qualitative incompatibility thesis or dogmas die hard. *Educational researcher*, *17*(8), 10-16.

Hughes, C., & Leekam, S. (2004). What are the links between theory of mind and social relations? Review, reflections and new directions for studies of typical and atypical development. *Social Development*, 13(4), 590–619.

Huitema, B. E. (1985). Autocorrelation in applied behavior analysis: A myth. *Behavioral Assessment*.

Hulme, C., and Snowling, M. J. (2009). *Developmental disorders of language learning and cognition*. John Wiley and Sons.

Humphrey, N., and Lewis, S. (2008). Make me normal' The views and experiences of children on the autistic spectrum in mainstream secondary schools. *Autism*, *12*(1), 23-46.

Humphrey, N., and Symes, W. (2010). Perceptions of social support and experience of bullying among children with autistic spectrum disorders in mainstream secondary schools. *European Journal of Special Needs Education*, *25*(1), 77-91.

Humphrey, N., and Symes, W. (2011). Peer interaction patterns among adolescents with autistic spectrum disorders (ASDs) in mainstream school settings. *Autism*, *15*(4), 397-419.

Hunsberger, P. H. (2007). Reestablishing clinical psychology's subjective core. 614.

Hwang, B., and Hughes, C. (2000). The effects of social interactive training on early social communicative skills of children with autism. *Journal of autism and developmental disorders*, *30*(4), 331-343.

ICAN (2017) Difficulties with Using Language Appropriately in Context. Retrieved 7th December 2017 from: http://www.talkingpoint.org.uk/parents/some-children-struggle/difficulties-using-language-appropriately-context

Jacobson, N. S., and Truax, P. (1991). Clinical significance: a statistical approach to defining meaningful change in psychoTherapy research. *Journal of consulting and clinical psychology*, *59*(1), 12.

Jensen, P. S., Hoagwood, K., and Trickett, E. J. (1999). Ivory towers or earthen trenches? Community collaborations to foster real-world research. *Applied Developmental Science*, *3*(4), 206-212.

Joffe, H. (2012). Thematic analysis. *Qualitative research methods in mental health and psychoTherapy: A guide for students and practitioners*, *1*, 210-223.

Johnson, C. P., and Myers, S. M. (2007). Identification and evaluation of children with autism spectrum disorders. *Pediatrics*, *120*(5), 1183-1215.

Johnson, R. B., and Onwuegbuzie, A. J. (2004). Mixed-methods research: A research paradigm whose time has come. *Educational researcher*, *33*(7), 14-26.

Johnson, R. B., Onwuegbuzie, A. J., and Turner, L. A. (2007). Toward a definition of mixed-methods research. *Journal of mixed-methods research*, *1*(2), 112-133.

Jones, R. R., Weinrott, M. R., and Vaught, R. S. (1978). Effects of serial dependency on the agreement between visual and statistical inference 1. *Journal of applied behavior analysis*, *11*(2), 277-283.

Jusczyk, P. W. (2000). *The discovery of spoken language*. MIT press.

Kaale, A., Smith, L., and Sponheim, E. (2012). A randomized controlled trial of preschool- based joint attention intervention for children with autism. *Journal of Child Psychology and Psychiatry*, *53*(1), 97-105.

Kanner, L. (1943). Autistic disturbances of affective contact. *Nervous child*, *2*(3), 217-250.

Kasari, C., and Smith, T. (2013). Interventions in schools for children with autism spectrum disorder: Methods and recommendations. *Autism*, *17*(3), 254-267.

Kasari, C., Dean, M., Kretzmann, M., Shih, W., Orlich, F., Whitney, R., ... and King, B. (2016). Children with autism spectrum disorder and social skills groups at school: A randomized trial comparing intervention approach and peer composition. *Journal of Child Psychology and Psychiatry*, *57*(2), 171-179.

Kasari, C., Sigman, M., Mundy, P., & Yirmiya, N. (1990). Affective sharing in the context of joint attention interactions of normal, autistic, and mentally retarded children. *Journal of Autism and Developmental Disorders*, 20(1), 87–100.

Kazdin, A. E. (1980). Acceptability of alternative treatments for deviant child behavior. *Journal of applied behavior analysis*, *13*(2), 259-273.

Kazdin, A. E., Esveldt-Dawson, K., Unis, A. S., and Rancurello, M. D. (1983). Child and parent evaluations of depression and aggression in psychiatric inpatient children. *Journal of Abnormal Child Psychology*, *11*(3), 401-413.

Kazdin, A. E., French, N. H., Unis, A. S., Esveldt-Dawson, K., and Sherick, R. B. (1983). Hopelessness, depression, and suicidal intent among psychiatrically disturbed inpatient children. *Journal of consulting and clinical psychology*, *51*(4), 504.

Kendall, P. C. (1985). Toward a cognitive-behavioral model of child psychopathology and a critique of related interventions. *Journal of Abnormal Child Psychology*, *13*(3), 357-372.

Kennedy, C. H. (2005). Single-case designs for educational research. Boston, MA: Allyn and Bacon.

Keogh, B. K., Juvonen, J., and Bernheimer, L. P. (1989). Assessing children's competence: Mothers' and teachers' ratings of competent behavior. *Psychological assessment: a journal of consulting and clinical Psychology*, *1*(3), 224.

Khan, S., and VanWynsberghe, R. (2008, January). Cultivating the under-mined: Cross-case analysis as knowledge mobilization. In *Forum qualitative Sozialforschung/forum: Qualitative social research* (Vol. 9, No. 1).

Kivunja, C., and Kuyini, A. B. (2017). Understanding and Applying Research Paradigms in Educational Contexts. *International Journal of Higher Education*, *6*(5), 26-41.

Knight, A., Petrie, P., Zuurmond, M., and Potts, P. (2009). 'Mingling together': promoting the social inclusion of disabled children and young people during the school holidays. *Child and Family Social Work*, *14*(1), 15-24.

Kohler, F. W., Strain, P. S., Hoyson, M., and Jamieson, B. (1997). Merging naturalistic teaching and peer-based strategies to address the IEP objectives of preschoolers with autism: An examination of structural and child behavior outcomes. *Focus on Autism and Other Developmental Disabilities*, *12*(4), 196-206.

Kolko, D. J., and Kazdin, A. E. (1993). Emotional/behavioral problems in clinic and nonclinic children: Correspondence among child, parent and teacher reports. *Journal of Child Psychology and Psychiatry*, *34*(6), 991-1006.

Koster, M., Pijl, S. J., Nakken, H., and Van Houten, E. (2010). Social participation of students with special needs in regular primary education in the Netherlands. *International Journal of Disability, Development and Education*, *57*(1), 59-75.

Kovacs, M. (1985). The children's depression inventory (CDI). Psychopharmacol bull, 21, 995-998.

Kratochwill, T. R., Hitchcock, J., Horner, R. H., Levin, J. R., Odom, S. L., Rindskopf, D. M. and Shadish, W. R. (2010). *Single-case designs technical documentation*. Retrieved from What Works Clearinghouse website:http://ies.ed.gov/ncee/wwc/pdf/wwc_scd.pdf.

Krippendorff, K. (1980*). Content Analysis: An Introduction to Its Methodology*. Newbury Park, CA: Sage.

Kuehnel, C. A. (2013). *Online delivery of a social skills intervention with video modeling for adolescents with autism spectrum disorder*. Michigan State University.**

Kuenssberg, R., McKenzie, K., and Jones, J. (2011). The association between the social and communication elements of autism, and repetitive/restrictive behaviours and activities: A review of the literature. *Research in Developmental Disabilities*, *32*(6), 2183-2192.

La Greca, A. M., and Lopez, N. (1998). Social anxiety among adolescents: Linkages with peer relations and friendships. Journal of abnormal child psychology, 26(2), 83-94.

Laenen, F. V. (2009). 'I don't trust you, you are going to tell', adolescents with emotional and behavioural disorders participating in qualitative research. *Child: care, health and development*, *35*(3), 323-329.

Landsberger, H. A. (1958). Hawthorne Revisited: Management and the Worker, Its Critics, and Developments in Human Relations in Industry.

Lane, J., and Gast, D. L. (2014). Visual analysis in single-case experimental design studies: Brief review and guidelines. *Neuropsychological Rehabilitation*, 24:3-4, 445-463, DOI: 10.1080/09602011.2013.815636.

Laugeson, E. A., Ellingsen, R., Sanderson, J., Tucci, L., and Bates, S. (2014). The ABC's of teaching social skills to adolescents with autism spectrum disorder in the classroom: The UCLA PEERS® program. *Journal of autism and developmental disorders*, *44*(9), 2244-2256.**

Laugeson, E. A., Frankel, F., Gantman, A., Dillon, A. R., and Mogil, C. (2012). Evidence-based social skills training for adolescents with autism spectrum disorders: The UCLA PEERS program. *Journal of autism and developmental disorders*, *42*(6), 1025-1036.**

Lauri S. & Kynga¨s H. (2005) Developing Nursing Theories (Finnish:Hoitotieteen Teorian Kehitta¨minen). Werner So¨derstro¨m, Dark Oy, Vantaa. As cited in Elo, S. & Kyngäs, H. (2007). The qualitative content analysis process. *Journal of Advanced Nursing*, 62 (1), 107-115.

LeGoff, D. B. (2004). Use of LEGO© as a therapeutic medium for improving social competence. *Journal of autism and developmental disorders*, *34*(5), 557-571.

Legoff, D. B., and Sherman, M. (2006). Long-term outcome of social skills intervention based on interactive LEGO© play. *Autism*, *10*(4), 317-329.

LeGoff, D. B., Baron-Cohen, S., De La Cuesta, G. G., and Krauss, G. W. (2014). *LEGO®-Based Therapy: How to build social competence through LEGO®-Based Clubs for children with autism and related conditions*. Jessica Kingsley Publishers.

Lei, J., & Ventola, P. (2018). Characterising the relationship between theory of mind and anxiety in children with Autism Spectrum Disorder and typically developing children. *Research in Autism Spectrum Disorders*, 49, 1-12.

Lei, J., Sukhodolsky, D. G., Abdullahi, S. M., Braconnier, M. L., and Ventola, P. (2017). Reduced anxiety following pivotal response treatment in young children with autism spectrum disorder. *Research in autism spectrum disorders*, *43*, 1-7.**

Leininger, M. M. (1985). Ethnography and ethnonursing: Models and modes of qualitative data analysis. In M. M. Leininger (Ed.), Qualitative research methods in nursing (pp. 33-72). Orlando, FL: Grune and Stratton.

Leon, A. C., Davis, L. L., and Kraemer, H. C. (2011). The role and interpretation of pilot studies in clinical research. *Journal of psychiatric research*, *45*(5), 626-629.

Letourneau, N., and Allen, M. (1999). Post- positivistic critical multiplism: a beginning dialogue. *Journal of advanced nursing*, *30*(3), 623-630.

Levant, R. F., and Hasan, N. T. (2008). Evidence-based practice in psychology. *Professional Psychology: Research and Practice*, *39*(6), 658.

Lilienfeld, S. O., Ritschel, L. A., Lynn, S. J., Cautin, R. L., and Latzman, R. D. (2013). Why many clinical psychologists are resistant to Evidence-based practice: Root causes and constructive remedies. *Clinical psychology review*, *33*(7), 883-900.

Lindlof, T. R., and Taylor, B. C. (2011). Sensemaking: Qualitative data analysis and interpretation. Qualitative communication research methods, 3, 241-281.

Lindlof, T. R., and Taylor, B. C. (2011). Sensemaking: Qualitative data analysis and interpretation. *Qualitative communication research methods*, *3*, 241-281.

Lindsay, S., Hounsell, K. G., and Cassiani, C. (2017). A scoping review of the role of LEGO® Therapy for improving inclusion and social skills among children and youth with autism. *Disability and health journal*, *10*(2), 173-182.

Loeber, R., Green, S. M., Lahey, B. B., and Stouthamer-Loeber, M. (1989). Optimal informants on childhood disruptive behaviors. *Development and Psychopathology*, *1*(4), 317-337.

Lord, C., and MaGill-Evans, J. (1995). Peer interactions of autistic children and adolescents. *Development and Psychopathology*, *7*(4), 611-626.

Loudon, J. L. (2008). *Increasing social skills and decreasing anxiety in adolescents with Asperger syndrome* (Doctoral dissertation, Kent State University). **

Luxford, S., Hadwin, J. A., and Kovshoff, H. (2017). Evaluating the effectiveness of a school-based cognitive behavioural Therapy intervention for anxiety in adolescents diagnosed with autism spectrum disorder. *Journal of autism and developmental disorders*, *47*(12), 3896-3908.

Lyneham, H. J., Street, A. K., Abbott, M. J., and Rapee, R. M. (2008). Psychometric properties of the school anxiety scale—Teacher report (SAS-TR). Journal of Anxiety Disorders, 22(2), 292-300.

Macintosh, K., and Dissanayake, C. (2006). Social skills and problem behaviours in school aged children with high-functioning autism and Asperger's disorder. *Journal of autism and developmental disorders*, *36*(8), 1065-1076.

Mack, L. (2010). The philosophical underpinnings of educational research. Polyglossia, 19, 5-11.

Maisel, M. E., Stephenson, K. G., South, M., Rodgers, J., Freeston, M. H., & Gaigg, S. B. (2016). Modeling the cognitive mechanisms linking autism symptoms and anxiety in adults. *Journal of Abnormal Psychology*, 125(5), 692–703.

Mallett, R., Hagen-Zanker, J., Duvendack, M. and Slater, R. (2012) 'The Benefits and Challenges of Using Systematic Reviews in International Development Research'. *Journal of Development Effectiveness* 4(3): 445-455.

Mandy, W. P., and Skuse, D. H. (2008). Research review: What is the association between the social-communication element of autism and repetitive interests, behaviours and activities?. *Journal of Child Psychology and Psychiatry*, *49*(8), 795-808.

Manolov, R., and Moeyaert, M. (2017). Recommendations for choosing single-case data analytical techniques. *Behavior Therapy*, *48*(1), 97-114.

Manolov, R., and Solanas, A. (2008). Comparing N= 1 effect size indices in presence of autocorrelation. *Behavior Modification*, *32*(6), 860-875.

Manolov, R., Gast, D. L., Perdices, M., and Evans, J. J. (2014). Single-case experimental designs: Reflections on conduct and analysis. *Neuropsychological Rehabilitation*, *24*(3-4), 634-660.

March, J. S., Sullivan, K., and Parker, J. (1999). Test-retest reliability of the Multidimensional Anxiety Scale for Children. Journal of anxiety disorders, 13(4), 349-358.

Masi, A., DeMayo, M. M., Glozier, N., and Guastella, A. J. (2017). An overview of autism spectrum disorder, heterogeneity and treatment options. *Neuroscience bulletin*, *33*(2), 183-193.

Mattick, R. P., and Clarke, J. C. (1998). Development and validation of measures of social phobia scrutiny fear and social interaction anxiety. Behaviour research and therapy, 36(4), 455-470.

Matyas, T. A., and Greenwood, K. M. (1990). Visual analysis of single- case time series: Effects of variability, serial dependence, and magnitude of intervention effects. *Journal of Applied Behavior Analysis*, *23*(3), 341-351.

Maxwell, J. A. (2012). *Qualitative research design: An interactive approach* (Vol. 41). Sage publications.

Mayes, S. D., and Lockridge, R. (2018). Brief Report: How Accurate is Teacher Report of Autism Symptoms Compared to Parent Report? *Journal of autism and developmental disorders*, *48*(5), 1833-1840.

Mayring, P. (2004*). Qualitative content analysis*. A companion to qualitative research, 1, 159-176.

Mays, N., Pope, C., and Popay, J., (2005). Systematically reviewing qualitative and quantitative evidence to inform management and policy-making in the health field. *Journal of health service research and policy*, 10 (Suppl 1), 6–20.

McClintock, C. (1985). Process sampling: A method for case-study research on administrative behavior. *Educational Administration Quarterly*, *21*(3), 205-222.

McConnell, S. R. (2002). Interventions to facilitate social interaction for young children with autism: Review of available research and recommendations for educational intervention and future research. *Journal of autism and developmental disorders*, *32*(5), 351-372.

McCracken, G. (1988). The long interview (qualitative research methods series, no. 13). *Newbury Park, California, EE. UU.: Sage Publications*.

McNiff, J., Lomax, P., and Whitehead, J. (2003). The nature of action research. *You and your action research project*, *2*, 9-17.

Mertens, D. M. (2010). Transformative mixed-methods research. *Qualitative Inquiry*, 16, 469-474.

Mesman, J., and Koot, H. M. (2000). Child-reported depression and anxiety in preadolescence: I. Associations with parent-and teacher-reported problems. *Journal of the American Academy of Child and Adolescent Psychiatry*, *39*(11), 1371-1378.

Miles M. & Huberman A. (1994) *Qualitative Data Analysis; an Expanded Source Book*. Sage Publications, Thousand Oaks, CA.

Milne, M. J., & Adler, R. W. (1999). Exploring the reliability of social and environmental disclosures content analysis. *Accounting, Auditing & Accountability Journal*, 12(2), 237-256.

Moher, D., Liberati, A., Tetzlaff, J., Altman, D.G., and the PRISMA Group (2009) Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. Annals Internal Medicine. 1512649.

Morgan, D. L. (1993). Qualitative content analysis: a guide to paths not taken. *Qualitative health research*, 3(1), 112-121.

Morgan, D. L. (2007). Paradigms lost and pragmatism regained: Methodological implications of combining qualitative and quantitative methods. *Journal of mixed-methods research*, *1*(1), 48-76.

Morse, J. M., and Niehaus, L. (2009). Principles and procedures of mixed-methods design. Walnut Creek, CA: Left Coast Press.

Moses, L. J., Baldwin, D. A., Rosicky, J. G., & Tidball, G. (2001). Evidence for referential understanding in the emotions domain at twelve and eighteen months. *Child Development*, 72(3), 718–735.

Mundy, P. (1995). Joint attention and social-emotional approach behavior in children with autism. *Development and Psychopathology*, 7(1), 63–82.

Mundy, P., & Newell, L. (2007). Attention, joint attention, and social cognition. *Current Directions in Psychological Science*, 16(5), 269–274.

Mundy, P., Sigman, M., Ungerer, J., and Sherman, T. (1986). Defining the social deficits of autism: The contribution of non- verbal communication measures. *Journal of child psychology and psychiatry*, *27*(5), 657-669.

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.

NAS. (2017) *Autism facts and history*. Retrieved 27th November 2017 from: http://www.autism.org.uk/about/what-is/myths-facts-stats.aspx.

Nauta, M. H. (2005). *Anxiety Disorders in Children and Adolescents: assessment, cognitive behavioural Therapy, and predictors of treatment outcome*. University of Groningen.

Nauta, M. H., Scholing, A., Rapee, R. M., Abbott, M., Spence, S. H., and Waters, A. (2004). A parent-report measure of children's anxiety: psychometric properties and comparison with child-report in a clinic and normal sample. *Behaviour research and Therapy*, *42*(7), 813-839.

Nauta, M.H. (2005) *Anxiety Disorders in Children and Adolescents: assessment, cognitive behavioural Therapy, and predictors of treatment outcome. [electronic source]*

Neggers, Y. H. (2014). Increasing prevalence, changes in diagnostic criteria, and nutritional risk factors for autism spectrum disorders. ISRN nutrition, 2014.

Neil, A. L., and Christensen, H. (2009). Efficacy and effectiveness of school-based prevention and early intervention programs for anxiety. *Clinical psychology review*, *29*(3), 208-215.

Neuman, S.B. and McCormick, S. (1995*). Single-Subject Experimental Research: Applications for Literacy*. Newark, DE: International Reading Association.

Neundorf, K. (2002). *The content analysis guidebook*. Thousands Oaks: Sage.

Nevo, I., and Slonim-Nevo, V. (2011). The myth of Evidence-based practice: Towards evidence-informed practice. *British Journal of Social Work*, *41*(6), 1176-1197.

Newschaffer, C. J., Croen, L. A., Daniels, J., Giarelli, E., Grether, J. K., Levy, S. E., ... and Reynolds, A. M. (2007). The epidemiology of autism spectrum disorders. *Annu. Rev. Public Health*, *28*, 235-258.

Ng, L., Pitt, V., Huckvale, K., Clavisi, O., Turner, T., Gruen, R., and Elliott, J. H. (2014). and Abstract Screening and Evaluation in Systematic Reviews (TASER): a pilot randomised controlled trial of title and abstract screening by medical students. *Systematic reviews*, *3*(1), 121.

NHS (2015) Social Communication Difficulties and Autistic Spectrum Conditions: Community Paediatrics. Retrieved 19th July 2018 from: http://www.cambscommunityservices.nhs.uk/docs/default-source/leaflets---community-paediatrics/0044---social-communication-difficulties-and-autistic-spectrum-disorders.pdf?sfvrsn=4.

Niditch, L. A., and Varela, R. E. (2011). Mother–child disagreement in reports of child anxiety: Effects of child age and maternal anxiety. *Journal of Anxiety Disorders*, *25*(3), 450-455.

Noens, I., and van Berckelaer-Onnes, I. (2004). Making sense in a fragmentary world: Communication in people with autismand learning disability. *Autism, 8,* 197. doi:10.1177/1362361304042723.

O'Connor, S., Ferguson, E., Carney, T., House, E., and O'Connor, R. C. (2016). The development and evaluation of the paediatric index of emotional distress (PI-ED). Social psychiatry and psychiatric epidemiology, 51(1), 15-26.

Ooi, Y. P., Weng, S. J., Magiati, I., Ang, R. P., Goh, T. J., Fung, D. S., and Sung, M. (2016). Factors influencing agreement between parent and child reports of anxiety symptoms among children with high-functioning autism spectrum disorders. *Journal of Developmental and Physical Disabilities*, *28*(3), 407-424.

Orgilés, M., Méndez, X., Spence, S. H., Huedo-Medina, T. B., and Espada, J. P. (2012). Spanish validation of the Spence Children's Anxiety Scale. *Child Psychiatry and Human Development*, *43*(2), 271-281

Osborne, L. A., and Reed, P. (2009). The relationship between parenting stress and behavior problems of children with autistic spectrum disorders. *Exceptional Children*, *76*(1), 54-73.

Osborne, L. A., and Reed, P. (2011). School factors associated with mainstream progress in secondary education for included children with Autism Spectrum Disorders. *Research in Autism Spectrum Disorders*, *5*(3), 1253-1263.

Ospina, M. B., Seida, J. K., Clark, B., Karkhaneh, M., Hartling, L., Tjosvold, L., ... and Smith, V. (2008). Behavioural and developmental interventions for autism spectrum disorder: a clinical systematic review. *PloS one*, *3*(11), e3755.

Owens, G., Granader, Y., Humphrey, A., and Baron-Cohen, S. (2008). LEGO® Therapy and the social use of language programme: An evaluation of two social skills interventions for children with high functioning autism and Asperger syndrome. *Journal of autism and developmental disorders*, *38*(10), 1944.

Ozsivadjian, A., Hibberd, C., and Hollocks, M. J. (2014). Brief report: the use of self-report measures in young people with autism spectrum disorder to access symptoms of anxiety, depression and negative thoughts. *Journal of autism and developmental disorders*, *44*(4), 969-974.

Palincsar, A. S., and Parecki, A. D. (1995). Important issues related to single-subject experimental research. *Single-subject experimental research: Applications for literacy*, 137-150.

Park, H. S., Marascuilo, L., and Gaylord-Ross, R. (1990). Visual inspection and statistical analysis in single-case designs. *The Journal of Experimental Education*, *58*(4), 311-320.

Parker, R. I., and Vannest, K. (2009). An improved effect size for single-case research: Nonoverlap of all pairs. *Behavior Therapy*, *40*(4), 357-367.

Parker, R. I., Hagan-Burke, S., and Vannest, K. (2007). Percentage of all non-overlapping data (PAND) an alternative to PND. *The Journal of Special Education*, *40*(4), 194-204.

Parker, R. I., Vannest, K. J., and Davis, J. L. (2011). Effect size in single-case research: A review of nine nonoverlap techniques. *Behavior Modification*, *35*(4), 303-322.

Parsonson, B. S., and Baer, D. M. (1986). The graphic analysis of data. In *Research methods in applied behavior analysis* (pp. 157-186). Springer, Boston, MA.

Pathak, A., and Intratat, C. (2016). Use of semi-structured interviews to investigate teacher perceptions of student collaboration. *Malaysian Journal of ELT Research*, *8*(1), 10.

Pawson, R. (2006). *Evidence-based policy: a realist perspective*. Sage.

Phares, V., Compas, B. E., and Howell, D. C. (1989). Perspectives on child behavior problems: Comparisons of children's self-reports with parent and teacher reports. *Psychological Assessment: A Journal of Consulting and Clinical Psychology*, *1*(1), 68.

Popay, J., Roberts, H., Snowden, A., Petticrew, M., Arai, L., Rodgers, M. and Britten, N. with Roen, K. and Duffy, S. (2006) 'Guidance on the Conduct of Narrative Synthesis in Systematic Reviews'. Accessed from

http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.178.3100andrep=rep1andtype =pdf [January 4th 2017]

Porta, M. (Ed.). (2008). *A dictionary of epidemiology*. Oxford university press.

PRISMA (2017) Preferred Reporting Items for Systematic Reviews and Meta-Analyses. Accessed from: http://prisma-statement.org/ [4th January 2017].

Prizant, B.M., Wetherby, A.M., Rubin, E., and Laurent, A.C. (2003). The SCERTS model: A transactional, family-centered approach to enhancing communication and socioemotional abilities of children with autism spectrum disorder. Infants and Young Children, 16, 296-316.

Public Health England (2016) The mental health of children and young people in England. Accessed 17th July 2018, retrieved from: http://www.cumbria.gov.uk/eLibrary/Content/Internet/537/6381/4278314423.pdf

Ramchandani, P., Joughin, C. and Zwi, M. (2001). Evidence-based child and adolescent mental health services: Oxymoron or brave new dawn? Child Psychology and Psychiatry Review, 6, 59-64.

Ravet, J. (2011). Inclusive/exclusive? Contradictory perspectives on autism and inclusion: the case for an integrative position. *International Journal of Inclusive Education*, *15*(6), 667-682.

Reaven, J. A., Blakeley-Smith, A., Nichols, S., Dasari, M., Flanigan, E., and Hepburn, S. (2009). Cognitive-behavioral group treatment for anxiety symptoms in children with high-functioning autism spectrum disorders: A pilot study. *Focus on Autism and Other Developmental Disabilities*, *24*(1), 27-37.

Reed, P. (2016) Interventions for Autism: Evidence for Educational and Clinical Practice. Wiley Blackwell.

Reed, P., Osborne, L. A., and Waddington, E. M. (2012). A comparative study of the impact of mainstream and special school placement on the behaviour of children with Autism Spectrum Disorders. *British Educational Research Journal*, *38*(5), 749-763.

Reynolds, C. R., and Richmond, B. O. (2008). RCMAS-2-Revised children's manifest anxiety scale. Los Angeles: Western Psychological Services.

Robey, R. R., Schultz, M. C., Crawford, A. B., and Sinner, C. A. (1999). Single-subject clinical-outcome research: Designs, data, effect sizes, and analyses. *Aphasiology*, *13*(6), 445-473.

Robson, C., and McCartan, K. (2016). *Real world research*. John Wiley and Sons.

Rogers, S. J. (2000). Interventions that facilitate socialization in children with autism. Journal of Autism and developmental Disorders, 30(5), 399–409.

Rotheram- Fuller, E., and MacMullen, L. (2011). Cognitive- behavioral Therapy for children with autism spectrum disorders. *Psychology in the Schools*, *48*(3), 263-271.

Ruijs, N. M., and Peetsma, T. T. (2009). Effects of inclusion on students with and without special educational needs reviewed. *Educational Research Review*, *4*(2), 67-79.

Rumney, H. L., and MacMahon, K. (2017). Do social skills interventions positively influence mood in children and young people with autism? A systematic review. *Mental Health and Prevention*, *5*, 12-20.

Sandelowski, M. (1995). Qualitative analysis: What it is and how to begin. *Research in nursing & health*, 18(4), 371-375.

Sandelowski, M. (2011). "Casing" the research case-study. *Research in nursing and health*, *34*(2), 153-159.

Sansosti, F. J. (2010). Teaching social skills to children with autism spectrum disorders using tiers of support: A guide for school- based professionals. *Psychology in the Schools*, *47*(3), 257-281.

Sarantakos, S. (2012). *Social research*. Macmillan International Higher Education.

Sariçam and Çetintaş, (2015). The Adaptation of School Anxiety Scale-Teacher Report: Validity and Reliability Study. *International Journal of Education*, 4(2), 41-50

Saunders, M., Lewis, P., and Thornhill, A. (2009). *Research methods for business students*. Pearson education.

Schleismann, K. D., and Gillis, J. M. (2011). The treatment of social phobia in a young boy with Asperger's disorder. *Cognitive and Behavioral Practice*, *18*(4), 515-529.

Schmidt, C. (2004). The analysis of semi-structured interviews. *A companion to qualitative research*, 253-258.

Schneider, B. H., and Leroux, J. (1994). Educational environments for the pupil with behavioral disorders: A "best evidence" synthesis. *Behavioral Disorders*, *19*(3), 192-204.

Schohl, K. A., Van Hecke, A. V., Carson, A. M., Dolan, B., Karst, J., and Stevens, S. (2014). A replication and extension of the PEERS intervention: examining effects on social skills and social anxiety in adolescents with autism spectrum disorders. *Journal of Autism and Developmental Disorders*, *44*(3), 532-545.**

Scotland, J. (2012). Exploring the philosophical underpinnings of research: Relating ontology and epistemology to the methodology and methods of the scientific, interpretive, and critical research paradigms. *English Language Teaching*, *5*(9), 9.

Scott, A., Joughin, C., and Shaw, M. (Eds.). (2001). *Finding the Evidence: A Gateway to the Literature in Child and Adolescent Mental Health*. RCPsych Publications.

Scottish Government. (2011). *The Scottish strategy for autism.* Edinburgh: The Scottish Government. Retrieved from: http://www.scotland.gov.uk/Resource/Doc/361926/0122373.pdf

Scruggs, T. E., Mastropieri, M. A., and Casto, G. (1987). The quantitative synthesis of single-subject research: Methodology and validation. *Remedial and Special education*, *8*(2), 24-33.

Seidman, I. (2006). Interviewing as qualitative research: A guide for researchers in education and the social sciences. Teachers college press.

Shadish WR (1993) Critical multiplism: a research strategy and its attendant tactics. New Directions for Program Evaluation. 60, 13-57.

Sharp, J. L., Mobley, C., Hammond, C., Withington, C., Drew, S., Stringfield, S., and Stipanovic, N. (2012). A mixed-methods sampling methodology for a multisite case-study. *Journal of Mixed-methods Research*, *6*(1), 34-54.

Simonoff, E., Pickles, A., Charman, T., Chandler, S., Loucas, T., and Baird, G. (2008). Psychiatric disorders in children with autism spectrum disorders: prevalence, comorbidity, and associated factors in a population-derived sample. *Journal of the American Academy of Child and Adolescent Psychiatry*, *47*(8), 921-929.

Sindelar, P. T., Rosenberg, M. S., and Wilson, R. J. (1985). An adapted alternating treatments design for instructional research. *Education and Treatment of Children*, 67-76.

Skinner, B. F. (1966). What is the experimental analysis of behavior*? Journal of the Experimental Analysis of Behavior*, 9, 213-218.

Slack, G. (2013). *An evaluation of the FRIENDS for Life intervention with an autistic spectrum population: evaluating the impact on children's anxiety* (Doctoral dissertation, University of Nottingham).

Snilstveit, .B. , Oliver, S., and Vojtkova, M. (2012) Narrative approaches to systematic review and synthesis of evidence for international development policy and practice. *Journal of Development Effectiveness*, 4:3, 409-429, DOI: 10.1080/19439342.2012.710641.

Speer, D. C. (1992). Clinically significant change: Jacobson and Truax (1991) revisited. *Journal of consulting and clinical psychology*, *60*(3), 402.

Speer, D. C., and Greenbaum, P. E. (1995). Five methods for computing significant individual client change and improvement rates: Support for an individual growth curve approach. *Journal of Consulting and Clinical Psychology*, *63*(6), 1044.

Spence, R. S. (2010). The effects of inclusion on the academic achievement of regular education students. Electronic Theses and Dissertations. 369.

Spence, S. H. (1999). *Spence Children's Anxiety Scale- Parent Version.* Brisbane, QLD, Australia: University of Queensland.

Spence, S.H. (1997). The Spence Children's Anxiety Scale (SCAS).In I. Sclare (Ed.), *Child Psychology Portfolio.* Windsor, UK: NFER-Nelson.

Spence, S.H., Barrett, P.M., and Turner, C.M. (2003). Psychometric properties of the Spence Children's Anxiety Scale with young adolescents. *Journal of Anxiety Disorders,* 17:6,605-625

Spielberger, C. D. (2010). State- Trait anxiety inventory. The Corsini encyclopedia of psychology, 1-1.

Spriggs, A. D., and Gast, D. L. (2010). *Visual representation of data.* In D. L. Gast (Ed.), Single-subject research methodology in behavioral sciences (pp. 166–198). New York, NY:Routledge.

Spring, B. (2007). Evidence- based practice in clinical psychology: What it is, why it matters; what you need to know. *Journal of Clinical Psychology*, *63*(7), 611-631.

Stake, R. E. (1995). *The art of case-study research*. Sage.

Stark, R. E. (1986). Prespeech segmental feature development. *Language acquisition*, 149-173.

Stemler, S. (2001). An overview of content analysis. Practical assessment, research & evaluation, 7(17), 137-146.

Stoiber, K. C., and Waas, G. A. (2002). A contextual and methodological perspective on the Evidence-based movement within school psychology in the United States. *Educational and Child Psychology*.

Sutton, B. M., Webster, A. A., and Westerveld, M. F. (2019). A systematic review of school-based interventions targeting social communication behaviors for students with autism. Autism, 23(2), 274-286.

Sutton, B. M., Webster, A. A., and Westerveld, M. F. (2018). A systematic review of school-based interventions targeting social communication behaviors for students with autism. *Autism*, 1362361317753564.

Tate, R. L., Perdices, M., Rosenkoetter, U., Shadish, W., Vohra, S., Barlow, D. H., ... and Sampson, M. (2016). The single-case reporting guideline in behavioural interventions (SCRIBE) 2016 statement. *Physical therapy*, *96*(7), e1-e10.

Tobias, A. (2009). Supporting students with autistic spectrum disorder (ASD) at secondary school: a parent and student perspective. *Educational Psychology in Practice*, *25*(2), 151-165.

Todd, Z., Nerlich, B., and McKeown, (2004). Introduction. In Z. Todd, B. Nerlich, S. McKeown, and D. Clarke (Eds.), Mixing methods in psychology: The integration of qualitative and quantitative methods in theory and practice (pp. 3–16). Hove and New York: Psychology Press.

Travis, L., Sigman, M., and Ruskin, E. (2001). Links between social understanding and social behavior in verbally able children with autism. *Journal of Autism and Developmental Disorders*, *31*(2), 119-130.

Tse, J., Strulovitch, J., Tagalakis, V., Meng, L., and Fombonne, E. (2007). Social skills training for adolescents with Asperger syndrome and high-functioning autism. *Journal of autism and developmental disorders*, *37*(10), 1960-1968.**

Uljarevic, M., and Hamilton, A. (2013). Recognition of emotions in autism: a formal meta-analysis. *Journal of autism and developmental disorders*, *43*(7), 1517-1526.

Usher, R. (1996). "A Critique of the Neglected Epistemological Assumptions of Educational Research." In D. Scott, and R. Usher (eds.), Understanding

van Steensel, F. J., Bögels, S. M., and Perrin, S. (2011). Anxiety disorders in children and adolescents with autistic spectrum disorders: a meta-analysis. *Clinical child and family psychology review*, *14*(3), 302.

Vasey, M. W., and Dadds, M. R. (Eds.). (2001). The developmental psychopathology of anxiety. Oxford University Press.

Veneziano, E., Sinclair, H., and Berthoud, I. (1990). From one word to two words: repetition patterns on the way to structured speech. *Journal of child language*, *17*(3), 633-650.

Vygotsky, L. (1987). Mind in society. Cambridge, MA: Harvard University Press.

Waddington, E. M., and Reed, P. (2017). Comparison of the effects of mainstream and special school on National Curriculum outcomes in children with autism spectrum disorder: an archive- based analysis. Journal of Research in Special Educational Needs, 17(2), 132-142.

Wagner, P. (2000). Consultation: Developing a comprehensive approach to service delivery. *Educational Psychology in Practice*, *16*(1), 9-18.

Wang, M., Meng, Q., Liu, L., and Liu, J. (2016). Reliability and Validity of the Spence Children's Anxiety Scale for Parents in Mainland Chinese Children and Adolescents. *Child Psychiatry and Human Development*, *47*(5), 830-839.

Watkins, L., Kuhn, M., Ledbetter-Cho, K., Gevarter, C., and O'Reilly, M. (2017). Evidence-based social communication interventions for children with autism spectrum disorder. *The Indian Journal of Pediatrics*, *84*(1), 68-75.

Webb, N. J., Candreva, I. A., Sturm, D. H., Richter, A., and Dwelle, T. (2012). Evaluating community inclusion: A novel treatment program for children with autism spectrum disorders. Journal of Public and Nonprofit Affairs, 2015, v. 1 no.2:pp. 118-135.

Whalen, C., & Schreibman, L. (2003). Joint attention training for children with autism using behavior modification procedures. *Journal of Child Psychology and Psychiatry*, 44(3), 456–468.

Whalen, C., Schreibman, L., & Ingersoll, B. (2006). The collateral effects of joint attention training on social initiations, positive affect, imitation, and spontaneous speech for young children with autism. *Journal of Autism and Developmental Disorders*, 36(5), 655–664.

White, S. W., Albano, A. M., Johnson, C. R., Kasari, C., Ollendick, T., Klin, A., ... and Scahill, L. (2010). Development of a cognitive-behavioral intervention program to treat anxiety and social deficits in teens with high-functioning autism. *Clinical child and family psychology review*, *13*(1), 77-90.

White, S. W., Oswald, D., Ollendick, T., and Scahill, L. (2010). Anxiety in children and adolescents with autism spectrum disorders. *Clinical psychology review*, *29*(3), 216-229.

Whitehouse, A. J., Watt, H. J., Line, E. A., and Bishop, D. V. (2009). Adult psychosocial outcomes of children with specific language impairment, pragmatic language impairment and autism. *International Journal of Language and Communication Disorders*, *44*(4), 511-528.

Whiteside, S. P., and Brown, A. M. (2008). Exploring the utility of the Spence Children's Anxiety Scales parent-and child-report forms in a North American sample. *Journal of Anxiety Disorders*, *22*(8), 1440-1446.

Widemen, J.E. (1990) Introduction to The souls of black folk by W.E.B.DuBois. New York: Random House as cited in Seidman, I. (2005). Interviewing as Qualitative Research: A Guide for Researchers in Education and the Social Sciences, 3rd Edition. 3rd Edition. Teachers College Press.

Willig, C. (2013). *Introducing qualitative research in psychology*. McGraw-Hill Education (UK).

Winn, B. D., Skinner, C. H., Allin, J. D., and Hawkins, J. A. (2004). Practicing school consultants can empirically validate interventions: A description and demonstration of the non-concurrent multiple-baseline design. *Journal of Applied School Psychology*, *20*(2), 109-128.

Wise, E. A. (2004). Methods for analyzing psychotherapy outcomes: A review of clinical significance, reliable change, and recommendations for future directions. Journal of personality assessment, 82(1), 50-59

Wolery, M., and Harris, S. R. (1982). Interpreting results of single-subject research designs. Physical Therapy, 62, 445–452.

Wolfberg, P. J., Zercher, C., Lieber, J., Capell, K., Matias, S., Hanson, M., and Odom, S. L. (1999) "Can I play with you?" Peer culture in inclusive preschool programs. *Journal of the Association for Persons with Severe Handicaps, 24*, (2), 69 – 84.

Wong, C., Odom, S. L., Hume, K. A., Cox, A. W., Fettig, A., Kucharczyk, S., ... and Schultz, T. R. (2015). Evidence-based practices for children, youth, and young adults with autism spectrum disorder: A comprehensive review. *Journal of autism and developmental disorders*, *45*(7), 1951-1966.

Wood, J. J., and Gadow, K. D. (2010). Exploring the nature and function of anxiety in youth with autism spectrum disorders. *Clinical Psychology: Science and Practice*, *17*(4), 281-292.

Wood, J. J., Drahota, A., and Sze, K. M. (2007). Cognitive behavioral Therapy for anxiety and social problems in children with autism: Intervention manual. *Los Angeles: Unpublished intervention manual developed at the University of California*.

World Health Organization. (1992). The ICD-10 classification of mental and behavioural disorders: clinical descriptions and diagnostic guidelines. *Weekly Epidemiological Record= Relevé épidémiologique hebdomadaire*, *67*(30), 227-227.

Yin, R. (1984). case-study research. Beverly Hills.

Yin, R. K. (2003). Case-study research design and methods third edition. *Applied social research methods series*, *5*.

Yin, R. K. (2009). Case-study research: Design and methods (applied social research methods). *London and Singapore: Sage*.

Yoo, H. J., Bahn, G., Cho, I. H., Kim, E. K., Kim, J. H., Min, J. W., ... and Cho, S. (2014). A Randomized Controlled Trial of the Korean Version of the PEERS® Parent- Assisted Social Skills Training Program for Teens With ASD. *Autism Research*, *7*(1), 145-161.**

Young, R. L., Brewer, N., and Pattison, C. (2003). Parental identification of early behavioural abnormalities in children with autistic disorder. *Autism*, *7*(2), 125-143.

YoungMinds (2017) Wise up! Prioritising wellbeing in schools. Retrieved 13th April 2018 from: https://youngminds.org.uk/media/1428/wise-up-prioritising-wellbeing-in-schools.pdf.

Appendices

APPENDIX ONE - STUDIES SCREENED FOR ELIGIBILITY FOR THE SYSTEMATIC LITERATURE REVIEW

Title	Authors	Journal	Included / excluded, if excluded give reason
SCOPUS search tool			
1. The secret agent society social skills program for children with High-functioning autism spectrum disorders: a comparison of two School variants	Renae Beaumont, Cassie Rotolone, And Kate Sofronoff	Psychology in the Schools, Vol. 52(4), 2015	Included
2. A Group-Administered social Skills Training for 8- to 12- Year-Old, high-Functioning Children With Autism Spectrum Disorders: An Evaluation of its Effectiveness in a Naturalistic Outpatient Treatment Setting	Anne Deckers, Peter Muris, Jeffrey Roelofs, and Arnoud Arntz	J Autism Dev Disord (2016) 46:3493–3504	Excluded - Dependent measures did not make explicit mention to measuring 'anxiety', only mention to Anxiety was as a moderator variable.
3. Evidence-based Social Skills Training for Adolescents with Autism Spectrum Disorders: The UCLA PEERS Program	Elizabeth A. Laugeson, Fred Frankel, Alexander Gantman, Ashley R. Dillon and Catherine Mogil	J Autism Dev Disord (2012) 42:1025–1036	Included
4. A Randomized Controlled Trial to Improve Social Skills in Young Adults with Autism Spectrum Disorder: The UCLA PEERS_Program	Elizabeth A. Laugeson, Alexander Gantman, Steven K. Kapp, Kaely Orenski, and Ruth Ellingsen	J Autism Dev Disord (2015) published online	Excluded – Participants were over 19 year of age
5. Increasing Social Skills and decreasing anxiety in adolescents with Asperger Syndrome	Jennifer L. Loudon	A dissertation submitted to the Kent State University College and Graduate School Of Education, Health, and Human Services	Included
6. Mindfulness-Based Program for Children with Autism Spectrum Disorder and Their Parents: Direct and Long-Term Improvements	Anna Ridderinkhof, Esther I. de Bruin, René Blom and Susan M. Bögels	Mindfulness (2018) 9:773–791	Excluded – Developing social skills was not a core feature of the intervention
7. A Replication and Extension of the PEERS Intervention: Examining Effects on Social Skills and Social Anxiety in Adolescents with Autism Spectrum Disorders	Kirsten A. Schohl, Amy V. Van Heck, Audrey Meyer Carson, Bridget Dolan, Jeffrey Karst and Sheryl Stevens	J Autism Dev Disord (2013) Published Online	Included
8. Social Skills Training for Adolescents with Asperger Syndrome and High-Functioning Autism	Jeanie Tse, Jack Strulovitch, Vicki Tagalakis,	J Autism Dev Disord (2007) 37:1960–1968	Included

9.	A Randomized Controlled Trial of the Korean Version of the PEERS® Parent-Assisted Social Skills Training Program for Teens With ASD	Linyan Meng and Eric Fombonne Hee-Jeong Yoo, Geonho Bahn, In-Hee Cho, Eun-Kyung Kim, Joo-Hyun Kim, Jung-Won Min, Won-Hye Lee, Jun-Seong Seo, Sang-Shin Jun, Guiyoung Bong, Soochurl Cho, Min-Sup Shin, Bung-Nyun Kim, Jae-Won Kim, Subin Park, and Elizabeth A. Laugeson	Autism Research (2014) Published Online	Included
		Science Direct search tool		
10.	Virtual Reality Social Cognition Training for children with high functioning autism	Nyaz Didehbani, Tandra Allen, Michelle Kandalaft, Daniel Krawczyk and Sandra Chapman	Computers in Human Behavior 62 (2016) 703e711	Excluded - Dependent measures did not make explicit mention to measuring 'anxiety'
11.	Social skills plus relaxation training with a child with ASD in the schools	Margaret T. Floressa, Kim Zoder-Martell and Rachel Schaubc	Research in Developmental Disabilities 71 (2017) 200–213	Excluded – Dependent measures did not make explicit mention to measuring 'anxiety'
12.	Reduced anxiety following pivotal response treatment in young children with autism spectrum disorder	Jiedi Lei, Denis G. Sukhodolsky, Sebiha M. Abdullahi, Megan L. Braconnie and Pamela Ventola	Research in Autism Spectrum Disorders 43–44 (2017) 1–7	Included
13.	Teaching social–emotional skills to school-aged children with Autism Spectrum Disorder: A treatment versus control trial in 41 mainstream schools	Belinda Ratcliffe, Michelle Wonga, David Dossetor and Susan Hayes	Research in Autism Spectrum Disorders 8 (2014) 1722–1733	Excluded – Impact of intervention on Anxiety was not explicitly reported in results or discussion
		NU search tool		
14.	Social Competence and Social Skills Training and Intervention for Children with Autism Spectrum Disorders	Albert J. Cotugno	J Autism Dev Disord (2009) 39:1268–1277	Excluded – Intervention incorporated aspects of CBT
15.	Social Skills Training for Young Adults with High-Functioning Autism Spectrum Disorders: A Randomized Controlled Pilot Study	Alexander Gantman, Steven K. Kapp, Kaely Orenski and Elizabeth A. Laugeson	J Autism Dev Disord (2012) 42:1094–1103	Excluded – Participants were over 19 year of age
16.	An Evaluation of Behavioral Skills Training for Teaching Caregivers How to Support Social Skill Development in Their Child with Autism Spectrum Disorder	Mahfuz Hassan, Andrea Simpson, Katey Danaher, James Haesen, Tanya Makela and Kendra Thomson	Journal of Autism and Developmental Disorders (2018) 48:1957–1970	Excluded – Dependent measures did not make explicit mention to measuring 'anxiety'
17.	Social and Vocational Skills Training Reduces Self-reported Anxiety and Depression Among Young Adults on the Autism Spectrum	Ashleigh J. Hillier, Tom Fish, Jeffrey H. Siegel and David Q. Beversdorf	J Dev Phys Disabil (2011) 23:267–276	Excluded – Participants were over 19 year of age

18.	Measuring Changes in Social Behavior During a Social Skills Intervention for Higher-Functioning Children and Adolescents with Autism Spectrum Disorder	Camilla M. McMahon, Laurie A. Vismara and Marjorie Solomon	J Autism Dev Disord (2013) 43:1843–1856	Excluded – Dependent measures did not make explicit mention to measuring 'anxiety'
19.	A Replication and Extension of the PEERS® for Young Adults Social Skills Intervention: Examining Effects on Social Skills and Social Anxiety in Young Adults with Autism Spectrum Disorder	Alana J. McVey, Bridget K. Dolan, Kirsten S. Willar, Sheryl Pleiss, Jeffrey S. Karst, Christina L. Casnar, Christina Caiozzo, Elisabeth M. Vogt, Nakia S. Gordon and Amy Vaughan Van Hecke	J Autism Dev Disord (2016) 46:3739–3754	Excluded – Participants were over 19 year of age
20.	Randomized Comparative Trial of a Social Cognitive Skills Group for Children With Autism Spectrum Disorder	Latha V. Soorya, Paige M. Siper, Todd Beck, Sarah Soffes, Danielle Halpern, Michelle Gorenstein, Alexander Kolevzon, Joseph Buxbaum and Ting Wang	J Am Acad Child Adolesc Psychiatry 2015;54(3):208–216.	Excluded – Dependent measures did not make explicit mention to measuring 'anxiety', only mention to Anxiety was as a moderator variable.
		Reference lists		
21.	Online delivery of a social skills intervention with video modelling for adolescents with autism spectrum disorder	Carolyn Anne Kuehnel	Submitted to Michigan State University in partial fulfilment of the requirements for the degree of School Psychology – Doctor of Philosophy (2013)	Included
22.	The ABC's of Teaching Social Skills to Adolescents with Autism Spectrum Disorder in the Classroom: The UCLA PEERS Program	Elizabeth A. Laugeson, Ruth Ellingsen, Jennifer Sanderson, Lara Tucci and Shannon Bates	J Autism Dev Disord (2014) 44:2244–2256	Included

APPENDIX TWO – QUALITY INDICATORS FOR QUANTITATIVE RESEARCH (GERSTEN ET AL., 2005, P152)

Essential and Desirable Quality Indicators for Group Experimental and Quasi-Experimental Research Articles and Reports

Essential Quality Indicators

Quality Indicators for Describing Participants

1. Was sufficient information provided to determine/confirm whether the participants demonstrated the disability(ies) or difficulties presented?
2. Were appropriate procedures used to increase the likelihood that relevant characteristics of participants in the sample were comparable across conditions?
3. Was sufficient information given characterizing the interventionists or teachers provided? Did it indicate whether they were comparable across conditions?

Quality Indicators for Implementation of the Intervention and Description of Comparison Conditions

1. Was the intervention clearly described and specified?
2. Was the fidelity of implementation described and assessed?
3. Was the nature of services provided in comparison conditions described?

Quality Indicators for Outcome Measures

1. Were multiple measures used to provide an appropriate balance between measures closely aligned with the intervention[a] and measures of generalized performance?
2. Were outcomes for capturing the intervention's effect measured at the appropriate times?

Quality Indicators for Data Analysis

1. Were the data analysis techniques appropriately linked to key research questions and hypotheses? Were they appropriately linked to the unit of analysis in the study?
2. Did the research report include not only inferential statistics but also effect size calculations?

Desirable Quality Indicators

1. Was data available on attrition rates among intervention samples? Was severe overall attrition documented? If so, is attrition comparable across samples? Is overall attrition less than 30%?
2. Did the study provide not only internal consistency reliability but also test–retest reliability and interrater reliability (when appropriate) for outcome measures? Were data collectors and/or scorers blind to study conditions and equally (un)familiar to examinees across study conditions?
3. Were outcomes for capturing the intervention's effect measured beyond an immediate posttest?
4. Was evidence of the criterion-related validity and construct validity of the measures provided?
5. Did the research team assess not only surface features of fidelity implementation (e.g., number of minutes allocated to the intervention or teacher/interventionist following procedures specified), but also examine quality of implementation?
6. Was any documentation of the nature of instruction or series provided in comparison conditions?
7. Did the research report include actual audio or videotape excerpts that capture the nature of the intervention?
8. Were results presented in a clear, coherent fashion?

[a]A study would be acceptable if it included only measures of generalized performance. It would not be acceptable if it only included measures that are tightly aligned.

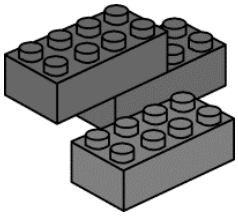
APPENDIX THREE - STAKEHOLDERS AND STRATEGIES FOR ENGAGEMENT

Stakeholder	Strategies used
University of Nottingham	The researcher worked closely with the University in the design planning and implementation of this research. Support was accessed via supervision with tutors. Guidance was also sought from the Doctorate handbook to ensure this research met the expectations and standards for the Doctoral programme.
Local Authority and Educational Psychology Service	Lego-based Therapy was one of the training packages the local authority who employed the researcher had invested in and was offering to schools to support their children and young people with ASD and social communication difficulties. With an investment of local authority resources into this intervention, both the educational psychology service and local authority were keen for the researcher to complete a piece of research which could support their evidence-informed service of delivery, therefore the researcher was committed to sharing the outcomes of this research with the service at the end of the research.
Participating Primary Schools	It was intended that the consenting Primary schools would gain additional professional support with the intervention through the presence of a TEP. Furthermore, the researcher agreed to share the findings and outcomes of the study with the school.
The developers and creators of Lego Therapy	The researcher made contact with the developers and creators of the program, and informed them of the research design and aims.
The Educational Psychology Research community	Due to the limited research into Lego-based Therapy within a school-setting and limited evidence-base for interventions targeting anxiety-related behaviours in children with social communication difficulties. It was anticipated that this research may gain wider attention.

An outline of key stakeholders and strategies used to encourage positive engagement

APPENDIX FOUR - INTERVENTION INFORMATION SHEET

Lego-based Therapy Information Sheet for Parents and Schools



What is Lego-based Therapy?

Lego-based Therapy is…

- Collaborative play Therapy in which children work together to build Lego®
- An opportunity for children and young people with social communication difficulties, to develop skill such as turn-taking, collaboration and social communication.
- Fun!

What does Lego-based Therapy involve?

- A session lasts for one hour
- Children work in groups of 3, with an adult to facilitate
- Initial sessions will help the children to identify group rules (including how to work as a team, language to describe the Lego® bricks, which models to build and what to do if there is any confusion or potential misunderstandings)
- Each session has two core components:
    - Structured play – the children work on a specific Lego® model
    - Free play - the children are able to play and build anything they like, but are encouraged to do this together
- During structured play, each child has a clearly defined job which rotates each session;
    1. Engineer – reads the Lego® instructions
    2. Supplier – finds the Lego® bricks
    3. Builder – builds the model
- At the end of the session the children will have some time to share/photograph their models with the other children in group (this depends on the size of he group)
- An adult (Teaching Assistant) facilitates the group through guiding the process and prompts the children to problem solve, such as supporting their description of the pieces required to build the model
- If you require any further information or would like to discuss the Lego-based Therapy intervention further, www.bricks-for-autism.co.uk is a helpful website or, alternatively, please feel free to contact me or my supervisor using the details given at the end of the consent form and letter.

APPENDIX FIVE – SCHOOL INFORMATION LETTER AND CONSENT FORM



Dear Sir/Madam,

My name is Emma Lynch and I am a Trainee Educational Psychologist at the University of Nottingham, undertaking a research study on Lego-based Therapy. This research is being carried out whilst on an employed placement with Lincolnshire County Council's Educational Psychology service.

The central aim of my research is to evaluate the effectiveness of Lego Therapy on primary school-aged children who have been identified with social communication difficulties. In particular, I am interested in its potential impact on anxiety-related behaviours.

This study will form part of University requirements, and will be supervised by Mr Neil Ryrie (an academic tutor at the University of Nottingham), as well as Dr Gemma Slack (a Senior Educational Psychologist in Lincolnshire County Council's Educational Psychology service).

Since your school is currently running the Lego-based Therapy intervention, and your involvement in the education of children and young people, I am writing to inform you about the study and to ask for consent for your school and children to be involved in this research.

This proposed study will work alongside your delivery of the Lego-based Therapy intervention. Following typical intervention procedures, like those your school received in the Lego-based Therapy intervention training from Lincolnshire County Council, there will be an initial planning session. In this initial session I would like to meet with the trained member of staff, and help to identify the 6 children who are seen as being suitable for the intervention. As part of this research, two children will be selected at random from the group to become the participants in the research, and will need to complete further assessment measures. These measures will be taken before, during and after the intervention in order to evaluate Lego-based Therapy's effectiveness. As you may be aware the intervention lasts for 10 weeks, an indication of the approximate length of the research. These measures will be collected through short questionnaires.

In order to get a good overall understanding of Lego-based Therapy's impact, I would also like the selected two pupil's teacher(s), the intervention facilitator as well as parents, to complete a questionnaire. If you consent for your school to participate in the research, I will provide the class teacher and intervention facilitator with several copies of the questionnaire; I will do the same for parents. I will need up to five to be completed prior to the intervention to collect baseline measures, and then one to be completed each week until the end of the intervention (approximately 10 weeks). These questionnaires should take no more than 15 minutes to complete, and where possible they should be completed on the same day and at the same time where possible; this will help to increase the validity of the research.

Finally, in order to get an in depth evaluation of the intervention and its impact on the children, I would like to carry out a semi-structured interview at the end of the intervention with the intervention facilitator to gather their views of the process. In order to complete this part of the research, I will need around 45

minutes with this member of staff; the time and date of this interview will be at the school's discretion and convenience.

I have an enhanced DBS check, and will be guided by the professional and ethical standards set out by the British Psychological Society (BPS) and the Health and Care Professions Council (HCPC). These guidelines protect the integrity of the research and those involved in it. By following these guidelines all personal information relating to your school and focus pupil will be strictly confidential, which means all names will be anonymised. Any raw information will be destroyed up to two years after the completion and publication of the research, but, final results and outcomes of the study will be made available to your school and the child's parents. Informed consent will also be required from the parents/guardians of the group of children identified for the intervention.

Once you have read this letter and the information attached and, if you are happy for your school to participate in this study, please could you sign and return the consent form below at your earliest convenience, but no later than May 31st 2018.

Participation in this study is totally voluntary and you are under no obligation to take part in the research; it will not affect your autonomy to carry out the intervention. Finally, as a stakeholder in this research you will have the freedom to withdraw from the research, without prejudice, at any point in the process up to April 2019.

If you have further questions or require more information on the study, please feel free to contact me or my supervisor using the details below.

Thank you in anticipation,

Yours Sincerely,

Emma Lynch
Doctorate in Applied Educational Psychology Student

Mr Neil Ryrie
Educational Psychologist and Academic Tutor

AN EVALUATION OF THE LEGO-BASED THERAPY INTERVENTION AND ITS IMPACT ON ANXIETY EXPERIENCED BY PRIMARY SCHOOL-AGED CHILDREN WITH SOCIAL COMMUNICATION DIFFICULTIES

Ethics Approval Number: S1066R

Researcher: Emma Lynch

Supervisors: Mr Neil Ryrie

lpxejl@nottingham.ac.uk

Name of staff _____ School_____

Role _____ Year Group _____

Gender: M/F

Pupil's Class teacher(s)

_____

Lego-based Therapy facilitator

_____

School Address

_____

Contact telephone number_____

Please circle as necessary.

- Have you read and understood the participant information sheet? YES / NO
- Have you been given an opportunity to ask questions and discuss the study? YES /NO
- Have any questions been answered satisfactorily? NOT APPLICABLE / YES /NO
- Have you received enough information about the study? YES / NO
- Do you understand that you are free to withdraw from the study; At any time? YES / NO

  And, without giving a reason? YES / NO

- Do you agree to taking part in this study by engaging in the delivery of a Lego-based Therapy group and supporting the researcher by supporting your staff in completing questionnaire measures (pre, during, post) and the semi-structured interviews at the end of the intervention?

  YES / NO

"This study has been explained to me to my satisfaction, and I agree that I will take part.

I understand that I am free to withdraw consent at any time".

Staff Signature: Date:

For researcher use only:

I have explained the study to …… and they have given their informed consent for X school to participate.

Signature of researcher: Date:

APPENDIX SIX – INFORMATION LETTER AND CONSENT FORM FOR LEGO-BASED THERAPY FACILITATOR



Dear Sir/Madam,

My name is Emma Lynch and I am a Trainee Educational Psychologist at the University of Nottingham, undertaking a research study on Lego-based Therapy. This research is being carried out whilst on an employed placement with Lincolnshire County Council's Educational Psychology service.

The central aim of my research is to evaluate the effectiveness of Lego Therapy on primary school-aged children who have been identified with social communication difficulties. In particular, I am interested in its potential impact on anxiety-related behaviours.

This study will form part of University requirements, and will be supervised by Mr Neil Ryrie (an academic tutor at the University of Nottingham), as well as Dr Gemma Slack (a Senior Educational Psychologist in Lincolnshire County Council's Educational Psychology service).

Since your school is currently running the Lego-based Therapy intervention, and your involvement in the education of children and young people, I am writing to inform you about the study and to ask for consent for your school and children to be involved in this research.

This proposed study will work alongside the school's delivery of the Lego-based Therapy intervention. Following typical intervention procedures, like those your school received in the Lego-based Therapy intervention training from Lincolnshire County Council, there will be an initial planning session. In this initial session I would like to meet with the trained member of staff, and help to identify the 6 children who are seen as being suitable for the intervention. As part of this research, two children will be selected at random from the group to become the participants in the research. They will then need to complete further assessment measures. These measures will be taken before, during and after the intervention in order to evaluate Lego-based Therapy's effectiveness. As you may be aware the intervention lasts for 10 weeks, an indication of the approximate length of the research. These measures will be collected through short questionnaires.

In order to get a good overall understanding of Lego-based Therapy's impact, I would also like you as the selected the intervention facilitator, as well as the two pupil's class teacher(s) and parents, to complete a questionnaire. If you consent to participating in the research, I will provide you and the class teacher with several copies of the questionnaire; I will do the same for parents. I will need up to five of these measure to be completed prior to the intervention to collect baseline measures, and then one to be completed each week until the end of the intervention (approximately 10 weeks). These questionnaires should take no more than 15 minutes to complete, and where possible they should be completed on the same day and at the same time where possible; this will help to increase the validity of the research

Finally, in order to get an in depth evaluation of the intervention and its impact on the children, I would like to carry out a semi-structured interview at the end of the intervention with the intervention facilitator to gather their views of the

process. In order to complete this part of the research, I will need around 45 minutes with this member of staff; the time and date of this interview will be at the school's discretion and convenience.

I have an enhanced DBS check, and will be guided by the professional and ethical standards set out by the British Psychological Society (BPS) and the Health and Care Professions Council (HCPC). These guidelines protect the integrity of the research and those involved in it. By following these guidelines all personal information relating to your school and focus pupil will be strictly confidential, which means all names will be anonymised. Any raw information will be destroyed up to two years after the completion and publication of the research, but, final results and outcomes of the study will be made available to your school and the child's parents. Informed consent will also be required from the parents/guardians of the group of children identified for the intervention.

Once you have read this letter and the information attached and, if you are happy for your school to participate in this study, please could you sign and return the consent form below at your earliest convenience, but no later than May 31st 2018.

Participation in this study is totally voluntary and you are under no obligation to take part in the research; it will not affect your autonomy to carry out the intervention. Finally, as a stakeholder in this research you will have the freedom to withdraw from the research, without prejudice, at any point in the process up to April 2019.

If you have further questions or require more information on the study, please feel free to contact me or my supervisor using the details below.

Thank you in anticipation,

Yours Sincerely,

Emma Lynch — Doctorate in Applied Educational Psychology Student

Mr Neil Ryrie — Educational Psychologist and Academic Tutor

AN EVALUATION OF THE LEGO-BASED THERAPY INTERVENTION AND ITS IMPACT ON ANXIETY EXPERIENCED BY PRIMARY SCHOOL-AGED CHILDREN WITH SOCIAL COMMUNICATION DIFFICULTIES

Ethics Approval Number: S1066R

Researcher: Emma Lynch

Supervisors: Mr Neil Ryrie

lpxejl@nottingham.ac.uk

Name of staff _____ School_____

Role _____ Year Group _____

Gender: M/F

Lego-based Therapy facilitator_____

School Address _____

Contact telephone number_____

Please circle as necessary.

- Have you read and understood the participant information sheet? YES / NO
- Have you been given an opportunity to ask questions and discuss the study? YES / NO
- Have any questions been answered satisfactorily? NOT APPLICABLE / YES / NO
- Have you received enough information about the study? YES / NO
- Do you understand that you are free to withdraw from the study; At any time? YES / NO
  And, without giving a reason? YES / NO
- Do you agree to taking part in this study by engaging in the delivery of a Lego-based Therapy group and supporting the researcher by completing questionnaire measures (pre, during, post) and the semi-structured interviews at the end of the intervention?
  YES / NO

"This study has been explained to me to my satisfaction, and I agree that I will take part.

I understand that I am free to withdraw consent at any time".

Staff Signature: Date:

For researcher use only:

I have explained the study to …… and they have given their informed consent for X school to participate.

Signature of researcher: Date:

APPENDIX SEVEN – INFORMATION LETTER AND CONSENT FORM FOR CLASS TEACHER



Dear Sir/Madam,

My name is Emma Lynch and I am a Trainee Educational Psychologist at the University of Nottingham, undertaking a research study on Lego-based Therapy. This research is being carried out whilst on an employed placement with Lincolnshire County Council's Educational Psychology service.

The central aim of my research is to evaluate the effectiveness of Lego Therapy on primary school-aged children who have been identified with social communication difficulties. In particular, I am interested in its potential impact on anxiety-related behaviours.

This study will form part of University requirements, and will be supervised by Mr Neil Ryrie (an academic tutor at the University of Nottingham), as well as Dr Gemma Slack (a Senior Educational Psychologist in Lincolnshire County Council's Educational Psychology service).

Since your school is currently running the Lego-based Therapy intervention, and your involvement in the education of children and young people, I am writing to inform you about the study and to ask for consent for your school and children to be involved in this research.

This proposed study will work alongside the school's delivery of the Lego-based Therapy intervention. Following typical intervention procedures, like those your school received in the Lego-based Therapy intervention training from Lincolnshire County Council, there will be an initial planning session. In this initial session I would like to meet with the trained member of staff, and help to identify the 6 children who are seen as being suitable for the intervention. As part of this research, two children will be selected at random from the group to become the participants in the research. They will then need to complete further assessment measures. These measures will be taken before, during and after the intervention in order to evaluate Lego-based Therapy's effectiveness. As you may be aware the intervention lasts for 10 weeks, an indication of the approximate length of the research. These measures will be collected through short questionnaires.

In order to get a good overall understanding of Lego-based Therapy's impact, I would also like you as the selected pupil's teacher(s), the intervention facilitator as well as parents, to complete a questionnaire. If you consent to participating in the research, I will provide you and intervention facilitator with several copies of the questionnaire; I will do the same for parents. I will need up to five of these measure to be completed prior to the intervention to collect baseline measures, and then one to be completed each week until the end of the intervention (approximately 10 weeks). These questionnaires should take no more than 15 minutes to complete, and where possible they should be completed on the same day and at the same time where possible; this will help to increase the validity of the research.

Finally, in order to get an in depth evaluation of the intervention and its impact on the children, I would like to carry out a semi-structured interview at the end of the intervention with you to gather their views of the process. In order to

complete this part of the research, I will need around 45 minutes to meet with you; the time and date of this interview will be at the school's discretion and convenience.

I have an enhanced DBS check, and will be guided by the professional and ethical standards set out by the British Psychological Society (BPS) and the Health and Care Professions Council (HCPC). These guidelines protect the integrity of the research and those involved in it. By following these guidelines all personal information relating to your school and focus pupil will be strictly confidential, which means all names will be anonymised. Any raw information will be destroyed up to two years after the completion and publication of the research, but, final results and outcomes of the study will be made available to your school and the child's parents. Informed consent will also be required from the parents/guardians of the group of children identified for the intervention.

Once you have read this letter and the information attached and, if you are happy to participate in this study, please could you sign and return the consent form below at your earliest convenience, but no later than May 31st 2018.

Participation in this study is totally voluntary and you are under no obligation to take part in the research; it will not affect your autonomy to carry out the intervention. Finally, as a stakeholder in this research you will have the freedom to withdraw from the research, without prejudice, at any point in the process up to April 2019.

If you have further questions or require more information on the study, please feel free to contact me or my supervisor using the details below.

Thank you in anticipation,

Yours Sincerely,

Emma Lynch
Doctorate in Applied Educational Psychology Student

Mr Neil Ryrie
Educational Psychologist and Academic Tutor

EXPERIENCED BY PRIMARY SCHOOL-AGED CHILDREN WITH SOCIAL COMMUNICATION DIFFICULTIES

Ethics Approval Number: S1066R

Researcher: Emma Lynch

Supervisors: Mr Neil Ryrie

lpxejl@nottingham.ac.uk

Name of staff _____ School_____

Role _____ Year Group _____

Gender: M/F

Name of class teacher: _____

School Address _____

Contact telephone number_____

Please circle as necessary.

- Have you read and understood the participant information sheet? YES / NO
- Have you been given an opportunity to ask questions and discuss the study? YES / NO
- Have any questions been answered satisfactorily? NOT APPLICABLE / YES / NO
- Have you received enough information about the study? YES / NO
- Do you understand that you are free to withdraw from the study; At any time? YES / NO
  And, without giving a reason? YES / NO
- Do you agree to taking part in this study by engaging in the delivery of a Lego-based Therapy group and supporting the researcher by completing questionnaire measures (pre, during, post) and participating in a semi-structured interview at the end of the intervention? YES / NO

"This study has been explained to me to my satisfaction, and I agree that I will take part.

I understand that I am free to withdraw consent at any time".

Staff Signature: Date:

For researcher use only:

I have explained the study to …… and they have given their informed consent for X school to participate.

Signature of researcher: Date:

APPENDIX EIGHT – SCHOOL DEPARTURE LETTER

The University of Nottingham
UNITED KINGDOM · CHINA · MALAYSIA

October 2018

Dear Parent/Guardian,

My name is Emma Lynch and I am a Trainee Educational Psychologist at the University of Nottingham.

You received a letter from me towards the end of the last academic year explaining a piece of research I was conducting as part of my Doctoral training with St Bartholomew's Primary School.

The aim of my research is to evaluate the effectiveness of Lego-based Therapy on primary school-aged children who have been identified with social communication difficulties; in particular, its potential impact on anxiety-related behaviours.

You very kindly provided consent for your child to participate in this research. However, due to a range of factors, St Bartholomew's are unable to support the research at this time. This therefore means that you and your child's participation in the research has come to an end.

Please note, this will in no way affect your child's access to the intervention, and delivery of the intervention will continue at the school's discretion.

If you would like to ask any questions or have any queries about the research, please feel free to contact me on the email address provided below.

Yours Sincerely,

Emma Lynch

Doctorate in Applied Educational Psychology Student

Study details:
Ethics Approval Number: S1066R
Researcher: Emma Lynch (*lpxejl@nottingham.ac.uk*)
Supervisor: Mr Neil Ryrie

APPENDIX NINE – PARENT INFORMATION LETTER AND CONSENT FORM



Dear Parent/Guardian,

My name is Emma Lynch and I am a Trainee Educational Psychologist at the University of Nottingham, undertaking a research study on Lego-based Therapy. This research is being carried out whilst on an employed placement with Lincolnshire County Council's Educational Psychology service.

The main aim of my research is to evaluate the effectiveness of Lego-based Therapy on primary school-aged children who have been identified with social communication difficulties. In particular, I am interested in its potential impact on anxiety-related behaviours.

This study will form part of University requirements, and will be supervised by Mr Neil Ryrie (an academic tutor at the University of Nottingham), as well as Dr Gemma Slack (a Senior Educational Psychologist Lincolnshire County Council's Educational Psychology service).

Your child's school has been approached by myself because they are currently running the Lego-based Therapy intervention in school. Since your child is enrolled at X school and identified as being suitable for this intervention, it is required that I write to inform all parents/guardians about this study and to ask for consent for your son/daughter to be involved in this research.

Through conversations with staff at X school, your child has been identified as being suitable for the intervention due to their social communication difficulties as well as their enjoyment for Lego. Furthermore, it has also been shared that your child is not currently receiving another intervention focussing on developing their social communication.

Before all children begin the intervention, a member of staff (named where possible) from X will meet with me. In this initial meeting, up to 6 children will be identified for the intervention. As part of this research, two children will be selected at random from the group to complete some extra assessment measures. These will be taken before, during and after the intervention 10 weeks in order to evaluate Lego Therapy's effectiveness. The intervention lasts for 10 weeks, an indication of the approximate length of the research. These measures will be collected through short questionnaires.

In order to get a good overall understanding of Lego-based Therapy's impact, I would also like your child's teacher, as well as yourself, to complete a questionnaire. If you consent for your child to be in the research, I will provide you with a copy of the questionnaire. I will need you to complete one copy prior to the intervention, and one at the end of the intervention' I will provide more details about timings

closer to the time. These questionnaires should take no more than 15 minutes to complete.

I have an enhanced DBS check, and will be guided by the professional and ethical standards set out by the British Psychological Society (BPS) and the Health and Care Professions Council (HCPC). These guidelines protect the integrity of the research and those involved in it. By following these guidelines all personal information relating to your child will be strictly confidential and all names will be anonymised. Any raw information will be destroyed up to two years after the completion and publication of the research, but, the final results and outcomes of the study will be made available to your child's school and to you.

Once you have read this letter and the information attached and, if you are happy for your son/daughter to participate in this study, please could you sign and return the consent form below at your earliest convenience, but no later than May 31st 2018.

To support me in this process, I would also be grateful if you could share and discuss this study with your son/daughter. Your child's teacher will be providing your son/daughter with more information and asking for their consent on a separate sheet.

Participation in this study is totally voluntary and you and your child are under no obligation to take part in the research; it will not affect your son/daughter's ability to access the intervention in school. Finally, you and your son/daughter have the freedom to withdraw from the research, without prejudice, at any point in the process, up to April 2019.

If you have further questions or require more information on the study, please feel free to contact me or my supervisor using the details below.

Thank you in anticipation,

Yours Sincerely,

Emma Lynch
Doctorate in Applied Educational Psychology Student and Academic Tutor

Mr Neil Ryrie
Educational Psychologist

AN EVALUATION OF THE LEGO-BASED THERAPY INTERVENTION AND ITS IMPACT ON ANXIETY EXPERIENCED BY PRIMARY SCHOOL-AGED CHILDREN WITH SOCIAL COMMUNICATION DIFFICULTIES

Ethics Approval Number: S1066R

Researcher: Emma Lynch

Supervisors: Mr Neil Ryrie

lpxejl@nottingham.ac.uk

Name of Child _____ School_____

Date of Birth _____ Year Group _____

Gender M/F Class teacher _____

Home Address _____

Contact telephone number _____

Please circle as necessary.

- Have you read and understood the participant information sheet? YES / NO
- Have you been given an opportunity to ask questions and discuss the study? YES/ NO
- Have any questions been answered satisfactorily? NOT APPLICABLE / YES / NO
- Have you received enough information about the study? YES / NO
- Do you understand that you are free to withdraw from the study; At any time? YES / NO
  And, without giving a reason? YES / NO

- Do you agree to your child taking part in this study? YES / NO
- Does your child agree to take part in this study? YES / NO
- Do you agree to your child's teacher completing questionnaires about any changes since beginning Lego-based Therapy? Any completed questionnaires will be made anonymous, locked away and destroyed up to two years after publication of the research.
  YES / NO
- Do you agree to completing questionnaires about any changes since beginning Lego-based Therapy? Any completed questionnaires will be made anonymous, locked away and destroyed up to two years after publication of the research?
  YES / NO

"This study has been explained to me to my satisfaction, and I agree that I will take part. I understand that I am free to withdraw consent at any time".

Parental Signature: Date:

Parent's name:

For researcher use only:

I have explained the study to …… and they have given their informed consent for X school to participate.

Signature of researcher: Date:

APPENDIX TEN – CHILDREN'S CONSENT LETTER

AN EVALUATION OF THE LEGO-BASED THERAPY INTERVENTION AND ITS IMPACT ON ANXIETY EXPERIENCED BY PRIMARY SCHOOL-AGED CHILDREN WITH SOCIAL COMMUNICATION DIFFICULTIES

Ethics Approval Number: S1066R

Researcher: Miss Emma Lynch

Supervisors: Mr Neil Ryrie

lpxejl@nottingham.ac.uk

To ……..

Your school is starting a new programme called Lego-based Therapy, and you have been invited to be a part of this.

In Lego-based Therapy children:

- Build Lego together
- Talk to each other
- Help each other make rules and then follow these rules

Lego-based Therapy will run once a week for one hour with one of your teachers. There will be up to 6 children doing the programme with you, with 3 children in each group.

Alongside the Lego-based Therapy, a piece of research is happening. Research is when an adult finds out if things work, how things work and even, why they might work.

This research would like to find out if Lego-based Therapy works, in particular, if it can help children feel better when they are in school.

Would you like to be a part of the research?

Yes No

If you choose to be a part of the group but don't enjoy it, tell your teacher and you can leave the group. If you don't choose to be a part of the group or the research that is ok, this is your choice.

To help this research, Emma would like you to answer some questions, your answers will help Emma to learn about how you work, play and feel. Emma will need you to answer these questions each week until you finish the Lego-based Therapy.

Will you answer these questionnaires for Emma?

Yes No

Emma will also ask your teachers and your parents to answer similar questions.

Is it ok for Emma to ask you parents these questions?

Yes No

Is it ok for Emma to ask your teachers these questions?

Yes No

Your name:

For staff use only:

I have explained the study to …… and they have given their informed consent to participate in the research.

Signature of Staff: Date:

For researcher use only:

I have explained the study to …… and they have given their informed consent to participate in the research.

Signature of researcher: Date:

APPENDIX ELEVEN – PARTICIPANT WITHDRAWAL LETTER

The University of Nottingham
UNITED KINGDOM • CHINA • MALAYSIA

October 2018

Dear Parent/Guardian,

My name is Emma Lynch and I am a Trainee Educational Psychologist at the University of Nottingham.

You received a letter from me towards the end of the last academic year explaining a piece of research I was conducting as part of my Doctoral training with XXXXX Primary School.

The aim of my research is to evaluate the effectiveness of Lego-based Therapy on primary school-aged children who have been identified with social communication difficulties; in particular, its potential impact on anxiety-related behaviours.

You very kindly provided consent for your child to participate in this research.

As part of the research, all children had to meet some inclusion criteria. One criterion was evidence that the child presents as worried/anxious 'a lot' or 'most of the time'. After reviewing the data collected so far for your child, the data indicates that your child does meet this specific criterion. This means that I have had to bring you and your child's participation in the research to an end.

Please note, this will in no way affect your child's access to the intervention, and delivery of the intervention and your child's involvement in it will continue at school's discretion.

Thank you so much for your support in the research. If you would like to ask any questions or have any queries about the research, please feel free to contact me on the email address provided below.

Yours Sincerely,

Emma Lynch

Doctorate in Applied Educational Psychology Student

Study details:
Ethics Approval Number: S1066R
Researcher: Emma Lynch (*lpxejl@nottingham.ac.uk*)
Supervisor: Mr Neil Ryrie

Fidelity Check for Lego-based Therapy

The University of Nottingham
UNITED KINGDOM • CHINA • MALAYSIA

Structured-Play			Comments?
Environment	Are group rules displayed?	Yes No	
	Is a visual timetable displayed?	Yes No	
	What is the space like?	Limited? Plentiful?	
	How well is the space managed?	Lots of distraction? Distraction free?	
Adults	Was the session planned?	Yes No	
	Was there a starter activity?	Yes No	
	Was the session evaluated at the end?	Yes No	
	Level of adult interaction	Active? Passive?	
Children	Do the children communicate with each other?	Prompted? Spontaneous?	
	Are children taking turns?	Prompted? Spontaneous?	
	Level of child engagement	None Some All	
Task	Were roles allocated?	Yes No	
	Are roles being swapped on a session by session basis?	Yes No	

Free-Play			Comments?
Environment	Are group rules displayed?	Yes No	
	Is a visual timetable displayed?	Yes No	
	What is the space like?	Limited? Plentiful?	
	How well is the space managed?	Lots of distraction? Distraction free?	
Adults	Was the session planned?	Yes No	
	Was the session evaluated at the end?	Yes No	
	Level of adult interaction	Active? Passive?	
Children	Do the children communicate with each other?	Prompted? Spontaneous?	
	Are the children sharing?	Prompted? Spontaneous?	
	Level of child engagement	None / Some / All	
Task	Are children working together, independently or with an adult to build the Lego?	Together Independently With an adult	
	How do the children tidy up?	Together Independently	

APPENDIX THIRTEEN– LETTERS TO PARENTS TO GAIN CONSENT REGARDING CHANGE TO RESEARCH

Dear Parent/Guardian,

My name is Emma Lynch and I am a Trainee Educational Psychologist at the University of Nottingham, working within the Educational Psychology Team in Lincolnshire.

You received a letter from me towards the end of the last academic year explaining a piece of research I was conducting as part of my Doctoral training with X Primary School. The aim of this research was to evaluate the effectiveness of Lego-based Therapy on primary school-aged children who have been identified with social communication difficulties; in particular, its potential impact on anxiety-related behaviours. At that time, you very kindly provided consent for your child to participate in this research.

As my research journey continues, I would like to ask you for further consent to gain your child's views on Lego-based Therapy through a semi-structured interview with your child. The interviews would take place in school once the intervention has finished. The interview will be conducted by me, and will ask your child about what they liked and didn't like about Lego-based Therapy, as well as some questions about how the intervention made them feel. The interview will last approximately 20-30 minutes, during this time your child will have the right to withdraw at any point and without question.

As I mentioned in my previous letter, I have an enhanced DBS check, and will be guided by the professional and ethical standards set out by the British Psychological Society (BPS) and the Health and Care Professions Council (HCPC). These guidelines protect the integrity of the research and those involved in it. By following these guidelines all personal information relating to your child will be strictly confidential and all names will be anonymised. Any raw information will be destroyed up to two years after the completion and publication of the research, but, the final results and outcomes of the study will be made available to your child's school and to you.

Once you have read this letter and the information attached and, if you are happy for your son/daughter to participate in an interview with me as part of my research, please could you sign and return the consent form below at your earliest convenience, but no later than December 20th 2018.

To support me in this process, I would also be grateful if you could share and discuss the interviews with your child. This is a reminder to also say, that participation in this study is totally voluntary, you and your child are under no obligation to take part in the research; it will not affect your son/daughter's ability to access the intervention in school. Finally, you and your child have the freedom to withdraw from the research, without prejudice, at any point in the process, up to April 2019.

If you have further questions or require more information on the study, please feel free to contact me or my supervisor using the details below.

Yours Sincerely,
Miss Emma Lynch
Doctorate in Applied Educational Psychology Student

AN EVALUATION OF THE LEGO-BASED THERAPY INTERVENTION AND ITS IMPACT ON ANXIETY EXPERIENCED BY PRIMARY SCHOOL-AGED CHILDREN WITH SOCIAL COMMUNICATION DIFFICULTIES

Ethics Approval Number: S1066R

Researcher: Emma Lynch *lpxejl@nottingham.ac.uk*

Supervisor: Mr Neil Ryrie lpanr@exmail.nottingham.ac.uk

Researcher's Contact number: 07867553082

Name of Child _____ School_____

Date of Birth _____ Year Group _____

Gender M/F Class teacher _____

Home Address _____

Contact telephone number _____

Please circle your response as necessary:

- Have you read and understood the request of this letter? YES / NO
- Do you agree to your child taking part in the interviews about their views on Lego-based Therapy?
  YES / NO
- Does your child agree to take part in this study? YES / NO
  - Do you understand that you are free to withdraw from the study; At any time? YES / NO
    And, without giving a reason? YES/NO

"The addition of interviews to the study has been explained to me to my satisfaction, and I agree that my child can take part. I understand that I am free to withdraw consent at any time".

Parental Signature: ……. Date:

Parent's name: …….

For researcher use only:

I have explained the study to …… and they have given their informed consent for X school to participate. Date:

APPENDIX FOURTEEN – PROPOSED SEMI-STRUCTURE INTERVIEW SCHEDULE WITH FACILITATOR

Proposed Semi-Structured Interview Schedule

Approximate length of interview: 30-45 minutes

Interviewer: Emma Lynch (Researcher)

Interviewee: Intervention facilitator (Teaching assistant)

Location: A quiet room in school, free form interruption or distraction

How will the interview be recorded? By dictaphone and notes taken by interviewer

How will the interview recording be stored?

- All recordings will be saved immediately after recording. All files will be encrypted and password protected on a laptop computer. Only the researcher will have access to the password. All interview recordings will be stored electronically until April 2019 and then they will be destroyed by the researcher.
- All verbal recordings will be transcribed by the researcher in to a word document and saved electronically on a laptop computer. The word documents will be encrypted and password protected. Only the researcher will have access to the password.

How will the interview data be analysed? All interview scripts will be analysed qualitatively using content analysis.

10 example questions:

1. How have you found the Lego-based Therapy?
2. What impact, if any, do you think it has had for the children who have received the intervention?
3. What do you think the strengths of Lego-based Therapy are?
4. What do you think are the hindering factors of Lego-based Therapy?
5. What do you like about Lego-based Therapy?
6. What do you dislike about Lego-based Therapy?
7. What aspects of the intervention stand out for you the most?
8. What do you think the turning point is in the intervention for the children? When could you see this? And, what do you think leads to this?
9. Have you delivered other school-based interventions with children with Social Communication Difficulties? And/or Anxiety? If yes, what makes Lego-based Therapy different?
10. What could make the intervention even more successful?

Reasons and purposes for these questions:

- The questions are open in order to explore the subjective views of the intervention facilitator

- The questions consider both the strengths and weaknesses of the intervention without using leading questions, in order to collect a balanced account of the intervention
- These semi-structured interviews are to enable to the researcher to explore and evaluate the impact of Lego-based Therapy to a deeper level, and therefore the open-ended nature of the questions will hopefully allow the interviewee to relax and feel comfortable to open up to the interviewer.

APPENDIX FIFTEEN – PROPOSED SEMI-STRUCTURED INTERVIEW SCHEDULE WITH CHILD

Proposed Semi-Structured Interview Schedule with Child

Approximate length of interview: ~20-30 minutes (time will be dependent on each individual child's willingness and ability to engage with the interviewer)

Interviewer: Emma Lynch (Researcher)

Interviewee: Child Participant

Location: A quiet room in school, free form interruption or distraction. Safeguarding lead in school will be made aware of time and location of interview should they be required at any point during the interview process.

How will the interview be recorded? By dictaphone and notes taken by interviewer

How will the interview recording be stored?

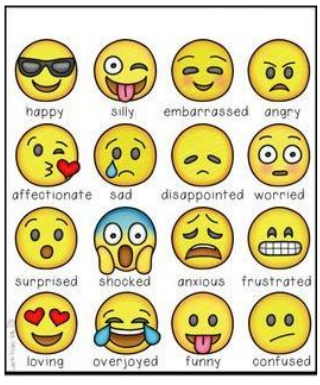
- All recordings will be saved immediately after recording. All files will be encrypted and password protected on a laptop computer. Only the researcher will have access to the password. All interview recordings will be stored electronically until April 2019 and then they will be destroyed by the researcher.
- All verbal recordings will be transcribed by the researcher in to a word document and saved electronically on a laptop computer. The word documents will be encrypted and password protected. Only the researcher will have access to the password.

How will the interview data be analysed? All interview scripts will be analysed qualitatively using content analysis.

6 example questions:

1. Tell me about Lego-based Therapy.
2. What have you liked / enjoyed about Lego-based Therapy?
3. Is there anything you didn't like about Lego-based Therapy?
4. Using pictures of the following faces:

I will ask: how did Lego-based Therapy make you feel? The child will be asked to point to a picture, and I will follow up with, can you explain some more about this answer?



5. Following question 4, I will ask whether that feeling has changed / stayed the same since starting Lego-based Therapy.
6. I will end with 'three stars and a wish' a question to draw out what worked well and what would be even better.

Reasons and purposes for these questions:

- The questions are open in order to explore the subjective views of the child
- The questions consider both the strengths and weaknesses of the intervention without using leading questions, in order to collect a balanced account of the intervention
- Questions are solution-focused and the interview will end with a positive focus

These semi-structured interviews are to enable to the researcher to explore and evaluate the impact of Lego-based Therapy to a deeper level, and therefore the open-ended nature of the questions will hopefully allow the interviewee to relax and feel comfortable to open up to the interviewer.

APPENDIX SIXTEEN – DEBRIEFING STATEMENTS AND PROCEDURES

An evaluation of the Lego-based-based Therapy intervention and its impact on anxiety experienced by primary school-aged children with social communication difficulties

Ethics Approval Number or Taught Project Archive Number

Researcher: Emma Lynch

Supervisors: Mr Neil Ryrie

lpxejl@nottingham.ac.uk

Debrief statement to be read aloud to children by staff member:

Now that Lego-based Therapy has finished, this means that you have also finished Emma's research. She would like to say a big thank you for taking part in the research. You have worked really hard in your Lego-based Therapy group. Emma will now be spending some time having a look over your hard work, and she will be having a think about how Lego-based Therapy may have helped you. Emma will be talking to your teachers and your parents/guardians, and in a few months will share what she has found with them. If you would like to find out about this too, you can, you will just need to ask me and I will find this out for you. Emma would like to say thank you again, and well done!

Debrief to Parents will be via a letter, this will outline and reiterate what has happened, and the researcher will also give details of the evaluation outcomes and signpost them to further information, should they wish. Parents will also be able to contact the researcher at a later date if they would like to read the finished thesis. [Copy of letter presented below]

Debrief to the school will be via a face-to-face meeting with all relevant staff, this meeting will outline and reiterate what has happened, and the researcher will also give details of the evaluation outcomes. School will also be informed they will have access to the thesis once it has been completed. [Copy of letter presented below]

Debrief to the local Authority and Educational Psychology Service will be through a presentation at a team meeting once the thesis has been approved and passed. The researcher will provide them with a copy of the final thesis.

University of Nottingham
UK | CHINA | MALAYSIA

Faculty of Science
School of Psychology

The University of Nottingham
University Park
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NG7 2RD

t: +44 (0) 115 7486970
e: psychology@nottingham.ac.uk

www.nottingham.ac.uk/psychology

08.03.19

Dear Parents and School of XXXXX,

Thank you for allowing XXXXX to take part in the research study on the on the impact of the Lego-based Therapy on anxiety in children with social communication difficulties, which has now come to an end for XXXXX. I have attached a summary document of the assessment data that was collected during the research process. Please note that these scores were the result of a one-off assessment and should always be interpreted alongside other information in the wider context. If you wish for further review or analysis, please contact school staff for further discussion, who may advise you or seek further consultation.

Further analysis of all the data collected will continue in the future months. If you would like any additional information in the future or would like to discuss any of the information shared, please do not hesitate to contact myself by email at emma.lynch@nottigham.ac.uk .

Participation in the study is totally voluntary and you are still free to withdraw the data. All data collected will be kept anonymous and used for research purposes only.

Yours sincerely,
Emma Lynch
(Trainee Educational Psychologist)
Ethics approval number reference: S1066R

Research supervisor: Dr Nick Durbin
Email address should have further questions about the research:
lpzdur@exmail.nottingham.ac.uk

Results summary for XXXXX

- Paediatric Index Emotional Distress (PI-ED; O-Connor et al., 2010): Is a 14-question questionnaire. It assesses psychological distress. It asks children about their symptoms related to anxiety and depression. The lower the score, the lower the level of reported feelings of emotional distress.

	Before Lego-based Therapy	During Lego-based Therapy
Mean	*7*	*3*

- School Anxiety Scale-Teacher Form (SAS-TF; Lyneham et al., 2008): Is a 16-question questionnaire for teachers to complete. It is designed to assess the behaviour of primary school-aged, exploring the behaviours and feelings distinctive to the experience of anxiety in school. The lower the score, the lower the level of reported anxiety.

	Before Lego-based Therapy	During Lego-based Therapy
Mean	*10*	*3*

- The Spence Children's Anxiety Scale- child report (SCAS; Spence, 1998): Is a 45 item self-report questionnaire assessing symptoms of the most common anxiety disorders in childhood. The lower the score, the lower the level of reported anxiety.

	Before Lego-based Therapy	During Lego-based Therapy
Panic attack and agoraphobia	*7*	*2*
Separation anxiety	*4*	*1*
Physical injury fears	*0*	*2*
Social phobia	*4*	*0*
Obsessive compulsive	*8*	*3*
Generalized anxiety disorder / overanxious disorder	*5*	*0*
Total Score	**28**	**8**

- Spence Children's Anxiety Scale- parent report (SCAS-P; Spence, 1998): Is a 39 item self-report questionnaire assessing symptoms of the most common anxiety disorders in childhood. The lower the score, the lower the level of reported anxiety.

	Before Lego-based Therapy	During Lego-based Therapy
Panic attack and agoraphobia	*3*	*1*
Separation anxiety	*7*	*6*
Physical injury fears	*7*	*6*
Social phobia	*7*	*4*
Obsessive compulsive	*2*	*2*
Generalized anxiety disorder / overanxious disorder	*5*	*6*
Total Score	**31**	**25**

APPENDIX SEVENTEEN – EXAMPLE INTERVIEW TRANSCRIPT

Key:

I – Interviewer

A – Interviewee (Intervention facilitator at Harry's school)

1. I: Yes,
2. A: Please let me have a copy of it because when I first got introduced to Harry, I was told not to have any direct contact with him. I was told to go just be in his area and certainly don't ask him any questions, don't talk to him to start with, so to actually see him sat here with you.
3. I: Yeah.
4. A: Yeah, like that, it's amazing.
5. I: He made eye contact as well.
6. A: Yeah,
7. I: he was actually looking up and he had a little smile on his face like a because we were a little unsure whether he would give me anything then but he gave me quite a lot.
8. A: Yeah and the fact of okay talked about other things, but whether they were genuine things that bothered him in Lego Club.
9. I: Yeah. Well we won't…
10. A: but they were still these things that he felt were important to tell you right here. Yeah, but you didn't ask him what he felt about that picture.
11. I: Yeah.
12. A: He told you what he felt about them, he volunteered that information
13. I: yeah,
14. A: So if we can have that recording…that would be amazing!
15. I: of course you can, of course. I'll email it to you. That'll be lovely.

16. I: Okay, so we've obviously collected some of Harry's views, which you heard there, but I guess it's over to you, somebody who worked with Harry in his group for the 10 weeks ermm. tell me about how your experience of Lego Therapy was with Harry.

17. A: Yeah, I can say to start with he was very quiet. He didn't say anything. He was… you really had to support and structure and sorry, just trying to flick through this (documents from Lego club) it and actually, really did heavily supported him, most obviously he was becoming more independent and the fact that maybe was if like the repetitiveness, but the fact of he found the dog and that was something he gravitated to in the freestyle …and even when others, but that gave him the point to work with others because if others had the dog or asked for the dog…

18. I: So the recalling with Harry where he said that he liked to find the dog that was actually, an accurate reflection of something, that you saw too?

19. A: Yeah

20. I: Okay, so he actually again was offering a little bit of information quite comfortably would we say just then?

21. A: Yeah. definitely. I don't think there's any uneasiness. Yeah, the comments and observations I made on the very first one was very quiet only spoken when spoken to … so to actually volunteer information to somebody who was met three times, four time.

22. I: Yeah and not actually directly. I was just a passive Observer wasn't I?

23. A: But the fact of each time when he did look for dog off to that gave him the chance to… erm …I'm looking for a week two when he was heavily scaffolded because he was the engineer that way yeah.

24. I: So do you think that Lego Therapy has helped Harry?

25. A: Obviously, it's always hard because when you have lots of things going on, but I definitely think the fact of it gave him a space and opening of a different variety obviously with a set of children that he doesn't usually work with so that in itself to talk to people and that he doesn't normally work with

and obviously I've never worked with him before Lego. So for him to make the bond with five of the children two new adults because it didn't work with Mrs. Dudley. Yeah, and then obviously have you come in observe, the sit and discuss with you? Yeah from the Harry I met 15 weeks ago. There's no way I would have said he would have spoken to you like, anywhere like he did.

26. I: Okay.

27. A: Yeah, his strategies for compromise to start with, he just let the other people take things off him right the beginning and if he heard this week three he gave a cat and a fish. He gave a cat a fish. When asked…. Nope… when asked why he said he's going to eat it…. agitated….no initiated… sorry, its bad when you can't even read your own writing, and it's even worse when being recorded.

28. I: that's alright.

29. A: Yes, so by week three. He did just interact with others.

30. I: Do you think that Harry so, before Lego Therapy obviously you were discussing with colleagues about children, that would be appropriate for Lego Therapy. Do you still feel that Harry was a good choice to join in the group?

31. A: Definitely! Yeah speaking to his one to one. She says the differences is with him in class right reflected as well

32. I: and what sort of things have she noticed as being there with him in class?

33. A: ermm again, a lot of it has to do discussing with people because rather than actually say to an adult he needs help. He's used to sort of just dance by them… in order to get their attention for them to say, Harry, what do you want? Whereas now, she said last week or week before he saw said, "excuse me. Can you help me?"

34. I: Wow

35. A: Or something to those?

36. I: Yeah.

37. A: Yeah he initiated and he said what he wanted.

38. I: so something you think might have helped him, is giving him a physical space where he has the opportunity in a smaller group

39. A: definitely

40. I: To, Practice talking to other children, to work with other children

41. A: It’s like this one of those that it forces your hand, but if in order to be in the LEGO Group Well, I have to ask the Builder and I have to ask the supplier. Ermm, I would say maybe compared to the others in the group, I wouldn’t say he made, for want of a better phrase, he made as much progress within the structure session that you could actually physically see yet, but on week 1 we had six individuals.

42. Whereas even though, in week 10, he wasn't actually directly full of conversation and with them, I was think it was a week nine or week 10 he sat listening to two of other children.

43. I: he did didn't he? it was because he was almost at the point of a triangle and it was with these two talking and he was laughing wasn't he?

44. A: Yeah,

45. I: and he, I don't know whether he might have said something but he definitely was engaged in what was going on around him.

46. A: and yeah instead of thinking this is my space, my Lego that’s what I am doing, there was a couple of times that he when he was testing his vehicles in the Box. That we sort of invited somebody else to join. and he didn't put up the opposition. It didn't shut him down. It didn’t stop him what he was doing, and he did interact even though it's not the full blown conversation, but it doesn't have to be.

47. I: Yeah. You're absolutely right. And if I remember correctly. I think I came in the very Early stages one of the things he used to do was just on his own flick the was a pieces to see how far they go was the next couple of times his almost distance from the group reduced, where he was, but it's difficult to know whether he's just kind of observing and doing it or whether a part of him. I mean, do you think that he was feeling just more comfortable?

48. A: he definitely seemed to be more relaxed, there wasn't the intensity of somebody talk to me.

49. I: Would you see that before that kind of nothing?

50. A: I think there was the anxious of the…The fact of somebody talk to me and the head down very quiet. Whereas when you're asking him questions. He was open, and even when even when he wasn't looking at you and he was playing with the books up it was still free conversation that they didn't hit you couldn't hear the anxiety in his voice and the fact of well, I'm just talking to you what I'm doing something else. It's not a I'm going to do something else to avoid or try and stop you from talking to me

51. I: Yeah. Yeah. I see what you're saying. There is a subtle difference there between what he may or may not have done. Okay.

52. I: So what do you think Lego Therapy? Which part of Lego Therapy do you think has had the biggest impact for Harry?

53. A: I think obviously the structured part is the key bit because you've got the three roles you've got the this is your, to certainly is the case of this is your box and don't step out. And you need the other two people in order to get anywhere, but then it's is good to even just have the time after even if they don't interact in the fact of you then get to process it. Rather than come in work with two other people like go back to class now. It just gives the sort of Time to absorb what's going on Violet feeling like a chore on a job you then get the relaxation little bit afterwards.

54. I: So you would you just how would you describe the freestyle part?

55. A: ermm… It's always difficult sorry. You don't you wanted to be as freestyle as you can, for what they do. And if the where they're going isn't quite in the same direction is all can be difficult to put them together. But I think even though when they've been they have genuinely been alongside each other rather than solitary and being in the same space.

56. I: So you think it's almost taking them from solitary to a parallel?

57. A: Yeah the fact that there is that chance for interaction and it's not it's not a big wall in front of them. You've got the dog or yeah the fact of…

58. And I think that when you give and child, what seems to be like quality time, whereas just by the nature of intervention for serious so - all right. This is our 10 minutes' slot. This is what we need to do. Well, it's because of the communication and the interaction it has to be a longer spread time. It has to be a longer session time. I think that's where Lego comes into it.

59. I'd hate to rain on Lego's parade. I think the actual principles of come you can relate them to other things apart from the Lego. But if she fits the Lego That's the tool.

60. I: It's the medium, isn't it? Yeah, so which principles could you see? So yeah what which principles of Lego Therapy? Could you see working?

61. A: Well obviously, you've got the cooperation, you've got the listening you've got… All the things that you bring out like the cooperation side when we look at these we redid the evaluation sheets it was about well does not see answer what you want to get out of it. Mmm. So yes, whether the right assigning the roles and then obviously that relates back to class of whether the assigned roles in class doesn't necessarily mean that you have to just do one job in class. Yeah, if your job is to be sat on the carpet interacting with the group or your job is to be sat at the table working quietly. Then you can draw the parallels back to class. Yeah, the seeking positive and social approval.

62. Because I maybe not so much with Harry with some of the others the fact that it I've seen it represent not necessarily, social approval from school but social approval from the peers. Yeah. Well, we've had two that the follow each other around the class room…so they've run off and jumped on the bean bags mmm, but then two of others have done that yeah, wait actually on one hand is her no, we're not here to do that but actually, it's kind of a way of interacting bond with thing. Yeah bonded with them and you've gone and done something that they have done as well. Yeah. So one of the foundation stage little girls doesn't talk, but she was quite happy to follow that I do what the other another child did, even if that was the know you've been asked to sit down. And you

wouldn't expect her to step out the box of not she would sit down but the other little girl ran around she got up and ran around with her.

63. I: It’s like it's boosted something about that actually I quite like the interaction. I don't just need to be on my own, there's something to be had from, and did you have you seen any inclination of that with Harry?

64. A: Well just the fact that obviously Harry has gone from being head down south, very isolated, very to you have to prompt him you have to ask him the questions was long says it came he came out with his own description and a little bit more. While instead of what color is it? But it's and that's only yeah, I'm fine. Yes giving the shape and color up. Yeah.

65. I: So do you do you like Lego Therapy?

66. A: I love the principles.

67. I: Yeah?

68. A: Yeah.

69. I: And do you think it does, you know its aim is to increase social interaction and it claims to reduce anxiety in children. Do you do you see have you seen that?

70. A: definitely going to say both of this group with Harry and with them the fact that it's the it's a non-formal type of the education. It’s the putting into practice with something that they think is fun. If you like to certain degree going back to where they started a foundation of learning through play, and sometimes it's good to be able to say, right? Okay. So yes, we are learning through play, but we're not playing on the same. I don't want to say childish levels because that's not what the correct terminology. So it’s like coming from let’s go play mommies and daddies in the corner, to actually let's see if we get this piece of Lego and the fact of what's nice is we've got a whole range of Lego. So you can aim that because I said, there's one piece that I think even a set of teachers would struggle today. We tried it with one group but we needed a lot of support, for the fact of they thrived on the fact that it was a challenge yet and they saw that as their challenge not the fact that they had to work with two other people.

71. I: So it takes the pressure off from being like right now go talk to so and so. It's okay, right. Let's play. Yeah, go build something together takes the yeah,

72. A: if I say go work with him and you need to produce something at the end of it and be a gosh.

73. I: Yeah it would be very difficult.

74. A: Yeah. Absolutely. I think it breaks down a lot of barriers

75. I: It almost uses the Lego as a bit of a distraction, Not as a distraction, but as a bit of a distraction, it's a Lego together. Not right. Can you do this task?

76. A: Yeah, they see it as well here to play Lego. Yes. No you're not yeah. Yeah. They were like, oh, he's fine.

77. I: Do you think that children like Harry knew that you were looking at more than just their Lego skills?

78. A: I guess… a big pause. No, I don't think he did

79. I: And do you think that helps.

80. A: Oh definitely. Yes,

81. I: because one of the other school said that actually what it helps as it takes the pressure off the children because they can just do what they want. But the adults can then just kind of almost keep their own objective in mind and pull out these skills, without it being that right. I'm assessing you for the quality of where is it becomes another test then doesn't it?

82. A: Yeah, if we put a learning object from said, right this isn't Lego club. This is the learning objective is to get you to interact within 10 weeks. Whether it be…

83. I: and you will say three words by the end or so.

84. A: Yeah and set it like I would be a case of okay, I don't know what I meant to say. I don't know. Yeah, especially those who are on the higher anxiety level, because you're just there adding to the anxiety level rather than reducing it. Yeah.

85. I: Is there anything you would change about?

86. A: Yeah. Sorry

87. I: So what would you do? What would you change or make even better?

88. A: It's not knowing exactly how to change it to make it better. But I know it's got its flaws. Yeah and God forbid nothing in this world's perfect. I think the biggest flaw especially the group that Harry worked with is that you work in a cycle. So the same Builder always has the same engineer and always has the same supplier. If it's a building your very able and you have an engineer who is less verbal and leaves a lot of structuring and Scaffolding to be an engineer. It makes it a very very slow process so they get frustrated…and I say they because actually within their group The…we just make sure which way around it was what role? Yeah when Harry was engineer…and I know Ben* found it very frustrating with both, Izzy* and Harry, and on one hand. The reason I put Izzy and Harry in hiding in the same group was to make it easier so you could just focus on one group. However, by having them both in the same group, it made it harder for Ben and Ben was I didn't look at the other the four and think which one was better together. Yes. Yeah. So in a way, I think Ben had a less of experience right because of the people who was with him and that doesn't mean to say that he didn't take anything from it or that I mean that detrimental to Harry and Izzy they both came on Leaps and Bounds, and even though it may be didn't get Ben's actual verbal communication the facts of the things he did pick up was his tolerance, his patience, his empathy.

89. I: Yeah. Almost that understanding that they obviously find it quite difficult,

90. A: but it was nice because you saw if like the two parts and the fact of really, I'm really this is this is really hard. I just want to do it for them and I can't so it showed in the self-restraint as well. So even though I think overall to certain degree it's a negative there were still positives.

91. I: Yes. Yes, but you would maybe think about how you can alter it so that the dynamic slightly different.

92. A: Yeah,

93. I: there's you know, if it was Ben as the Builder wasn't always receiving an instruction from...

94. A: Yeah, so it would vary each time. It wouldn't just be Izzy or yeah, because especially and in relation to Ben, Ben found it very hard when Izzy was trying to he was supplier because she was engineer was a case of just tell me what it is. Yeah, but Izzy may not say anything or she may say something say something completely awesome. Maybe inaudible. So obviously then as a builder it made Harry's job harder. Or not depending how you look at it. And because he may be built to Pieces opposed to putting 10 or 15 pieces. When in other session…

95. I: but it's interesting that even though as adults we can maybe see some of that, Harry still recalls the Builder yes as being for him his favourite.

96. A: But you could say that maybe that was why the Builder was so good. Yeah because he could do the pressure wasn't on him. Whereas as the engineer the pressure is you have to describe it. You have to tell the supplier that you have to tell so in a way the engineer is the hard ya think that about the hardest job because you've got two people to give instructions to, two people to listen to, two people to say actually look you do need to listen to ya have to be the more confident one of the whereas obviously Harry isn't there yet. So yeah, I certainly, if you have come up with engineer was the best job at have been like really? Wow, that's huge.

97. I: Do you think that if you were to do a Lego Therapy with Harry again? Where do you think he could get to?

98. A: I think obviously the fact that his description was coming out. So the fact of being the engineer he would be much much better.

99. I: Yeah, you'd be able to see improvements in that role.

100. A: Yes might still not tell you that he likes that role but you'd see.

101. I: Oh, yeah, there's a mainly everybody's favourite.

102. A: Yeah. But yeah, if you had a choice to look at Lego, I think there may be two in this in that in the two groups who would choose engineer as a

favourite and they probably were both in that because a lot of people telling me what to do here. Yeah. I'm gonna tell you when I'm gonna be in charge.

103. I: Yes. Yes. The fact is the control isn't it? Because the control for them is how they manage. However, Harry probably doesn't want that. Does he?

104. A: No so actually for Harry to take control and say I need help or I didn't like that picture…is massive.

105. I: yes, it might look small to us. But yeah.

106. A: It's a massive triumph for him and moving forward

107. I: I mean you've done how many cycles of Lego Therapy have you done now? Three? once with the when you were training and then two since?

108. A: Yeah, I did one when training and then we try to do a group with just three. Yes. However, I don't think that was. We did I think we did 8 sessions but I don't think that was a true reflection of the Lego Therapy a) because of the Dynamics of the group. I do think it's important on the bigger scale to have the two separate groups of then merging two. What I do do I've done another cycle with three different groups in Foundation stage, which is a whole different ballgame because they haven't asked yet the descriptive language.

109. I: Yeah. There's actually a different development stage

110. A: What shape is that? We don't know the shapes, were still learning colours. Yeah. So a lot of the Lego pieces are so dramatic. It's not a simple square or rectangle or a circle which are hard enough as it is. It's a I don't know.

111. I: Whereas Harry does he have those that learning?

112. A: Yeah, I think yeah,

113. I: so he was probably more except to the principles of Lego Therapy.

114. A: Yeah, so a even though the principles maybe aren't the same you still obviously got a high structure of principles that you are teaching. You

just have to structure more in the fact of well Is it a circular square? Is it a circle or a square? Yeah, or is it a flat piece or is it a yellow piece or blue piece? You just have to give them more information. Yes, and they can pass on the information. Yeah classic example this morning. I said to a little boy. In fact I said right you need to tell them what it looks like. “What it looks like?”

115. I: Oh, very literal.

116. A: No. No what shape is it? It's a rectangle. Okay. Tell them what it is…what shape it is.

117. That's not what I mean, right? Okay. So yes, it comes with its own barriers with the younger, but by the end of the session. He was then saying it's rectangle and he said yeah,

118. I: yeah they're the types of progress a very different aren't they? Yes for Harry. Correct me if I'm wrong. He was selected because his social communication was is a barrier and he was experiencing high levels of anxiety in social situations.

119. A: Yeah, the fact we've obviously what are the beginning? Yah the minute I was introduced to him. And so right you're going to…

120. I: Wow amazing

121. A: so here to see the difference between the same child, it’s incredible.

122. I: have you got experience working within any other interventions at all for social communication

123. A: not within school. Yeah, I think…me personally communication underlies everything and that's where I did a lot of my degree work and that's why I went down the route of come…and largely special needs learning disabilities…Deaf deaf-blind.

124. I: Yeah, so you have an understanding but in your role as a teaching assistant have you?

125. A: No,

126. I: that so is this what my reason behind that question? I was just wondering whether you have any comparison about what makes Lego Therapy, even if you're not done any but you've read about them what makes Lego Therapy stand out as being a- an intervention that you would recommend to another school or would you recommend it?

127. A: Yeah going to say definitely the thing that stands out for me in. The LEGO Group is the very first group we did and if you like the level of need was higher because they were the six children in school that were on the SEN register with one to one

128. I: so all with Education Health and Care plans?

129. A: Yes, so it was very much the case of like, whoa, this is going to be a a hard group because everyone needs were so high but to see the development that they all made was just like and again, we had a couple of boys that didn't say anything. He didn't follow the rules at the beginning but come week 10 were interacting and we found with two of those that actually it wasn't the Lego that we needed. So the Lego became secondary. it was the freestyle because if you like to a certain degree remove withdrew the Lego that they then started to interact more. with just one break that it need to build anything. They could have the brick that was a space rocket and there are two of them flew around the room together,

130. I: but they were like that right at the

131. A: They weren't like that beginning.

132. I: That's amazing.

133. A: So yeah, just seeing them Blossom. Has been

134. I: And so I think I've told you before that my thesis is about its impact on the anxiety in children with social communication difficulties. Do you think that Lego Therapy can reduce anxiety?

135. A: definitely going to say obviously, it's very hard to say. It's just the Lego Therapy cuz…people who need the support. I've got the support throughout not just in school but at home and they get the additional support

they may require. Hopefully they do, but no the facts of if like Harry's being our second true success from somebody who didn't talk a lot. He was very shy and even if that is just a case of, in 10 weeks he became familiar with the group, actually 10 weeks to become familiar with a group that then..

136. I: that he hadn't worked with before

137. A: you haven't worked with before that. You're quite happy to talk to you that you're quite open with them.

138. I: I mean and he was open with me. Yes. I'm an adult so there's less pressure there, but I'd only met him three times.

139. A: But you say sorry you say it's because you're an adult, but I'm not sure that's true. I think he had more issues with adults because they used to say watch him on the playground. He will talk to his friends, unless he thinks an adult sees him, then you that seemed only a clammed up. So took to actually open up to you. I think it's actually the biggest step.

140. I: Wow, so, hence why you would like a copy of that?

141. A: Yeah

142. I: Okay. So we've kind of spoken about the experience with Lego and with Harry what we thinks worked well and that is a variety of different things. The greatest impact having been like the structured part and then time afterwards to process and just that quality time. No high level of demand is that sort of thing a little bit on their terms about what they choose to do without it being kind of completely adult led something that you'd like to I don't know, how you, I mean we both agree. We're not quite sure whether you can or what it would look like, but just about the grouping and you how you can manage making sure it's not always the same person.

143. A: With the because even if you swap between the six, yeah, I noticed that I see in the Structured. Sometimes the three that work together especially over in that we would then work together down there

144. I: Yeah, they almost became a little bit more familiar as a little group. It would have been really interesting if you did a little swap.

145. A: Yeah, whether you could interswap the groups. Yeah,

146. I: but it's whether you then take away from that 10 weeks of building familiarity.

147. A: Yes,

148. I: Like the point that we've got to with Harry whether that would have negatively impacted, I gues we don't know do we.

149. I: that something that just needs to be there was actually one Oliver used to see Ben and they weren't in the same group, but in the hall... Again, it's one of those please don't shout go across the hall but I really love the fact that you go. Hi, Ben you go to Lego Club.

150. I: Yeah. That's the lovely.

151. A: So, definitely the recognition within it as well.

152. I: Yeah, whether that pays into your favour as well, when they work in their threes in cycles. hmmm that's interesting and you've mentioned a few times, like, what you think is important with Lego is the group dynamics and choosing the right, Not only just the the type of need that the child is bringing, you know, so I think we've spoken to before about you tried it with children whose Behaviour was kind of quite external and challenging, and you mentioned that wasn't quite as successful as those that are …

153. A: no going to say obviously the fact of when you've got those with challenging Behavior as addition. You've got to be very very careful to balance that what they get out of the group doesn't actually impact negatively on the other ones in the group.

154. I: So, who would you say Lego Therapy works best with?

155. A: The Quiet Ones,

156. I: okay.

157. A: Yeah, I think as a whole because as much as just looking at the last six, it's the two who were very quiet, that whether that's because it's easier to see their progress because they have been quite to not so quiet. Yeah,

obviously you had Ben who made the progress in the fact of dealing with other, seeing others point of views.

158. I: tolerance. I think the was already used

159. A: Yeah tolerant and the acceptance and actually being able to go to know what this is really annoying me. This is but dealing with that.

160. I: I guess a bit of Regulation.

161. A: Yeah the fact of do you know what it's fine to be annoyed?

162. I: Yeah. Absolutely

163. A: because yes, they do take a long time, but you're dealing with it really Well. Yeah, so it gives him that social aspect whereas Because I didn't I didn't have a lot to do with the other group of such because again the adults to keep the familiarity stayed with the same yet where I think maybe that's something that could change.

164. I: Yeah, there are little things that you'd maybe want to just kind of see but again, but keeping those core principles to actually the core principles of the structured the roles. Yes, it does work. It's just how they look for the children. You have got and moving forward. Okay, that's really helpful.

165. A: Yeah, because if you look at it, even though Joshua's with the sort of second time around because the first time round he was with two other boys who were friends and knew each other. So I think to start with Lego Therapy was maybe… I don't want to use the word torturous. But it's hard work because every time he tried to and even I suppose even that he did teach him something mmm because the fact of will to fund if I keep trying to interject. They like that even less. Yeah, so maybe helped him within the social roles. But the fact of somebody who is quite eager to please at times and wants the acceptance

166. I: that must have been really hard for him.

167. A: It was case of this is actually going to be more negative than positive for him.

168. I: So are you still learning what Dynamics work.

169. A: Oh, I don't think I'll ever get it right

170. I: but you're aware that it's important

171. A: Maybe the fact of because I am I think I concentrate a lot on group dynamics and communication. So I look deeper in the fact of if you like that when we looked when we did the training I was I don't want to use the word critical because that's not how it was. What's the word I'm looking for? I don't know the fact of questionnaires. Oh, yes. The question is I'm sorry again, and I don't mean to be critical. It's more. I do love genuinely want it to be constructive. It was…

172. I: the questionnaires for the school anxiety scale

173. A: Yeah. They're very opinionated, which…

174. I: and you are worried that it doesn't always catch what was actually...

175. A: yeah because it's also not it's not just about opinionated about the child at the time and as right or wrong it is it depends on what frame of mind I'm personally as well and the fact of right Ok I need to be doing this. I need to go do that. I need to go do that. I need to fill this in... Whereas On the days of that's why I've got five minutes to fill it. I can do it yet even that in itself. Yeah, and I'm so conscious how things like that can change.

176. I: So do you have a little bit of a worry that perhaps these reports won't capture.

177. A: Oh definitely… I don't think it will capture the change. Definitely the facts of is quantitative and qualitative data, the fact of when I've looked back through some of my qualitative data and quantitative data. It doesn't show…anything like I would have expected it… actually Harry's he went from being six on the altruistic measure to 5, which obviously we don't want him to become less altruistic.

178. I: But that's what that suggesting is.

179. A: Absolutely, but the facts of the qualitative data blows out of the water yet of yes, maybe that's but it's no matter what measure you always Pick, it does it out of the always reflects because it's always swayed one way or another or the 101 reasons that can affect it but the score still score.

180. I: Yeah, and you get to see Harry far more holistically day in day out with talking to the adults that work with him to seeing him in the corridor in the playground and that gives you a completely different worldly view.

181. A: His belongings scale did go up mmm, but again, and it's sort of its like well is it the questions is because we took time to try and find different Quantitative, but I still don't I don't think we've got the right quantitative yet.

182. I: because perhaps, they're just not very perceptive enough to to capture those small changes that we've said we've been able to see

183. A: ya because even though obviously you were following them all somebody I think made a big step may look like they have taken a step backwards,

184. I: but it's probably because at some point as well, has his understanding of the questionnaire change coming to… ten weeks when you're mean, how old is Harry is seven. Yeah, seven… 12 weeks in total of 15 weeks. It's a huge amount of time to learn new but you know a greater understanding of the words and things like that. So

185. A: and even because the artistic one is the fact of where you've got somebody…Yes, yeah. Yeah, so we had people saying well, I would be the one sat on the Bench because I don't like playing basketball. So it wasn't that they didn't want to join in and want to take over and I know that's a dummy question. but, the fact of they could explain away if you like whereas it was. The first place is probably just would have yeah, but even so it takes away from the school, but they've got a valid reason there's one about there's a dog hurt. So the altruistic answer is you're the person helping the doc. Yeah. Well how to tell he was scared of dogs. He's going nowhere near the dog, whether he's hurt or not…Yeah, that instantly makes him less altruistic.

186. I: is there anything else about Lego Therapy and its links with anxiety and Harry that you think we would be worth knowing.

187. A: There probably will be in about a quarter of an hour when you've gone.

188. I: I mean even just your first reaction of getting the interview, that's enough for me?

*Names have been replaced by pseudonyms

APPENDIX EIGHTEEN – EXAMPLE OF HANDWRITTEN CODING SHEET FOR CONTENT ANALYSIS

