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LEGO Therapy and Social Competence: An Exploration of Parental and Teacher Perceptions of LEGO-Based Therapy with Pupils Diagnosed with Autism Spectrum Disorder (ASD)

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Part A: Literature Review
Part B: The Empirical Study
Part C: Critical Review

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Summary

This document is separated into three sections. Part A provides a detailed literature review that explores the current understanding of Autism Spectrum Disorder (ASD). The literature review outlines the long-term impact of pervasive difficulties in social interaction and communication on individuals with ASD. A number of psychological theories relating to ASD are outlined and their implications for intervention and professional practice are discussed. Evidence from research articles exploring the impact of social skills training (SST) are also discussed and critiqued. The literature review provides an introduction to Play Therapy and summarises the LEGO-Based Therapy approach. Existing outcome-based studies relating to LEGO-Based Therapy and social competence are described and evaluated. The section concludes with an outline of the current research aims and subsequent research questions.

Part B is an account of the empirical study, which aimed to explore teacher and parent perceptions of the LEGO-Based Therapy intervention. The implementation of four LEGO-Based Therapy groups is outlined in detail. The pupils' social interaction and communication skills were evaluated pre and post intervention by teaching staff. The views of both parents and teachers regarding the LEGO-Based Therapy intervention were collected and analysed using thematic analyses. The results are discussed in detail and implications for future practice are provided.

Part C is a critical review, which is a reflexive account of the research-practitioner's experience of conducting the current study. The critical review details the current study's contribution of knowledge and explores the limitations and methodological issues experienced by the researcher. The experimental findings are discussed and implications for future research and practice are detailed.

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List of Abbreviations

ABA	Applied Behaviour Analysis
ASC	Autism Spectrum Condition
ASD	Autism Spectrum Disorder
C	Communication
CYP	Children and Young People
DSM-IV	Diagnostic and Statistical Manual of Mental Disorders: 4th Edition
DSM-V	Diagnostic and Statistical Manual of Mental Disorders: 5th Edition
EF	Executive Function
EP	Educational Psychologist
EPS	Educational Psychology Service
E-S	Empathizing-Systemizing Theory
EQ	Empathy Quotient
ICD-10	International Statistical Classification of Diseases and Related Health Problems: 10th Edition
TD	Typically Developing
TEP	Trainee Educational Psychologist
ToM	Theory of Mind
RG	Reduced Generalisation Theory
SEN	Special Educational Needs
SI	Social Interaction
SQ	Systemizing Quotient
SST	Social Skills Training
WCC	Weak Central Coherence

LEGO Therapy and Social Competence: An Exploration of Parental and Teacher Perceptions of LEGO-Based Therapy with Pupils Diagnosed with Autism Spectrum Disorder (ASD)

Part A: Literature Review

1. Introduction

1.1 Structure of the Literature Review

The literature review will consider the clinical definition of Autism Spectrum Disorder (ASD) and a variety of psychological theories which underpin the field of research in this area. The prevalence of ASD and rate of increased diagnosis will be considered, along with its relevance to current Educational Psychology (EP) practice. This review will focus on the social interaction and communication difficulties experienced by many individuals with ASD, and will consider the impact of social skills interventions on development in these areas. The review will also consider whether there is evidence that skills acquired during context-specific intervention, such as school-based intervention, are generalised to alternative social contexts.

The central focus of this literature review will be to provide an overview of the psychological theory and evidence from social skills programmes and Play-Therapy approaches which have contributed to the development of LEGO-Based Therapy. Research which directly explores the effectiveness of LEGO-Based Therapy will also be discussed. The review will culminate with a rationale for the current study and an outline of the current research questions. The aim of the research is to contribute additional knowledge and empirical evidence by exploring the perceptions of parents and teachers regarding LEGO-Based Therapy, to investigate whether the intervention improved pupils' social competence, whether any acquired skills were generalised to non-therapeutic contexts, and whether any acquired skills were maintained over time.

1.2 Search Terms and Sources

The literature review was compiled using evidence from a variety of sources, utilising search terms such as: 'Autism,' 'Autism Spectrum Disorders,' 'Autistic Spectrum Disorders,' 'Autism Spectrum Condition,' 'Autistic Spectrum Condition,' 'Social Competence,' 'Social Skills,' 'Social Skills Intervention,' 'LEGO-Based Therapy,' 'LEGO Therapy,' 'Generalisation,' 'Transferability,' 'Transference.' The search terms were

applied in to the PsychINFO 1806-2016, PsycArticles Full Text, and Cardiff University Books@Ovid in December 2014, January 2015, and in December and January of 2016. These sources were chosen to include a variety of empirical research articles available in peer-reviewed journals and publications, primarily targeting publications from the last decade. The search for literature detailing theoretical perspectives utilised a broader range of dates to accommodate for historical perspectives which have informed research and practice.

Due to the number of available articles exploring ASD, only those considered most relevant to the current study were included in this literature review. Articles that were included explored the effects of social difficulties on individuals with ASD, the effects of social skills training, and the generalisation of skills across contexts. Additional information was also obtained from a variety of published books from the field of Autism, Play-Therapy, and LEGO-Based Therapy. A comprehensive search was completed for research articles relating to LEGO-Based Therapy, with limited results. Consequentially, the review also relies extensively on the handbook *LEGO®-Based Therapy: How to build social competence through LEGO®-Based Clubs for children with autism and related conditions* (LeGoff, Gómez de la Cuesta, Krauss & Baron-Cohen, 2014).

2 Autism Spectrum Disorder

2.1 Terminology

The term Autism Spectrum Disorder (ASD) will be used throughout this research and literature review. There are ongoing debates regarding the most appropriate terminology to refer to ASD, as some researchers prefer to refer to ASD as Autism Spectrum Condition (ASC). The increasingly widespread use of ASC is largely attributed to Simon Baron-Cohen who claimed that use of the word disorder may carry negative connotation and may not represent a diverse population of individuals with areas of individual strength, who all fall under the “umbrella term” of ASD (Lai, Lombardo, Chakrabarti & Baron-Cohen, 2013, p.1).

The decision to use the term Autism Spectrum Disorder (ASD) throughout this research is to ensure consistency with the current terminology of diagnosis and with a large proportion of published research and literature.

2.2 Definition and Prevalence of ASD

ASD is considered to be a pervasive, neurodevelopmental disorder which is characterised by qualitative abnormalities in reciprocal social interactions and patterns of communication and by restricted, stereotyped, repetitive repertoire of interests and activities which are a pervasive feature of the individual's functioning across time and contexts (World Health Organisation: WHO, ICD-10, 1992).

The diagnostic criteria for ASD was reviewed by the American Psychiatric Association (APA) and was updated in the Diagnostic and Statistical Manual, 5th Edition (DSM-V, 2013) in May 2013. The DSM-V identified that ASD was defined by two diagnostic categories; Criteria A: "Difficulties in social communication and interaction" and Criteria B: "Restricted and repetitive patterns of thoughts and behaviour" (Lai, Lombardo & Baron-Cohen, 2014, p. 896). These two broad diagnostic categories are frequently referred to as the "dyad of impairment" and are considered to emphasise the dimensional nature of ASD (Lai et al., 2014, p. 896).

The updated criteria within the DSM-V has been described as more "stringent" (Lai et al., 2013, p. 1) than the previous criteria within the Diagnostic and Statistical Manual, 4th Edition (DSM-IV, APA, 2000). Some researchers have commended the reviewed diagnostic criteria in the DSM-V for its clear symptom descriptors, its consideration of the dynamic nature of development, and have speculated on the beneficial effect of having a unitary label on planning support and intervention for individuals with ASD (Lai et al., 2013). However, researchers have also outlined a number of features associated with ASD which are not incorporated within the updated DSM-V diagnostic criteria (Buxbaum & Baron-Cohen, 2013; Lai, Lombardo & Baron-Cohen, 2014). These features are outlined in Table 1, below.

Behavioural characteristics in ASD	
Core Features in DSM-V: Criteria for diagnosis of ASD (APA, 2013)	
Criteria A **Persistent deficits in social communication and social interaction across multiple contexts.**	Deficits in social-emotional reciprocity. Deficits in non-verbal communicative behaviours used for social interaction. Deficits in developing, maintaining, and understanding relationships.
Criteria B **Restricted, repetitive patterns of behaviour, interests, or activities.**	Stereotyped repetitive motor movements, use of objects or speech. Insistence on sameness, inflexible adherence to routines or ritualised patterns of verbal or non-verbal behaviour. Highly restricted, fixated interests that are abnormal in intensity or focus. Hyper-reactivity or hypo-reactivity to sensory input or unusual interest in sensory aspects of the environment.
Associated Features *not* in DSM-V	
Atypical language development and abilities.	Age <6 years: frequently deviant and delayed in comprehension; two thirds have difficulty with expressive phonology and grammar. Age ≥6 years, deviant pragmatics, semantics, and morphology, with relatively intact articulation and syntax (i.e. early difficulties are resolved).
Motor abnormalities.	Motor delay; hypotonia, catatonia; deficits in co-ordination, movement, preparation and planning, praxis, gait and balance.
Excellent attention to detail.	..

Table 1. Behavioural characteristics of ASD according to the DSM-V, and an overview of associated features not included in the DSM-V criteria. Adapted from Lai et al., (2014).

Reports indicate that ASD diagnosis has increased significantly since the earliest epidemiologic studies conducted in the 1960s (Centers for Disease Control and Prevention, CDC, 2014). The latest figures suggest that, on average, 1 in every 68 children over 8 years old is diagnosed with ASD in the United States of America (CDC, 2014). It is reported that ASD is almost five times more common in males than females,

and is reported to occur globally, in all racial, ethnic and socioeconomic groups (CDC, 2014).

It has been suggested that the significant increase in the prevalence of ASD is attributable to improved awareness, service availability and changes in diagnostic practice (Matson & Kozlowski, 2011; CDC, 2014). While authors have agreed that this attribution may be plausible, they have also criticised the CDC's methods of data collection and highlighted the variability in prevalence across geographical areas, which suggests that prevalence may not be generalised definitively (Mandell & Lecavalier, 2014).

With consideration of the increased prevalence of ASD diagnosis and the emphasis on inclusion and integration of individuals with special educational needs (SEN) into mainstream education (Farrell, 2000), it could be suggested that improving evidence-based practice for social intervention in pupils with ASD should be considered as imperative to the role of the educational psychology service (EPS).

3 The Impact of ASD on Social Competence Skills

3.1 What is Social Competence?

Social competence is considered to be one of the most important aspects of an individual's personal development (Gresham, Sugai & Horner, 2001). Social competence may be defined as the child or young person's (CYP's) ability to establish satisfactory interpersonal relationships, gain peer acceptance, and to be able to terminate negative relationships when they are no longer functional or mutually beneficial (Gresham et al., 2001). It has also been suggested that social competence is a predictor of long-term individual outcomes and psychological wellbeing (Tse, Strulovitch, Tagalakis, Meng & Fombonne, 2007).

Social competence is also used to refer to the readiness of the CYP to engage, interact and communicate verbally and non-verbally with others. In Rose-Krasnor's model of social competence, these skills are defined as effectiveness in interaction, and are the result of organised behaviours that meet short-term and long-term developmental needs, including positive engagement with peers and emotional self-regulation (Rose-Krasnor, 1997).

The model proposed by Rose-Krasnor (1997) suggests that social competence requires a self-awareness which is more sophisticated than those taught in social skills training. While social skills and behaviours may be facilitated in pupils with ASD using activities such as social scripts (Barnhill, 2002) and role-play (Howlin, Baron-Cohen & Hadwin, 1999), social competence requires self-perception, social judgements and evaluations of dynamic, interactive and interpersonal interactions within and across contexts (Gresham et al., 2001).

3.2 Factors Influencing Social Competence

Persistent difficulties in social communication and interaction across multiple contexts is central to diagnosis of ASD (DSM-V, APA 2013) and has a significant impact on the individual's social, behavioural and academic experiences (Church, Alisanki & Amanullah, 2000). CYP with ASD have been found to demonstrate reduced social competence skills when compared to their non-ASD, or "typically developing" (TD) peers (Zeedyk, Cohen, Eisenhower & Blacher, 2016, p. 436). Research has concluded that individuals with ASD frequently demonstrate poorer skills in co-operation, collaboration, eye contact, sharing, self-control, turn-taking and negotiating social compromises (Macintosh & Dissanayake, 2006).

There are many associated behavioural features which effect the social competence of pupils with ASD, which are not explicitly outlined in the DSM-V (APA, 2013) diagnosis criteria (Lai et al., 2014, see Table 1). For example, social interaction and communication skills in pupils with ASD may be significantly influenced by individual

language ability. Volkmar, Lord, Bailey, Schultz and Klin (2004) concluded that 25% of individuals with ASD have persistent difficulties with functional language. Research into functional lateralization of language in ASD has suggested that atypical language development is a prominent behavioural marker of the disorder (Kleinhans, Muller, Cohen & Courchesne, 2008) and is likely to impact on social competence. While there is a great deal of variety in individual language skills, CYP with ASD commonly have difficulty with acquisition of complex syntax, morphology and aspects of pragmatic knowledge (Kleinhans et al., 2008).

Difficulties with pragmatics and non-verbal cues in language, such as interpretation of facial expressions, appropriate eye gaze and expression, and hesitancy to initiate interaction with others is considered to be a persistent difficulty in pupils with ASD (Lord & Paul, 2007; Guerts & Embrechts, 2008). These persistent linguistic difficulties and deficits in social competence have been linked with increased peer rejection in school (Laws, Bats, Feuerstein, Mason-Apps & White, 2012) and a lack of appropriate play skills (Strain, Schwartz & Bovey, 2008).

The repetitive and rigid interests and behaviours of CYP with ASD often has a limiting effect on opportunities for reciprocal interaction, as fixed interests and rigidity during play can reduce opportunities and motivation for engagement with others (Zeedyk et al., 2016). Some findings suggest that the educational experiences of CYP with ASD are also associated with poorer reciprocal friendships with peers, and lower quality student-teacher relationships (Blacher, Baker & Eisenhower, 2009; Lyons, Cappadocia, & Weiss, 2011).

It has been suggested that the symptomology of ASD (including fixed and rigid interests and difficulties with social competence) has a negative impact on the ability of pupils with ASD to form friendships in school (Blacher et al., 2009; Zeedyk et al., 2016). Research exploring the friendships of pupils with ASD has suggested that their TD peers are less likely to reciprocate friendships, and that the pupils with ASD are likely to be located on the periphery of social networks (Rotheram-Fuller, Kasari,

Chamberlain, & Locke, 2010). Furthermore, difficulties for pupils with ASD in forming friendships can lead to incidences of victimization, bullying and social isolation (Zeedyk, Rodriguez, Tipton, Baker & Blacher, 2014).

It is also important to consider that many CYP with ASD are aware of their own difficulties, which may contribute to social anxiety and their consequent behavioural presentation. Bauminger, Shulman and Agam (2004) concluded that pupils with ASD were aware that their social competence, social interaction and communication skills were poorer than their TD peers, and they felt that this was a contributory factor to their social isolation. Information gathered from semi-structured interviews and diaries concluded that adolescents with ASD felt that establishing friendships with mainstream peers acted as a protective factor from social isolation and victimization (Humphrey & Lewis, 2008). Evidence has also suggested that while pupils with ASD may appear to be disengaged and disinterested in social interactions (Cotugno, 2009), their presenting social difficulties do not necessarily reflect a lack of motivation for social interaction and integration with their TD peers (White, Keoing & Scahill, 2007).

Establishing reciprocal and meaningful friendships between TD peers and individuals with disability is suggested to have a mutually beneficial effect (Hollingsworth & Buysse, 2009) by promoting understanding, tolerance and improved social competence (Zeedyk et al., 2016). It has been suggested that reciprocal friendships between TD pupils and pupils with ASD facilitates social competence by providing opportunities for positive modelling (Odom, McConnell & Brown, 2008). In their research into reciprocal relationships, Kasari, Locke, Gulsrud and Rotheram-Fuller (2011) concluded that 18% of pupils with ASD, aged between 6-11 years old had at least one meaningful friendship, which was considered to impact positively on pupil wellbeing and social competence. However, the rates of meaningful friendships and wellbeing between two or more TD peers were significantly higher.

While much of the evidence from research suggests that CYP with ASD are vulnerable to significant difficulties with social competence and friendships, Hill and Frith (2003)

highlighted the variability in individual presentation and symptomology. It may be pertinent to note that while the latest DSM-V diagnostic criteria (APA, 2013) provides a unitary label for individuals with ASD (Lai et al., 2013), there are significant individual differences in areas of strength and difficulty, which should be considered when preparing social intervention. Evidence suggests that some CYP with ASD are motivated and interested in social interaction (Prior et al., 1998; Gilchrist et al., 2001), and that young, non-verbal pupils are able to develop into fluent speakers, who seek to form meaningful friendships as adults (Hill & Frith, 2003).

Intervention for supporting and developing social competence is considered to be contributory to promoting positive long-term outcomes (World Health Organisation: WHO, 2013). The WHO suggest that people with ASD have higher rates of unmet needs than their TD peers, and emphasise the importance the empowerment of young people and their families. It was also suggested that "psycho-educational, developmental and behavioural interventions are the primary treatment to address the core deficits in communication, social behaviour and behavioural flexibility in ASDs" and that intervention should be accompanied by "broader actions for making physical, social, and attitudinal environments more accessible, inclusive and enabling" (WHO, 2013, p. 18).

With consideration of the pervasive social difficulties that are core features of diagnosis, it could be suggested that the educational psychologist (EP) is well placed to promote social competence, establish interventions, promote inclusion, and empower individuals and families experiencing ASD.

4 Psychological Theories of ASD

ASD is a medical diagnosis and is categorised as a neurodevelopmental disorder (WHO, 1992), but there are also a number of psychological and cognitive theories of ASD which have been extensively researched and evaluated (Rajendran & Mitchell, 2007). In the following section, the Theory of Mind Hypothesis, Weak Central Coherence Theory, Theory of Executive Dysfunction and the Empathizing-Systemizing Theory will be outlined and discussed. These theories have influenced the recommendations and interventions proposed by professionals and clinicians in facilitating individual social development.

4.1 The Theory of Mind Hypothesis

The Theory of Mind (ToM) hypothesis claims that individuals with ASD fail to "impute mental states to themselves and others" (Premack & Woodruff, 1978, p. 515) and was originally posited to account for all deficits in ASD (Baron Cohen, 1989). The ToM hypothesis suggests that individuals with ASD have difficulty adopting the internal perspective of others. Consequentially, CYP with ASD have difficulty mentalising another person's internal perspective, perceptions and beliefs (Rajendran & Mitchell, 2007).

The ToM hypothesis has been researched using a variety of false-belief tasks, in which the participant is required to infer the perspective of another when presented with incongruous information. Baron-Cohen, Leslie and Frith (1985) found that 80 percent of children with a diagnosis of ASD failed to correctly infer the perspective of another person when tested using false-belief tasks. These results have been widely replicated, and have led to many researchers concluding that individuals with ASD have a deficit in ToM (Rajendran & Mitchell, 2007). Some researchers have suggested that pervasive social difficulties in ASD may be the result of this deficit in mentalising the internal states of others, and consequentially, interpreting and responding appropriately to social situations (Peterson & Bowler, 2000).

Critics of the ToM hypothesis have highlighted that while 80 percent of CYP with ASD failed the false-belief task (Baron-Cohen et al., 1985), 20 percent of the participants did successfully demonstrate ToM (Happé, 1994). Therefore, the deficit does not appear to be universal to all CYP with ASD, and while ToM may be able to explain a portion of cognitive impairment, it is not able to account for the performance of all individuals with diagnosis on such tasks, or for all facets of the disorder (Ozonoff, Pennington & Rogers, 1991).

To account for this criticism, Baron-Cohen modified his theory to suggest that development of ToM may be delayed in CYP with ASD as a result of "Mindblindness" (Baron-Cohen, 1990, p. 79). To explore the concept of Mindblindness and individual cognitive deficits, advanced, second-order false belief tasks were developed which demonstrated consistent failure on behalf of individuals with ASD in interpreting the mental states of others (Baron-Cohen, Golan, Wheelwright & Hill, 2004).

Some critics of the ToM hypothesis suggest that delay in developing ToM could be related to individual verbal ability, as participants with ASD were reported to require a higher level of verbal ability than their TD peers to correctly solve false belief tasks (Happé, 1996). Difficulties with ToM have also been observed in individuals with other disorders, such as Schizophrenia (Sprong, Schothorst, Vos, Hox & Engeland, 2007) and unipolar depression (Wolkenstein, Schonenberg, Schirm & Hautzinger, 2011), which may suggest that the phenomena is not exclusive to individuals with ASD.

The ToM hypothesis, though widely researched and replicated, has been criticised for failing to demonstrate whether the deficit is generalised, or whether it is a specific, discrete cognitive mechanism which is able to account solely for difficulties with reflective thinking and empathy (Shanker, 2004). It has also been suggested that impaired social competence may not be entirely attributable to cognitive deficit, but could be related to biological challenges, such as sensory hyposensitivity or hypersensitivity, which inhibits their readiness to engage in co-regulated interactive experiences (Shanker, 2004).

4.2 Weak Central Coherence Theory

Unlike the ToM hypothesis, which does not account for the repetitive and rigid behaviours present in ASD (Ozonoff et al., 1991), the Weak Central Coherence (WCC) theory (Frith, 1989) provides some explanation for the non-social features of the disorder, such as attention to acute detail. Frith and Happé (1994) suggested that individuals with ASD have weak central coherence, and therefore fixate on details, such as constituent parts, rather than processing the overall bigger picture (Rajendran & Mitchell, 2007). Consequentially, it has been hypothesised that CYP with ASD find it difficult to "infer gist" from social and non-social situations, and "process things in a detail-focused or piecemeal way" (Rajendran & Mitchell, 2007, p. 237), which may account for their rigid presentation and adherence to specific routine.

The WCC theory has been researched using visuospatial and construction activities such as embedded figures, visual illusions, and block design tasks. Evidence from Shah & Frith (1983) suggested that CYP with ASD scored above average on the Children's Embedded Figures Test (CEFT; Witkin, Oltman, Raskin & Karp, 1971) and performed better than TD peers at identifying small embedded shapes inside larger, more salient shapes. Participants with ASD were also significantly faster at replicating block designs, and were observed to utilise useful strategies, such as perceptual segmentation, to increase the speed of their work (Shah & Frith, 1983). Frith (2003) suggested that participants with ASD performed better on visuospatial construction tasks due to their weak central coherence, that is, they lacked the drive of their TD peers to attend to global form (Rajendran & Mitchell, 2007).

Research using visual illusions has suggested that CYP with ASD are less susceptible to visual illusions, due to their increased focus on detail and WCC (Happé, 1996). However, these findings have been contradicted when different methodology has been utilised (Ropar & Mitchell, 2001; Mottron, Dawson, Bertone, & Wang, 2007). When asked to respond non-verbally to visual illusions using a computer, participants with ASD systematically erred, and were equally susceptible to illusion as the participants without ASD. These findings have led some researchers to hypothesise

that global processing is under attentional control (Milne et al., 2002) and that "higher order processing is merely optional in autism and is mandatory in people without autism" (Rajendran & Mitchell, 2007, p. 239). Should this hypothesis be correct, it could be suggested that promoting individual attention, interest and engagement is central to provoking higher-order processing in CYP with ASD.

4.3 Theory of Executive Dysfunction in ASD

There has been some disagreement in the literature regarding the exact definition of executive function (EF), but it is thought to involve self-reflection, planning and representation of abstract concepts (Liss et al., 2001). Gillberg & Coleman (2000) suggest that EF is a function that allows planning towards a goal that cannot be instantly met, while others suggest that EF is a behavioural construct rather than a cognitive structure (Zelazo, Carter, Reznick & Frye, 1997).

The Executive Dysfunction Theory suggests that cognitive difficulties in ASD may be accounted for by executive dysfunction, which is defined as: "The ability to maintain an appropriate problem solving set for attainment of a future goal; it includes behaviours such as planning, impulse control, inhibition of prepotent but irrelevant responses, set maintenance, organized search, and flexibility of thought and action" (Ozonoff et al., 1991, p. 1083).

Research exploring the EF hypothesis in ASD have utilised tasks focusing on inhibition, intentionality and executive memory (Burgess, Alderman, Evans, Emslie & Wilson, 1998). The results of research into EF have been widely criticised due to variability in the definition of EF, difficulties in establishing the ecological validity of EF testing materials and a focus on group characteristics (TD v ASD) rather than individual differences (Liss et al., 2001; Rajendran & Mitchell, 2007). Liss et al., (2001) concluded that although executive dysfunction was a commonly associated feature of ASD, it was not universal, and so was "unlikely to cause autistic behaviours or deficits in adaptive function" (p. 261).

4.4 The Empathizing-Systemizing Theory of ASD

Building upon the Mindblindness theory of ASD, which is considered by some to account only for the social and communication difficulties in Autism, the Empathizing-Systemizing (E-S) theory aims to explain difficulties related to non-social domains (Baron-Cohen, 2009). The E-S theory is a cognitive theory which has developed from the WCC and EF theories, and claims that activity in the cognitive level mediates neurobiological and behavioural patterns in ASD (Baron-Cohen, 2009).

The E-S theory is centred around two key dimensions: empathizing and systemizing. These dimensions may be measured using the Empathy Quotient (EQ) and Systemizing Quotient (SQ) and are considered to be measurable in both ASD and non-ASD populations (Baron-Cohen, 2009). The EQ is related to individual ability to identify others' mental states, attributions, and recognition of various factors such as vocal and postural expressions of emotion. EQ also involves "affective empathy" which is the ability to feel and demonstrate an appropriate emotional reaction to another person's thoughts and feelings (Baron-Cohen, 2009, p. 71).

The E-S theory claims that social difficulties in ASD are attributable to deficit or delay in developing empathy (or low levels of EQ), while areas of strength, such as attention to detail, can be accounted for by a superior level of skill in systemizing (high levels of SQ), (Baron-Cohen, 2002). Systemizing is defined as: "the drive to analyse and construct systems. What defines a system is that it follows rules, in order to predict how that system will behave" (Baron-Cohen, 2009, p. 71). Systemizing is considered to be a useful tool to manage change, and to predict and interpret behaviour (Baron-Cohen, 1994). Disruption to the system (such as an unexpected change to routine) can be particularly distressing for individuals with ASD, due to their reliance on systems for interpretation of their environment (Baron-Cohen, 2009).

Baron-Cohen (2009) suggested that systems are present in a variety of domains; such as collectible systems (e.g. distinguishing between types of shells or stones),

mechanical systems (such as a video recorder), natural systems (animal subgroups or tidal patterns), motoric systems (such as running back and forth or bounding on a trampoline), numerical systems (such as a bus timetable) or social systems (such as a management hierarchy). It has been suggested that some professions require a higher level of systemizing than others. These occupations include; mathematicians, physicists, engineers, lawyers, meteorologist, chemists, musicians, grammarians, librarians and company CEOs (Baron-Cohen, 2006).

The E-S and Assortative Mating theories suggest that individuals with ASD are "hyper-systemizers" (Baron-Cohen, 2006, p. 866), who are skilled in processing highly systemized (law-governed) information. The Assortative Mating theory was developed by Baron-Cohen alongside the E-S theory in order to explore the predictive effect of systemizing on diagnosis. It is well established that ASD is linked to genetics (Gillberg, 1991; Bailey et al., 1995). However, Baron-Cohen (2006) claimed that familial patterns are also observed in systemizing ability.

Evidence suggests that fathers of CYP with ASD are twice as likely to be engineers compared to men in the general population (Baron-Cohen, Wheelwright, Stott, Bolton & Goodyear, 1997). Further research into parental SQ has suggested that parents of CYP with ASD are particularly skilled systemizers (Baron-Cohen & Hammer, 1997; Baron-Cohen et al., 1997), which may suggest a genetic link between systemizing ability, and ASD (Baron-Cohen, 2006).

Evidence in support of the E-S theory found that CYP with ASD obtained a higher SQ score, performed better on systemised activities such as picture sequencing tests (Baron-Cohen, Leslie & Frith, 1986) and scored significantly higher on physics tests when compared with their TD peers (Baron-Cohen, Richler, Bisarya, Gurunathan, & Wheelwright, 2003). However, individuals with ASD were poorer at interpreting people's thoughts and feelings (Perner, Frith, Leslie, & Leekam 1989), which suggests that individuals with ASD have a low EQ and high SQ, which effects their social and non-social functioning.

Baron-Cohen (2009) claimed the explicit use of highly systemized approaches and intervention may be particularly effective in facilitating understanding, engagement and progress for individuals with ASD. For example, an "artificial approach of presenting mental states (such as emotional expressions) as if they are lawful and systemizable" may be more accessible to individuals with a high SQ than the social skills training programmes provided to TD children in schools (Baron-Cohen, 2009, p. 72).

5 Social Skills Training (SST) for CYP with ASD

Theoretical perspectives and empirical research have outlined the cognitive and social difficulties experienced by CYP with ASD and have informed the development of various social skills interventions. Pervasive difficulties with social interaction and communication are core deficits in ASD (APA, 2013) and intervention is considered to be critical in improving social competence and long-term outcomes (WHO, 2013). Therefore, it is somewhat surprising that there has been a lack of historical research exploring the impact of social interventions on developing social and communication skills (Reichow & Volkmar, 2010).

5.1 Effectiveness of SST

Very few of the published social interventions for pupils with ASD are based on empirical evidence or outcome-based practice (Kratochwill & Shernoff, 2004; LeGoff, 2004). However, in the last decade, due to the increasing emphasis on social and emotional wellbeing on long term pupil outcomes (Weare & Gray, 2003), efforts have been made to address the social needs of pupils with ASD and to question the lack of published research available to guide intervention decisions (Reichow & Volkmar, 2010).

It has been suggested that "social skills are behaviours that must be taught, learned, and performed whereas social competence represents judgements of evaluations of these behaviours within and across situations" (Gresham et al., 2001, p. 333). Therefore, social competence is a sophisticated ability which is preceded by basic social skills; such as greeting others, initiating interactions, emotional self-regulation, adherence to courtesies, and appropriate sharing and turn-taking (Gresham et al., 2001). Deficits in social skills stem from absence of knowledge in how to execute skills, or failure to discriminate which social behaviours are most appropriate for specific situations (Gresham & Elliott, 1990).

Social skills training (SST) aims to provide knowledge and explicit instruction of appropriate prosocial behaviours to individuals with deficits in social competence (Gresham et al., 2001). Specific instruction strategies commonly used in intervention include modelling, coaching, behavioural rehearsal, performance feedback, typically in a small group setting (Gresham, 1998). Kasari (2002) highlighted that much of the empirical research evaluating the effectiveness of SST have focused primarily on how findings relate to psychological theories, rather than how effectively they address the core deficits of the disorder.

One of the most commonly studied psychosocial and educational interventions is Applied Behaviour Analysis (ABA), (Volkmar et al., 2004). Several studies have evaluated the effectiveness of this comprehensive treatment program which aims to increase socially significant behaviours; such as communication, social skills, self-control and self-monitoring. ABA also aims to promote the generalisation of socially significant skills across contexts, and to reduce interfering behaviours such as self-injury or stereotypy (The Center for Autism and Related Conditions, CARD, 2015). In a review of the evidence by The National Academy of Science in the USA (NRC, 2001) into the effectiveness of ABA and SST, it was concluded that no single approach is best for all individuals, or even across time, for the same individual with ASD. It was suggested that a greater integration of a variety of social and behavioural intervention may be best to promote development of individual skills.

Other evaluations of the effectiveness of the ABA program have suggested that acquired social skills are not always maintained over time. A study of six children found that although five of the participants rapidly acquired new skills, only two of the six children demonstrated that these skills had been maintained two years post intervention (Volkmar et al., 2004). Reviews of empirical evaluations have suggested that the outcomes for those who receive SST are variable, and have noted the difficulty with identifying the parameters of successful treatment (Howlin, 1998). Researchers such as Wolery and Garfinkle (2002) have argued that the child's engagement in tasks is the single most important factor in intervention, and that this requires consideration of the individual child's interests.

In a study considering the outcomes and efficacy of social intervention, Barry et al. (2003) established a group intervention to address social skills such as greeting, conversation and play with four pupils diagnosed with ASD. The results indicated that the intervention had been successful in promoting the targeted behaviours. However, the researchers noted a lack of generalisation of the social skills to non-clinical settings, suggesting that the pupils compartmentalised the skills to the intervention setting and showed difficulty in transferring them to real life contexts (Barry et al., 2003). These findings are concerning, as studies have shown that even with the most ecologically valid treatments, generalisation of skills across context must be specifically addressed by the intervention, or it will rarely happen (Hwang & Hughes, 2000; Strain & Hoyson, 2000).

6 Generalisation of Skills in ASD

6.1 The Importance of Generalisation

Generalisation refers to the individual's independent ability to perform learned skills, actions and behaviours from inside the teaching context into an external, non-teaching context (Brown & Bebko, 2012). Plaisted (2001) argued that reduced generalisation is a core deficit in ASD, and is a plausible alternative to the WCC theory. Plaisteds' theory

suggests that reduced generalisation could be responsible for the differences in perceptual processes between individuals with ASD and their TD peers.

Plaisted claimed that the superior performance of participants with ASD on Block Design and Embedded Figures tasks could be explained as a reduction in processing of similarities that are held between stimuli and real life situations. For example, in the Embedded Figures Task, the target figure usually contains some elements which are consistent with the overall picture and features that define it. Therefore, identifying the target image among the other patterns is easier if the differences are more salient. According to Plaisted, individuals with ASD are superior at processing differences, rather than similarities between categorical features, when compared to their TD peers.

The Reduced Generalisation (RG) theory of ASD claims to account for the difficulties that individuals with ASD have with generalising newly learned behaviour to a novel environment (Mirenda & Donnellan, 1987). According to the RG theory, individuals with ASD develop narrower concepts of their environment and have sharper delineated boundaries. Therefore, practitioners working with CYP with ASD should carefully consider their approach to practice, and consider changing the intervention environment gradually. This approach is thought to allow CYP with ASD to "move in stages" by progressing through contexts, and may facilitate the generalisation of targeted skills (Rajendran & Mitchell, 2007, p. 240).

Baron-Cohen (2006) also attempted to explain generalisation difficulties in ASD by drawing parallels between observed difficulties to a theoretical framework of ASD. The E-S Theory suggests that individuals with ASD are "hyper-systemizers" who score highly on measures of Systemizing Quotient (SQ), but score within a low range of the Empathy Quotient (EQ) (Baron-Cohen, 2006, p. 869). Baron-Cohen suggested that the higher the SQ, the less able the individual is to generalise skills across contexts.

Baron-Cohen hypothesised that individuals with ASD view the word systemically, therefore from the perspective of the individual with ASD, SST is a discrete system, which is governed by consistent and predictable laws. Baron-Cohen hypothesised that effective systemizing presumes that one does not generalise from one system to another, until one has enough information that the rules of system A are consistent with the rules of system B. Therefore, the higher the SQ, the lower the individual's ability to generalise skills across contexts spontaneously, and to draw parallels across systems (Baron-Cohen, 2006).

Generalisation of skills from social intervention to other social contexts has been highlighted as a key area in determining the efficacy of social intervention for pupils with ASD (Bellini, Peters, Benner & Hopf, 2007). It could be suggested that if an individual is unable to transfer the skills they have developed during social intervention into a naturalistic setting, the social intervention is rendered useless to the real-life experiences of the CYP. Although the particular importance of generalisation of skills in CYP with ASD is frequently outlined in SST research (Hwang & Hughes, 2000), very few published studies explicitly report on the ability of participants to generalise skills between therapeutic and real life contexts (Bellini et al., 2007; LeGoff, Krauss, & Levin-Allen, 2012).

6.2 Supporting Generalisation of Skills

Some researchers have attempted to analyse the generalisation of SST across contexts. Barry et al. (2003) reported that while participants with ASD made progress in targeted skills within the clinical setting, the participants demonstrated a lack of generalisation of targeted social skills to non-clinical settings. It was suggested that the participants seemed to compartmentalise skills to the intervention setting, and showed difficulty in transferring them to real-life contexts.

Luckett, Bundy & Roberts (2007) suggested that difficulties with generalisation of skills between social domains may be attributable to a disparity between the heavily

structured, repetitive and external reinforcements used in social interventions, and the intrinsic, internally motivated elements required in voluntary play and real-world social interaction. The importance of intrinsic motivation in generalisation is also emphasised in Play Therapy. This approach is considered to be particularly effective in promoting generalisation of skills between social domains by encouraging individual engagement, and opportunities to connect therapy and outside behaviour (Kool & Lawver, 2010; Gallo-Lopez & Rubin, 2012).

Advocates of Play Therapy suggest that it is an effective method to promote generalisation because the approach includes opportunities for symbolic play and the interpretation of naturalistic situations (Kool & Lawver, 2010). Symbolic play requires the use of imagination to interact with toys creatively, such as using one object to represent another, as opposed to functional play, which requires interacting with materials according to their designated function (Barry et al., 2003). Play Therapy is purported to provide possibilities for generalisation by connecting behaviour from inside and outside the therapeutic setting and builds upon the pre-existing interests of the individual child (Kool & Lawver, 2010).

7 Play Therapy

One of the earliest means of developing social awareness and competence is through utilisation of the rich and versatile act of play (Gallo-Lopez & Rubin, 2012). As a social engagement, play can provide an insight into the rules of social interaction, as well as "a lens through which the different facets of growth and change- cognitive, moral, social, creative and spiritual- can be observed and evaluated" (Rubin, 2012, p. 19). Play has also been described as elementary to social survival in allowing children to play out the various roles and challenges that they will face while navigating the social world, both as children and later, as adults (Sutton-Smith, 2008).

Play-based interventions were initially developed for individuals with social, emotional and behavioural difficulties as a vehicle to promote social understanding and

expressive language, allowing communication of thoughts and feelings through the symbolic use of toys (Bratton, Ray, Rhine & Jones, 2005; Landreth, 2002). It is thought that this approach provides opportunities to address impairments by gaining experience-based and enjoyable interactions, which enhance shared attention, intrinsic motivation and communication through verbal and non-verbal initiations and responses (Bernard-Optiz, Ing & Kong, 2004).

CYP with ASD are often reluctant to engage in interactive play, which is considered a core skill in child development (LeGoff et al., 2012). It has been suggested that many children with ASD have a preference for functional play and have some difficulty with symbolic play (Barry et al., 2003). Functional play is thought to limit the repertoire of play available to CYP with ASD as the focus remains on interacting with objects according to their function, often in a rigid and repetitive manner (Rubin, 2012). Interacting with toys symbolically is considered to be more developmentally advanced than functional play, and is much more common in TD children (Libby, Powell, Messer & Jordan, 1998). The disparity between these preferential styles of play may lead to a lack of opportunity for CYP with ASD to interact meaningfully with their age-matched, TD peers. Consequentially, Play Therapy is widely used by practitioners to develop individual engagement and understanding of symbolic play (Gallo-Lopez, 2012; Gallo-Lopez & Rubin, 2012).

One of the most popular of the creative-expressive toys used in Play Therapy is LEGO (Kool & Lawver, 2010). LEGO blocks are an example of construction materials which are cited in the literature of play therapy as “creative-expressive” toys, providing opportunities for a myriad of themes, interpretation and symbolic play during therapy sessions (Kool & Lawver, 2010, p 21).

8 LEGO-Based Therapy

8.1 The Importance of Engagement

Attwood (1998) described children with ASD as being difficult to direct to areas of non-interest, as they are not typically sensitive to social pressures, or the need to please their teachers, peers or parents. Even on a one-to-one basis, it can be difficult to sustain the attention of a child with ASD to a task that they do not find inherently interesting (Attwood, 1998). Consequentially, many of the interventions recommended for improving social competence in TD pupils are not effective for CYP with ASD if they are not inherently motivated to engage with them (LeGoff, Krauss & Levin-Allen, 2010).

Although the rigidity of CYP with ASD to engage with activities of non-interest poses a challenge to practitioners, CYP with ASD can also be extremely motivated and focused when they are asked to engage with a topic of obsessive interest (Attwood, 1998). It has been recommended that taking advantage of a child's stereotyped interests is an effective way of promoting participation in social situations, or as convenient reinforcement for incidental, positive social interactions (Koegel & Koegel, 1995).

The choice of LEGO as a medium for social intervention was based upon this "constructive application" approach (Attwood, 1998, p.96), which suggests that the most effective way to motivate learning and to change behaviour is by targeting an area of natural interest to the child. LEGO-Based Therapy, also known as LEGO Therapy, evolved as a clinical intervention based upon the observations of spontaneous interactions between individuals with ASD, who regularly demonstrated a preference for engaging with construction toys, particularly with LEGO pieces (LeGoff, 2004).

8.2 Development of the LEGO-Based Therapy Approach

The use of LEGO construction materials in developing symbolic play in Play Therapy also contributed to the development of LEGO-Based Therapy as a discrete intervention (LeGoff, 2004). LEGO-Based Therapy built upon the Play Therapy approach and was formulated as a structured approach, tailored specifically to the social and communication needs of CYP diagnosed with ASD; targeting joint attention, turn-taking, role play, joint achievement, sharing resources, collaboration, and social competence (LeGoff et al., 2014).

It has been suggested that LEGO may be particularly effective in engaging pupils with ASD to develop intrinsic motivation for social interaction due to its characteristics as a highly structured, systematic toy (Owens, Granader, Humphrey & Baron-Cohen, 2008), which appeals to many CYP with ASD as a result of their attraction to systems (Baron-Cohen, 2006). The characteristics of LEGO materials themselves are thought to be particularly appealing to CYP with ASD due to the high rate of discrete actions and repetitions that are required in construction, the range and diversity of material available (LeGoff et al., 2012). As a resource, LEGO pieces are considered to have a simple, sensory appeal for those who have difficulty in processing or tolerating visual stimuli (LeGoff et al., 2012).

LEGO-Based Therapy is described as a "novel and promising" approach to promote social competence, communication and collaboration between CYP with ASD by manipulation of their intrinsic interests (Kasari & Lawton, 2010, p. 138). The establishment of many LEGO-Based Therapy groups in local authorities across the UK is testament to its appeal, although there has been very little empirical research analysing the impact of LEGO-Based Therapy on individual outcomes (Owens et al., 2008). With consideration of the popularity of this intervention, and the increasing number of training courses available to become LEGO-Based Therapy practitioners, it is surprising that the literature search strategy described identified only three published research papers examining the impact of LEGO-Based Therapy on social competence.

8.3 What is LEGO-Based Therapy?

The developers of LEGO-Based Therapy suggest that using an inherently motivating medium facilitates the process of establishing cohesive group-based intervention; targeting joint attention, communication, shared enjoyment, nonverbal communication and joint accomplishment (LeGoff et al., 2010). LEGO-Based Therapy is described as a child-led and peer-based intervention which utilises the natural interest of CYP with ASD to partake in construction activities with peers, taking on various roles and responsibilities, with the aim of accomplishing a shared goal.

It is suggested that this approach enables frequent, diverse, naturally occurring interactions, which provides opportunities for incidental feedback, correction and encouragement (LeGoff et al., 2010). There are a limited number of chapters and references made to LEGO-Based Therapy within publications related to Play Therapy and social intervention in schools (Gallo-Lopez & Rubin, 2012; Kool & Lawver, 2010). There is only one published book to date (LeGoff et al., 2014) which is dedicated solely to this increasingly popular intervention.

LeGoff et al. (2014) argue that LEGO-Based Therapy is considered particularly effective as a school based intervention, due to the availability of LEGO pieces and suitable facilitators (LeGoff et al., 2010). Those who are able to facilitate the intervention are referred to as “LEGO Therapists” and “therapy staff” in the handbook by LeGoff et al. (2014, p. 54). However, adult facilitators are not necessarily qualified therapists, or psychologists. While the literature suggests that most LEGO Therapists have at least a bachelor’s degree in education or psychology, there are no particular qualifications required to implement LEGO-Based Therapy (LeGoff et al., 2010). It is recommended that LEGO Therapists should have experience in working with CYP with ASD in either clinical or educational settings (LeGoff et al., 2014), but there is some evidence that the approach has been successfully implemented using inexperienced volunteers, without graduate education (Owens et al., 2008).

When referring to LEGO-Based Therapy with CYP with ASD, the intervention is often renamed "LEGO Club" to ease pupil familiarity and group cohesion (LeGoff et al., 2014, p. 109). It is recommended to use the term "LEGO Club" and to avoid using terms such as "therapy" and "social skills" with LEGO Club members (LeGoff et al., 2014, p. 109). Therefore, the literature often refers to LEGO Club when referring to the experiences of CYP, as opposed to LEGO-Based Therapy. LeGoff et al. (2014) describe sessions as highly structured, with clear rules and boundaries which are reinforced in every session (LeGoff et al., 2014).

The following section is as an outline of the structure required in implementation of LEGO-Based Therapy. The first stage of intervention requires the development of individual "pivotal skills" before the LEGO Club members are able to begin on collaborative projects (LeGoff et al., 2014, p. 37). These skills include:

PIVOTAL SKILLS	
APPROPRIATE CONDUCT	LEGO Club members must be able to sit at a table without wandering and responding to verbal instructions and nonverbal prompts, including pointing and eye gaze. No aggressive or disruptive behaviour, waiting appropriately, and following the LEGO club routine.
SORTING AND GROUPING	Sorting and grouping LEGO pieces by shape, colour and size.
MATCHING	LEGO Club members must be able to match LEGO pieces to images.
IDENTIFYING AND LABELLING	Identifying and labelling LEGO pieces accurately by verbal descriptions of their function and appearance.
FOLLOWING SIMPLE VISUAL INSTRUCTIONS	LEGO Club members must be able to follow simple visual instructions to begin simple projects, first with a therapist, then with peers.
INSPECTING A COMPLETED SET	This skill requires LEGO Club members to inspect a completed set and spot errors between the model and the visual plan.
THEMATIC PREFERENCES	The LEGO Therapist discusses thematic preferences with the LEGO Club members so that a motivating construction set is selected for the collaborative building phase.

Table 2: An overview of the pivotal skills required to participate in collaborative building within LEGO-Based Therapy sessions (Adapted from LeGoff et al., 2014).

8.4 Structure of LEGO-Based Therapy Sessions (Adapted from LeGoff et al., 2014).

The LEGO-Based Therapy sessions are highly structured, to provide clear expectations, predictability and to enhance the experience of LEGO Club members. Each session begins with a 'Check-In' phase, in which members are encouraged to greet one another in an age-appropriate manner, using eye contact and individual names. Following 'Check-In', the rules of the LEGO Club are discussed and are displayed on a cork board, so that they can be referred to throughout the session. Next, the 'Planning Phase' requires LEGO Club members to choose a building project. This is an opportunity for LEGO Therapists to model correct methods of debate, discussion, agreement or disagreement. This stage requires visual instructions, or a structured plan, for the LEGO Club members to follow.

The 'Structured Phase' of the LEGO-Based Therapy session requires all members to be engaged with the chosen building project and to adhere to their interdependent roles and responsibilities. Following completion of the collaborative project, the 'Creative Phase' allows for freestyle building, so that LEGO Club members are able to explore their individual designs and build their own creations. This can be an opportunity to link members and promote friendships between those who are exploring similar themes. Problem-solving, compromise and turn-taking should be modelled by the LEGO Therapist, but pupils are encouraged to take responsibility and provide directions for their own projects.

LEGO Club members are given 15 minutes warning, with 5 minute reminders, to begin de-constructing their personal LEGO builds and to help collect and return resources during 'Clean-Up Time'. All members must contribute to this process and are expected to tidy all resources, including those that may have been used by other members. Finally, during the 'Farewells,' members are encouraged to bid farewell to each other in an age-appropriate manner, using each other's names and eye contact. Each member should be addressed by every member of the group.

8.5 Peer-mediation and Group Cohesion in LEGO-Based Therapy

In order to promote interdependence and successful collaboration during construction tasks, the LEGO Club involves a number of roles and responsibilities, which are organised hierarchically, and are awarded to members according to their level of experience in the "LEGO Club Level System" (LeGoff et al., 2014, p. 76). The LEGO Therapist aims to provide opportunities for members to complete each of the roles' requirements and to interchange roles. Once the skills for a particular level are demonstrated, the members are given a certificate to mark their achievement. Successful completion of each level and award of the certificate is decided by the LEGO Club members, rather than the LEGO Therapist. Peer-mediated feedback is central to the ethos and structure of the LEGO-Based Therapy intervention (LeGoff et al., 2014).

LEGO-Based therapy practitioners, or LEGO therapists, are not in the role of teacher, and view themselves as facilitators, fostering collaborative and social skills in the club members via peer-mediation (LeGoff et al., 2014). Wherever possible, the LEGO therapist encourages LEGO club members to address issues such as inappropriate conduct and rule-breaking in a manner which is sensitive and constructive. The aim of this peer-mediated approach in the group is that it encourages onus on the pupil, builds intrinsic motivation to co-operate and utilise social competence, and builds a cohesive group identity (LeGoff et al., 2014).

Cohesion between peers can be supported by dividing tasks between group members to encourage their interdependence using the LEGO roles outlined in Table 3. The LEGO Club Level System begins at the level of LEGO Helper and progresses to the most advanced level, LEGO Genius.

Role/Level	*Responsibilities*
LEGO Helper	This is the first level within the hierarchy. Duties include sorting and organising pieces, supplying pieces to the builder, checking sets for consistency with plans, ordering, collecting resources and cleaning up the LEGO pieces.
LEGO Builder	LEGO Builders have demonstrated that they are able to independently construct moderate builds and are able to fulfil the key roles such as building, supplying and engineering duties.
LEGO Creator	This role involves the ability to design, find parts for, and construct an original and complex freestyle creation. The final construction must resemble the design.
LEGO Master	The LEGO Master leads a whole group project, must present their idea to the whole group and try to convince them that their idea is worth working on collaboratively during freestyle building time. The plan must constitute at least 300 pieces and the Master must be responsible for designating roles and coordinating the project.
LEGO Genius:	The LEGO Genius must write a movie script or story which is presented to the group, open to critique, this story must then translate to a detailed plan, or a stop-motion film of the project until completion. The level may also be awarded for extremely complex LEGO creations, engineering skill and leadership.

Table 3: An overview of LEGO Club roles and responsibilities in the LEGO Club Level System.

8.6 Linking LEGO-Based Therapy to Existing Theories of ASD

In the very early stages of development, the intervention did not claim to be based upon any particular theory or methodology, but rather upon the naturally occurring interests and strengths of CYP with ASD (LeGoff et al., 2010). However, it has been suggested that individual enjoyment, successful intervention outcomes, and the appeal of the LEGO resources may be strongly related to the characteristics of ASD outlined in the E-S theory (Baron-Cohen, 2006).

The E-S theory suggests that individuals with ASD are highly attracted to systems and to highly structured activities (Baron-Cohen, 2006). LEGO is described as a highly structured and systematic toy, which therefore may be particularly appealing to children with ASD (Owens et al., 2008). LeGoff (2004) argues that the schedule and content of LEGO-Based Therapy sessions are also highly structured and governed by a consistent set of rules, which provides clear expectations, consistency and predictability for LEGO Club members. Some may suggest that the LEGO-Based Therapy intervention is highly compatible with the E-S theory, which may not be surprising, as one of the co-founders of the intervention (LeGoff et al., 2014) also proposed the E-S Theory (Baron-Cohen, 2006).

When considering the literature, it may be suggested that the LEGO-Based Therapy approach may also be linked to the WCC theory, which suggests that individuals with ASD often become fixated by details and fail to consider the larger picture, or global whole (Rajendran & Mitchell, 2007). Evidence from WCC research using block designs tasks suggests that individuals with ASD are particularly skilled in construction activities (Frith, 2003). Participants with ASD were found to perform significantly better than their TD peers when following visual designs to complete block constructions, and were observed to utilise perceptual segmentation to speed their work (Shah & Frith, 1983). During LEGO-Based Therapy, participants are also required to follow visual designs to complete construction tasks. It may be suggested that LEGO-Based Therapy utilises WCC to facilitate engagement and intrinsic motivation in CYP with ASD.

8.7 Evidence from LEGO-Based Therapy Research

LEGO Therapy is a relatively new method of promoting social competence in pupils with ASD (Kasari & Lawton, 2010) and consequentially, there is very little published research about the long-term outcomes of the intervention. To date, there are only three published outcome studies that have focused on the LEGO-Based Therapy approach. However, of the research that has been published, some effort has been made to address the need for a measure of long-term effectiveness and evidence of skill generalisation across contexts in social interventions for CYP with ASD (LeGoff &

Sherman, 2006; Owens et al., 2008). It is pertinent to consider that most of the research regarding the intervention has been conducted, or co-conducted, by the original founder (LeGoff, 2004) of LEGO-Based Therapy. This will be discussed further in Part C of this document.

The first study conducted by the original developer of LEGO-Based Therapy utilised a waiting list timeline design, in which participants served as their own controls before and after taking part in LEGO-Based Therapy (LeGoff, 2004). The study explored the impact of intervention at both 12 week (N= 47) and 24 week intervals (N=21), using direct observational measures of social interaction during play times. LeGoff (2004) was particularly interested in the frequency of participants initiating interactions, and whether participants were able to sustain the duration of their social interactions following LEGO-Based Therapy intervention. Parents of the participants were also asked to complete the Stereotyped Behaviours scale from the Gilliam Autism Rating Scale (GARS, 1995).

The results of the research by LeGoff (2004) suggested that participants had improved in the frequency of their initiation and duration of their social interactions. Parents reported fewer stereotyped behaviours after 12 weeks of intervention, compared to those who had not received intervention. At 24 weeks, the participants who had received intervention improved again, but only within the domains of duration of interaction and stereotyped behaviours. The frequency of their interaction initiation had plateaued, which LeGoff (2004) hypothesised was due to the restricted timeframe (15 minutes) of playground observation. Although this methodological issue may be solely responsible for this finding, it could also be suggested that the intervention had a limited impact on the participants' ability to initiate social interaction of their own accord in a naturalistic context. Furthermore, it could be suggested that a wider range of social behaviours may have been observed across a greater variety of social contexts.

The second study by LeGoff and Sherman (2006) compared outcomes of measures of social development and adjustment for LEGO-Based Therapy on 60 participants with matched controls with diagnoses of ASD. The matched controls had received similar amounts of individual and group social skills training prior to experimental intervention. The control group received SST from mental health interventions, but did not receive LEGO-Based Therapy for the duration of the research period. The two groups were compared using the Socialization Domain from the Vineland Adaptive Behaviour Scale (VABS-II; Sparrow, Cicchetti & Balla, 2005) and the GARS Social Interaction subscale (GARS, 1995).

The study examined the participants' social interaction skills using both the GARS and VABS-II in a retrospective 3-year follow-up design. Although both the experimental and control group improved significantly over time, the participants who had received LEGO-Based Therapy had improved significantly more than those who had not received LEGO-Based Therapy. However, this research could be critiqued for lacking clarity as to which alternative social interventions were received by the control group, who are reported to have received "mental health interventions" using "traditional materials, not LEGO" (LeGoff & Sherman, 2006, p. 320).

The third study, completed by Owens et al. (2008) was an independent replication study by a group of researchers at Cambridge University Medical School. The researchers aimed to explore the generalisation of any acquired skills to non-therapeutic situations through observation of social interaction in naturalistic, school-based contexts. Owens et al. (2008) implemented a randomized control group design, assigning subjects to one of three groups. The first group of participants received LEGO-Based Therapy, the second received the Social Use of Language Programme (SULP: Rinaldi, 2004) and the third were allocated to a control group, which did not receive social intervention.

Similar to the results of LeGoff (2004) and LeGoff and Sherman (2006), the groups who received LEGO-Based Therapy and SULP made significant progress when compared to

the group who received no intervention. The participants who had received LEGO-Based Therapy showed significantly greater improvements than the SULP group when measured using parental ratings of social interaction using the GARS- Social Interaction subscale, and were able to sustain significantly longer social interactions when observed on the playground, in comparison to other groups.

Rates of parental satisfaction were gathered using a pre and post intervention 10-point scaling question. Interestingly, the results indicated that there was no significant difference in parental satisfaction between the SULP and LEGO-Based therapy groups. However, the validity of comparing SULP, a programme designed to target communication skills for children with a variety of Special Educational Needs (SEN) from the field of Speech and Language Therapy (SALT), to a social skills intervention tailored to CYP with ASD could be questioned.

Although Owens et al. (2008) found that parental satisfaction was comparable across both social interventions, anecdotal evidence suggests that LEGO-Based Therapy is particularly popular with both CYP and their parents. LeGoff (2004) noted a number of spontaneous, self-initiated friendships and social interactions with other members outside of the LEGO Club setting. These friendships were attributed to shared pupil enjoyment of the LEGO resource, and the rapport built during LEGO Club sessions (LeGoff, 2004). Measures of social interaction and communication (GARS) in the school setting were in line with anecdotal parental comments, demonstrating significant increase in the frequency and duration of spontaneous social exchanges.

9. The Current Study

The current study aims to contribute to the body of evidence regarding this increasingly popular intervention, which to date, has limited empirical evidence to support it (Kasari & Lawton, 2010). The existing published research was conducted by the founders of the intervention, therefore, it could be suggested that there is a lack of critical appraisal into the effectiveness of the intervention in promoting social competence. An increasing number of local educational authorities and educational psychologists are delivering this intervention, with limited empirical evidence to support outcome-based practice (Owens et al., 2008).

It is suggested that LEGO-Based Therapy allows capitalisation on the natural interests of pupils with ASD in construction and systems to improve intrinsic motivation for participation: "There is definitely something relevant with regard to this population about the use of LEGO materials and the resulting therapeutic benefit" (LeGoff et al., 2012, p. 116). While anecdotal evidence suggests that LEGO construction materials are particularly appealing to pupils with ASD (LeGoff et al., 2014), there is a lack of qualitative information to explore pupil preferences and the perceptions of the adults who support them.

LeGoff (2004) demonstrated high levels of parental satisfaction as a result of intervention, and reported that pupils who had received LEGO-Based Therapy demonstrated improved social competence (LeGoff, 2004). However, it may be suggested that parental satisfaction could be influenced by the improvement in social interactions and social engagements which occur outside of the school-based, therapeutic setting, and that more research is needed to consider the generalisation of skills to social domains outside of school.

9.1 Aims of the Current Research

In light of the research and literature reviewed, the current study aims to explore the perceptions of teachers and parents of the LEGO-Based Therapy intervention and to

establish whether or not any acquired social competence skills were obtained, maintained, and generalised over time. In the current study, "social competence" is defined as social interaction (SI) and communication (C) scores, which will be quantified by completion of the GARS-2 (Gilliam, 2006). The research will explore the effectiveness of LEGO-Based Therapy as a school-based intervention, and will implement an ABA design (Solso & Johnson, 1994; Robson, 2015), using a mixed-methods approach to explore any impact of LEGO-Based Therapy on social competence. Comparing both types of data may provide a valuable insight into whether or not LEGO-Based Therapy promotes real-life opportunities for spontaneous social interactions, and provide opportunity to gather teacher and parent perceptions of the generalisability of any learned skills to a variety of social domains.

9.2 The Research Questions:

The following questions have emerged from the literature review:

1. Is there a perception of improvement in social interaction and communication skills in pupils with ASD as a result of LEGO-Based therapy?
2. Are any effects of LEGO-Based Therapy maintained over time, once the intervention input is terminated?
3. Are there differences in any effects observed between home and school?
4. Are any effects of LEGO-Based Therapy transferred to other social contexts?
5. What are teacher perceptions of LEGO-Based Therapy as an intervention for developing social competence in pupils with ASD?
6. What are parental perceptions of LEGO-Based Therapy as an intervention for developing social competence in pupils with ASD?

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LEGO Therapy and Social Competence: An Exploration of Parental and Teacher Perceptions of LEGO-Based Therapy with Pupils Diagnosed with Autism Spectrum Disorder (ASD)

Part B: The Empirical Study

1. Abstract

This study aimed to explore the perceptions of teachers and parents of LEGO-Based Therapy by implementing a mixed-methods approach. Four LEGO-Based Therapy groups were established in three educational provisions, with the aim of facilitating the social competence skills of 13 pupils (aged 7:9 years – 12:6 years) with a diagnosis of Autism Spectrum Disorder. Six teachers and seven parents were convenience sampled to partake in the research. School staff completed the Gilliam Autism Rating Scale, 2nd Edition (GARS-2) to measure the pupils' social interaction and communication skills pre and post intervention. Statistical analysis of the GARS-2 did not demonstrate a significant effect of intervention over time. Parents' perceptions of the intervention were collected using individual, semi-structured interviews. Teachers' perceptions of the intervention were collected using a staff focus group. Two thematic analyses were completed on the qualitative data provided by parents and staff and a number of themes were identified. The results suggested that there were some differences between the views of teachers and parents. Teachers perceived there had been a domain-specific improvement in social competence skills when engaging with LEGO materials, but noted a lack of generalisation of skills from therapeutic to non-therapeutic contexts. Parents perceived an increased interest in LEGO materials as well as improved communication and initiation of interaction at home, suggesting that an element of skill generalisation had been achieved. The results are discussed with reference to the relevant research and implications for future research and practice are summarised.

2. Introduction

2.1 Autism Spectrum Disorder (ASD): Prevalence and intervention

Autism Spectrum Disorder (ASD) is a neurodevelopmental disorder which is characterised by abnormalities in reciprocal social interactions, communication, and by restricted, and, repetitive interests and activities (World Health Organisation: WHO, ICD-10, 1992). These two broad diagnostic categories are frequently referred to as the "dyad of impairment" (Lai, Lombardo & Baron-Cohen, 2014, p. 896).

With consideration of the increased prevalence of ASD (CDC, 2014), and the importance of facilitating integration of individuals with special educational needs (SEN) into mainstream education (Farrell, 2000), it could be suggested that improving evidence-based practice in social intervention for pupils with ASD should be considered as imperative to the role of the educational psychology service (EPS).

2.2 Social interventions and the Generalisation of Social Skills

It has been suggested that social competence is a predictor of long-term individual outcomes and psychological wellbeing (Tse, Strulovitch, Tagalakis, Meng & Fombonne, 2007). Historically, there has been a lack of empirical research exploring the impact of social skills training on social competence (Reichow & Volkmar, 2010) and few current interventions are based upon outcome-based practice (Kratochwill & Shernoff, 2004). Children and young people (CYP) with ASD are known to find generalisation of skills from teaching, to non-teaching contexts particularly difficult, which is considered a key feature of efficient social intervention (Bellini, Peters, Benner & Hopf, 2007).

More recent research has attempted to evaluate outcomes in published research to guide intervention (Reichow &Volkmar, 2010) and to consider individual ability to generalise skills (Barry et al., 2003). Attwood (1998) highlighted the importance of pupil enjoyment in their engagement with structured interventions. LEGO-Based Therapy claims to be inherently appealing to pupils with ASD due to their attraction to

construction activities, LEGO materials (LeGoff, 2004), and the appeal of systems (Baron-Cohen, 2006).

2.3 LEGO-Based Therapy

LEGO- Based Therapy aims to establish pivotal social and construction skills in order to progress through increasingly collaborative, group-based building projects. Peer-mediation is central to the ethos of the approach and aims to promote a deeper understanding of social skills, which it is claimed, facilitates social competence. This peer-mediated approach to intervention purports to improve generalisation of skills to social contexts outside of the therapeutic setting (LeGoff, de la Cuesta, Krauss & Baron-Cohen, 2014).

Unlike some other social skills training programmes, LEGO-Based Therapy is a clinically derived intervention, which was formulated specifically for pupils with ASD (LeGoff et al., 2014). The approach is tailored specifically to target their social and communication needs such as joint attention, turn-taking, role play, joint achievement, sharing resources, collaboration, and social competence (LeGoff et al., 2014). The approach is described as a "novel and promising" social intervention (Kasari & Lawton, 2010, p. 138), and has been adopted widely by practitioners across many local educational authorities in the UK (Owens, Granader, Humphrey & Baron-Cohen, 2008). However, as indicated by the literature survey conducted as part of the current research, the outcome-based research to support the intervention remains extremely limited.

2.4 Evidence from LEGO-Based Therapy Research

Evidence from longitudinal, quantitative analysis of the impact of LEGO-Based Therapy on social competence have utilised measures of maladaptive behaviours, social interaction and communication. Individual performance in these areas have been collected through a variety of measures by professionals such as child psychiatrists and speech pathologists (LeGoff & Sherman, 2006). The results indicated that over a

period of three years, pupils who received LEGO-Based Therapy made significant improvements in a broad range of social skills and demonstrated less maladaptive behaviour, when compared to matched controls. However, it could be suggested that LeGoff and Sherman (2006) were not transparent about the alternative interventions received by the matched controls, which may have compromised the validity of the research design and experimental outcomes.

Generalisation of social competence skills to non-therapeutic contexts has been explored through observation of social interaction duration in naturalistic, school-based contexts (Owens et al., 2008). The research indicated that pupils with ASD who received LEGO-Based therapy showed a small but significant increase in the duration of their social interactions during ten-minute playground observations when compared to matched controls who received the Social Use of Language Programme (SULP: Rinaldi, 2004). Participants who had received LEGO-Based therapy demonstrated a reduction in maladaptive behaviours and social difficulties. However, the validity of comparing SULP, a programme designed to target communication skills for children with a wide variety of Special Educational Needs (SEN) to a social skills intervention tailored to CYP with ASD could be questioned.

2.5 The Current Study

The current study aims to contribute empirical knowledge of LEGO-Based Therapy, which to date, has limited empirical evidence to support its outcome-based practice (Kasari & Lawton, 2010). It is suggested that LEGO-Based Therapy allows capitalisation of the natural interests of pupils with ASD in construction and systems to improve intrinsic motivation for participation. While anecdotal evidence suggests that LEGO construction materials are particularly appealing to pupils with ASD (LeGoff et al., 2014), there is a lack of qualitative information to explore pupil preferences and the perceptions of the adults who support them.

The current study explores the perceptions of teachers and parents of CYP receiving the LEGO-Based Therapy intervention and aims to establish whether or not any acquired social competence skills are obtained, maintained, and generalised over time. Comparing both qualitative and quantitative data may provide a valuable insight into whether or not LEGO-Based Therapy promotes real-life opportunities for spontaneous social interactions, and gather perceptions of the generalisation of any learned skills to a variety of social domains.

2.6 Research Questions:

1. Is there a perception of improvement in social interaction and communication skills in pupils with ASD as a result of LEGO-Based Therapy?
2. Are any effects of LEGO-Based Therapy maintained over time, once the intervention input is terminated?
3. Are there differences in any effects observed between home and school?
4. Are any effects of LEGO-Based Therapy transferred to other social contexts?
5. What are teacher perceptions of LEGO-Based Therapy as an intervention for developing social competence in pupils with ASD?
6. What are parental perceptions of LEGO-Based Therapy as an intervention for developing social competence in pupils with ASD?

3. Methodology

3.1 Epistemology and Research Design

The current study was based upon the epistemological position of critical realism (Baskhar, 2008). Critical realism suggests that knowledge is a social and historical product and that events can be interpreted as an interface between the natural and social worlds (Baskhar, 2008). This position maintains that there is a single, measureable reality (Sayer, 2000) which may have multiple interpretations, and that knowledge can be obtained from uncovering causal mechanisms (Robson, 2015). This research aimed to determine whether there was a causal effect of intervention on any changes in the pupil's social competence, while acknowledging the contribution of

social constructions on interpretation of the dependent variables. A mixed methods approach was employed to explore quantitative, measurable factors, alongside qualitative information which detailed staff and parent perceptions of the intervention.

In this research, the term 'social competence' was used to describe the two dependent variables which were the pupils' social interaction and communication skills. The dependent variables were measured using both quantitative methods (Gilliam Autism Rating Scale- Second Edition, GARS-2, 2006, Social Interaction and Communication scales) and qualitative methods (staff focus group and semi-structured parental interviews). The independent variable in this research were six, weekly sessions of the LEGO-Based Therapy intervention, which was administered to all participating pupils.

The research employed a mixed methods approach, using a within-subjects, repeated measures, ABA design (Solso & Johnson, 1994; Robson, 2015). See Figure 1 for a visual representation of the research design.

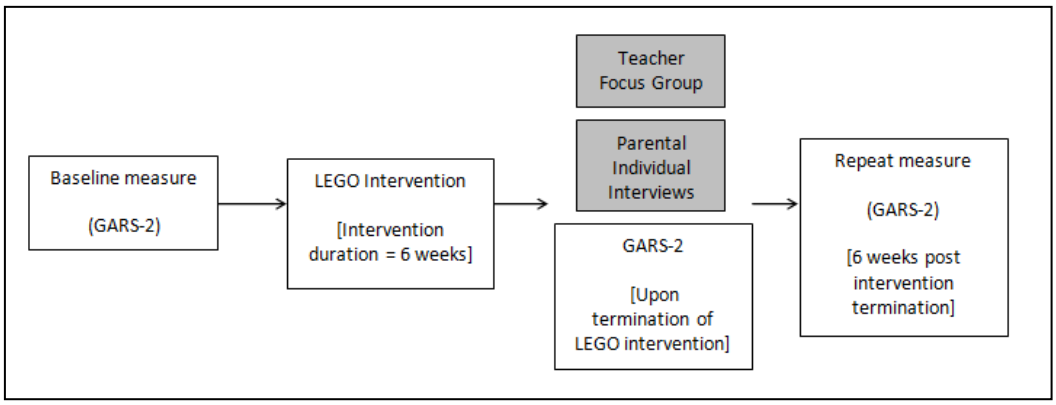


Figure 1: A diagram to illustrate the research design.

3.2 Participants

The research explored the perceptions of parents and school staff regarding the LEGO-Based Therapy intervention which was delivered to a convenience sample of 13 pupils, from both Key Stage 2 (KS2) and Key Stage 3 (KS3). Pupils were sampled from three educational provisions within one local educational authority (LEA) in South Wales, UK. The pupil's academic year groups spanned from Year 3 to Year 8, with an age range of

7:9 years - 12:6 years at the beginning of the research period. The participants included three female and ten male pupils.

All pupils were convenience sampled from three bases for CYP with a diagnosis of ASD, which were attached to mainstream schools and provided opportunities for regular mainstream integration. Assessment data provided by school confirmed that all pupils obtained a standardised ability score of above 70 on Welsh National Reading and Numeracy tests. School staff, who were familiar with the pupils, assigned the pupils into four groups for the purposes of LEGO Club with consideration of their year group and daily schedule.

Group name	School name	Pupil's key stage	Number of pupils in group	Number of male and female pupils
Group 1	School 1	2	3	1 female 2 males
Group 2	School 1	2	3	1 female 2 males
Group 3	School 2	2	4	4 males
Group 4	School 3	3	3	1 female 2 males

Table 4: An overview of group characteristics.

A convenience sample of six school staff took part in the research. School staff had been familiar to the individual pupils for a period of at least one academic year. To ensure consistency of ratings across the research period, three designated members of staff, one from each of the three educational provisions, completed the quantitative measures. All six participating staff members took part in the qualitative measures. A

representative parent for each child was invited to take part in the research. The researcher did not specify whether this parent should be male or female. Each of the thirteen representative parents were provided with an opportunity to take part in the research, and of these thirteen, a total of seven parents participated in the semi-structured interviews.

3.3 Inclusion Criteria

All participating pupils had a medical diagnosis of ASD and were in KS2 or KS3, in line with the recommendations by LeGoff et al. (2014). ASD diagnoses were confirmed for the researcher by staff members using school-held data. Participants did not receive any other structured social skills intervention for the duration of the research period in order to avoid potentially confounding effects on the experimental results.

3.4 Ethical Considerations

Ethical approval was gained from Cardiff University ethics committee. The main area of ethical consideration was that the research included direct intervention with a vulnerable population. To address these ethical concerns, three gatekeepers, representing each of the three participating schools were provided with a gatekeeper letter and information sheet detailing the LEGO intervention, research methods, aims and inclusion criteria (Appendix A). Once gatekeeper consent had been obtained (Appendix B), schools were provided with pupil, parent and staff information sheets (Appendix G) and consent forms (Appendices C, D, E, F, H). For the purposes of confidentiality, all participants were allocated a number (Staff 1, Staff 2, Parent 1, Parent 2, Pupil 1, Pupil 2, etc.)

All participants were provided with the researchers' contact details (LEA email address) so that any queries or concerns could be addressed. Participants were aware that they were able to withdraw from the research at any time. None of the participants contacted the researcher to query the intervention or research, however, one KS3

pupil decided to withdraw from the LEGO-Based therapy intervention after a period of three weeks. All relevant data was destroyed, and was not included in analysis.

All sessions were conducted by a LEGO Therapist, who worked on roll within the LEA and had previous experience of running LEGO-Based Therapy groups and in working with CYP with ASD. Upon completion of research, participants received debriefing, both orally and in writing, using a debrief sheet (Appendices K and L). All data was stored securely and confidentially, in line with the guidelines provided by Cardiff University.

3.5 Measures and analyses

3.5.1 Quantitative Measure: GARS-2

The GARS-2 is a standardised measure of ASD symptom severity designed for use with CYP aged 3-22 years (Gilliam, 2006) and the current research utilised the Communication (C) and Social Interaction (SI) subscales from this measure. Due to the implementation of LEGO-Based Therapy as a school-based intervention, the GARS-2 was completed by the pupils' classroom teachers to provide quantitative evidence of social competence and was statistically analysed using a within-subjects ANOVA to determine whether LEGO-Based Therapy improved social competence and whether any effects were maintained over time.

3.5.2 Qualitative Measure: Staff Focus Group

Six staff members from all three educational provisions took part in the focus group. The aim of the group was to discuss the staff members' constructions of the effectiveness of the LEGO-Based Therapy intervention for their respective pupils. The focus group provided a platform for discussion of any potential change in social competence which were not measured on the GARS-2 scales, and to explore whether any acquired skills had generalised from LEGO Club into the class, playground or any alternative social domains.

3.5.3 Qualitative Measure: Semi-structured Parental Interviews

Seven parents participated in the semi-structured telephone interviews in order to explore their perceptions of the intervention, and to establish whether the intervention had successfully generalised to the home, or to alternative social contexts.

3.6 Procedure

Prior to intervention, three designated staff members, one from each of the three educational provisions, completed the SI and C subscales (GARS-2, Gilliam, 2006) for each of the participating pupils. Upon completion of the GARS-2 scales, six sessions of LEGO-Based Therapy intervention were conducted once weekly by a LEGO Therapist. Each session was approximately 45 minutes in duration and was conducted within the pupil's respective educational settings.

The LEGO-Based Therapy intervention was termed "LEGO Club" to facilitate pupil engagement, and followed the structure and content outlined in the guidance of LEGO-Based Therapy produced by LeGoff et al. (2014, p. 109). The content of each session was planned in advance by the researcher and LEGO Therapist, and can be seen in greater detail in Appendix I. Staff members were invited to be present at the LEGO Club sessions. An illustrative overview of session content is provided in Figure 3, below.

The designated teachers repeated the GARS-2 upon termination of the intervention. Six weeks post termination of the intervention the GARS-2 assessments were repeated by the designated teachers to measure whether or not any impact made by the intervention had been maintained over time. Qualitative measures of teacher and parent perceptions of the LEGO-Based Therapy were collected via a staff focus group and parental semi-structured, telephone interviews. All responses were recorded using a digital audio recording device.

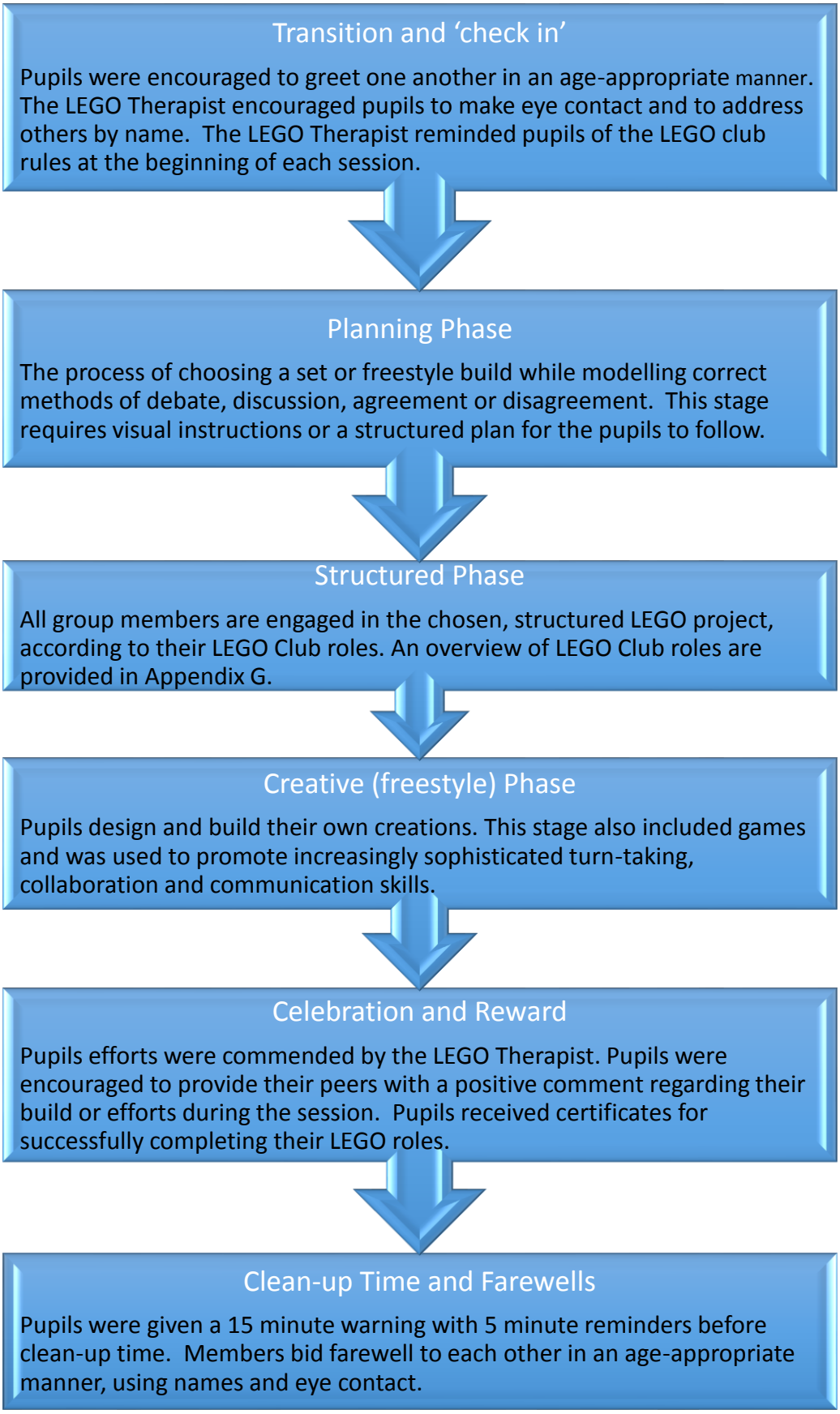


Figure 2: An overview of the structure of the LEGO-Based Therapy sessions.

During the semi-structured telephone interviews the parents were asked a series of questions regarding the LEGO Club, including their perceptions of the intervention, whether it had led to any improvements in social interaction or communication at home, in school, or in any other social context. The parents were also asked to think about any potential strengths or limitations of the intervention. For a full schedule of semi-structured interview questions and prompts, please see Appendix N. The parental responses will be discussed in greater detail within the Results section of Part B and again in Part C of this document.

3.7 Materials

3.7.1 Intervention Materials for LEGO-Based Therapy

The intervention materials included two containers of mixed LEGO brick pieces (see Figure 3 below) with corresponding visual construction plans (See examples in Figure 4). The researcher also received a collection of donated LEGO pieces, which included four LEGO base plates and an assortment of 2x2 and 4x2 LEGO bricks in a variety of colours.

Figure 3: LEGO 10662 Bricks & More Creative Bucket 607 pieces.

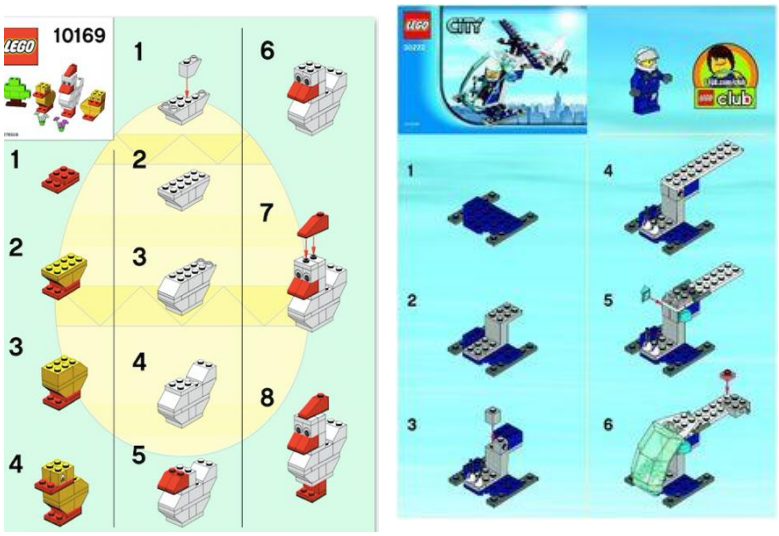


Figure 4: Examples of simple visual design plans used for the first stages of the building phase.

The LEGO-Based therapy sessions were differentiated according to the developmental stage of the pupils within each group. Initially, KS2 pupils completed simple visual designs, using up to 10 LEGO pieces in the initial building phase, while the KS3 pupils completed more sophisticated visual designs using up to 20 LEGO pieces. The number of pieces used increased with the experience of the participating LEGO Club members over time. The visual designs presented to the pupils were based upon their personal thematic preferences and construction abilities.

All participants engaged in team-building activities, including some collaborative and competitive building games. Each participant was awarded a certificate for successful participation within their LEGO roles. An overview of LEGO roles is provided in the information sheet in Appendix G, and an example of the certificate may be seen in Appendix J. The final session of LEGO Club included a large-scale collaborative build. Each of the four groups selected their thematic preference, Figure 5 demonstrates the choice of Group 4 (KS3) for their final, large-scale, collaborative build:

Figure 5: 31035 LEGO Creator Beach Hut

3.7.2 Focus Group and Semi-Structured Interview Materials

Both the staff focus group and parental semi-structured, telephone interviews were conducted using a schedule of questions and prompts. These can be found in Appendices N and O. The participant's responses during semi-structured interviews and the focus group were recorded using a digital recording device. All audio recordings were transcribed and destroyed by the researcher within four weeks of recording to ensure confidentiality.

4. Results and Analyses

4.1 Statistical Analysis

4.1.2 Communication Standard Scores

A within-subjects, repeated measures ANOVA was conducted using SPSS. Mauchly's test of sphericity showed that sphericity could be assumed. There was no significant effect with time ($F_{2,18}$=0.31, p=0.737) based on Schools 1 and 2. School 3 was not included in the ANOVA since data had not been returned for time 3.

4.1.3 Social Interaction Standard Scores

A within-subjects, repeated measures ANOVA was conducted using SPSS. Mauchly's test of sphericity showed that sphericity could be assumed. There was no significant effect with time ($F_{2,18}$=0.921, p=0.416) based on Schools 1 and 2. School 3 was not included in the ANOVA since data had not been returned for time 3.

4.2 Thematic Analyses

The process of inductive thematic analysis of parent and staff perceptions of the LEGO-Based Therapy intervention programme was completed by the researcher using the method of thematic analysis outlined by Braun & Clarke (2006, 2013). Following the anonymised transcription of the staff focus group and parental individual interviews, inductive thematic analysis began with the process of listening to audio recordings and re-reading staff and parent transcriptions to facilitate the researcher's familiarisation with both data sets.

Complete coding refers to the process of coding data by identifying anything and everything of interest across the entire data set. In complete coding, the codes provide a "label for a feature of the data that is potentially relevant in answering your research question." (Braun & Clarke, 2013, p. 207). The current research employed complete coding, rather than selective coding. Selective coding refers to the process of coding in which the researcher selectively codes only the data which is of experimental interest to support an underlying theory or hypothesis. As the current research did not have any pre-existing experimental hypotheses, complete coding was used to identify aspects from both bodies of data that related to the research questions.

On completion of complete data coding, candidate themes began to emerge, consistent with central organising concepts across the codes. Braun & Clarke (2013) highlight the importance of a "central organising concept" (p. 224) in generating candidate themes. A theme "captures something important about the data in relation to the research question, and represents some level of patterned response or meaning within the data set" (Braun & Clarke, 2006, p. 82). Therefore, the process of generating candidate themes relied upon the researcher's consideration of the central organising concepts across the codes. The researcher strived to generate themes which were representative of the key concepts outlined within the data set.

Candidate themes were reviewed to ensure that they were representative of the coded data and the data set as a whole. When the researcher felt confident that the candidate themes represented the data set, the candidate themes were organised into main themes and sub-themes. The main themes were considered to be overarching labels and captured the ideas encapsulated by the sub-themes. In other words, the sub-themes captured "notable, specific elements of the central organising concept" of the main themes (Braun & Clarke, 2013, p. 231). Additional detail regarding the process of thematic analysis may be found in Appendix P and visual, thematic maps illustrating the main themes and sub-themes may be found in appendix Q and S.

The identified themes are considered to be representative of both the respective data sets, with acknowledgement that the researchers' constructs may have influenced the analysis. Although there were some similarities between the themes identified from both the staff and parental thematic analyses, different themes were identified from both data sets, suggesting some differences between staff and parental perceptions of the LEGO-Based Therapy intervention.

4.3 Results

4.3.1 Staff Perceptions

Thematic analysis of the qualitative data obtained during the staff focus group identified five main themes. These themes are illustrated in Figure 6. Sub-themes were also identified and are presented in the form of thematic maps in Appendix Q.

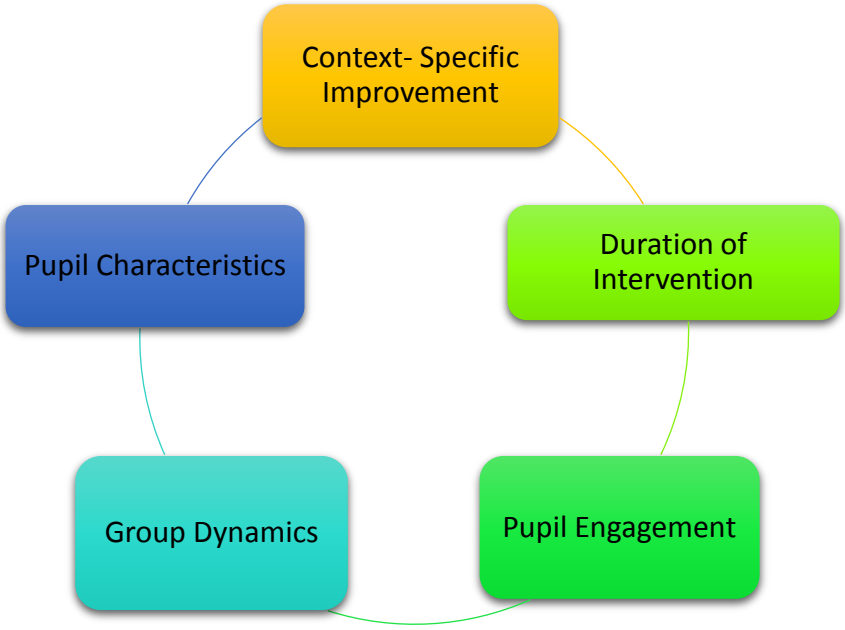


Figure 6: *A diagram to outline the main themes identified from the Staff Focus Group.*

Theme 1: Context Specific Improvement

This theme alludes to context specific improvement in individual skills, and the generalisation of these skills from the therapeutic to the non-therapeutic setting (Brown & Bebko, 2012). Pupils improved in the domains of social communication and interaction as the sessions progressed, as Staff 3 detailed: *"They were more able to ask each other for different pieces voluntarily."* However, these improvements were most frequently observed within the context of the intervention sessions, or when interacting with the LEGO resource during unstructured sessions. Social competence

skills were not perceived to transfer into the classroom when the pupils engaged with a medium other than LEGO, which suggests a domain and context specific improvement in skills.

Individual construction skills were observed to improve over time, both inside and outside of intervention sessions. The staff members attributed this generalisation of construction skills to increased pupil engagement with LEGO resources, and increased interest in the resource during unstructured sessions. During LEGO Club sessions, the more competent members were perceived to be modelling useful skills to the less able members of the group: *"Pupil 1 was listening carefully to how Pupil 13 was doing it [relaying instructions], and you could see he was copying her, he was visibly improving"* (Staff 5). It may be suggested that providing small, group based intervention provided opportunities for positive modelling (Gresham, 1998) and improved domain-specific skills over time, which was not considered to transfer to play in other domains, when engaging with alternative resources.

<u>Theme 2:</u> Pupil Characteristics

The outcome and efficacy of intervention was considered to be significantly influenced by individual pupil characteristics. Staff members hypothesised that the intervention was most effective with pupils whose everyday functioning were less affected by ASD. Therefore, the higher the individual was affected, the less effective the LEGO-Based Therapy intervention. Pupil rigidity was considered to be a critical factor in determining tolerance of others and the ability to share resources and collaborative work.

While the intervention is tailored to address the difficulties of CYP with ASD, staff also outlined how targeting areas of individual difficulty frequently provoked the pupils to exercise the skills they found most difficult. These difficulties drew adult attention to the areas most in need of development for each pupil. Staff 5 discussed the characteristics of Pupil 12: "*He wanted to prove a point, how skilled he thought he was,*

he wanted to remove himself, he could do anything. Whereas Pupil 13 wanted to interact".

<u>Theme 3:</u> Group Dynamics

Group dynamic was identified by every staff member as a crucial element in predicting the efficacy of LEGO Club. It was reported that inter-personal peer relationships were carefully considered by staff when grouping the pupils for intervention. The staff perceived that the dynamic of the LEGO Club groups related strongly to the session outcomes, and felt that individuals with existing interpersonal relationships were able to collaborate together better than those who did not. Staff 5 outlined her approach: *"I mean you know your pupils, but I also think, that where they are all so different, you need to think about which pupils will gel together."*

The importance of peer-mediation in resolving disputes and promoting group cohesion was identified as a useful tool for managing individual prerogatives and difficulties with conduct. Various roles from the LEGO Level system (LeGoff et al., 2014) were considered to facilitate group cohesion during construction activities: *"He has got to do a role, it's giving him that importance, that authority and responsibility, because it's like dominoes, if one goes down, they can't build that final project"* (Staff 1).

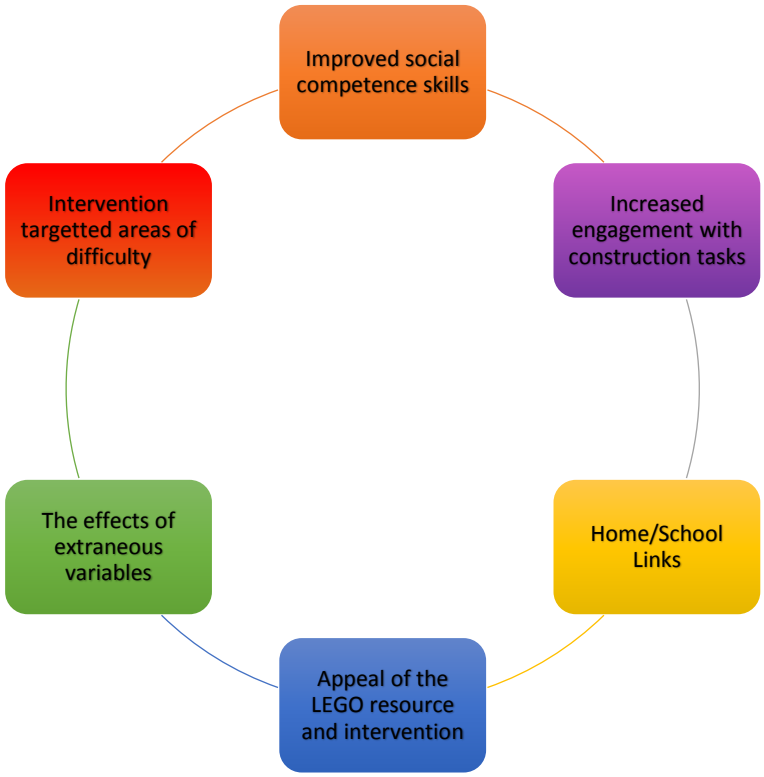
<u>Theme 4:</u> Pupil Engagement

Pupil engagement was an overarching theme throughout the data. Staff had anticipated pupil engagement with the intervention due to their interest in LEGO pre-intervention: *"I think we were at an advantage here because the pupils were already interested in LEGO and their preference for construction tasks during unstructured session"* (Staff 2); *"Whenever we get anything out to do with construction, whether its Stickle Bricks, LEGO, etc., their communication is always stronger"* (Staff 1). The discourse suggested that the LEGO was perceived as motivating and enjoyable and this was attributed to the calming and repetitive nature of play with the resource, as well as the wide variety of thematic choices available.

<u>Theme 5:</u> Duration of intervention

All staff members felt that the intervention was too short in duration to promote significant improvement in social competence and in generalisation: *"I think that if it was sustained for a little bit longer then it's probably would have a greater impact on them and they would be able to generalise more"* (Staff 2). The staff commented upon the delivery and structure of intervention and felt that its highly repetitive and structured approach was well-suited to their pupils. The short duration of intervention was considered to have impeded on potential positive outcomes on social competence, and all staff reported their intention to continue the intervention.

4.3.2 Parental Perceptions



<u>Figure 7</u>: A diagram to outline the main themes identified from Parental Interviews.

It is important to note that although the researcher's intention was to adhere as closely as possible to the semi-structured interview schedule, due to the lack of communication between school and home, some of the parents sought additional

clarification regarding their child's presentation in LEGO Club. The researcher advised that the parent sought additional information from their child's class teacher about individual outcomes and continued with the interview schedule. At times where parents made statements or provided reflections which lacked clarity, the researcher asked the parents to expand using the scheduled prompts, or made efforts to clarify that they had understood their statement using questions which were not included in the scheduled prompts. In example, Parent 2 felt that her child's social competence skills had improved, but found it difficult to attribute LEGO Club as the sole cause:

> ***Parent 2:*** *We have all noticed a massive improvement, yeah, but like I said, things with his Dad have improved massively.*
>
> ***Interviewer:*** *So it's all, yeah, it's difficult to disentangle?*
>
> ***Parent 2:*** *Yeah it's really difficult to say. I'm sure that the LEGO Therapy has a part to play, and I'd like to think that it's had its part to play, I mean if it was offered to him again I would most definitely like him to try again. Certainly when, hopefully, the issues with his Dad had passed, the next time then it might be a clearer indication as to what and when it's happening.*

Although aforementioned deviation from scheduled questions and prompts may be considered a methodological issue, it is pertinent to note that the interviews were designed to be semi-structured, to allow for greater reflexivity and flexibility during the process of data collection. The semi-structured design allowed the researcher to seek additional information, clarification and to explore ideas and concepts in greater depth (Robson, 2015) which informed the process of data analysis. The identified themes are as follows:

Theme 1: Improved social competence skills

Improved communication and increased initiation of interaction was reported from parents, who perceived that the LEGO Club had provided their child with a topical point of discussion. Parent 3 explained: "*this LEGO group has really taken off with him, he really enjoys it and he wants to talk about it."* The visual prompt provided by the

certificates for role acquisition were also discussed as a matter of topical interest: "*So having that certificate, just an item, was helpful because he doesn't talk a lot about what's happened in school unless there's a visual prompt"* (Parent 4). The parents also perceived increased initiation of interaction regarding topics which were not related to the LEGO Club:

> *He's starting to get more involved in things. He can and will stay in his room all the time but the last couple of week he's started to come and sit down a little bit and having a little conversation* (Parent 1).

Theme 2: Targeted Areas of Difficulty

Social interaction and communication skills were identified as a persistent area of difficulty for all the CYP. Parents perceived that the intervention had targeted the CYP's individual areas of deficit. Some parents detailed the way in which the intervention had improved their child's concentration, focus and motor skills through play. The highly structured nature of the intervention was considered to have been compatible with individual interests, and made boundaries sufficiently clear for those who could otherwise be disruptive:

> *He could see that there was cause and consequence for him and that is something that Pupil 2 massively struggles with, so for him to relay that he knew there was a consequence to his behaviour. I mean, he volunteered that information, it was amazing!* (Parent 2).

Theme 3: Home/School Links

Parents identified that a lack of communication between home and school made it difficult to interpret whether or not there had been significant impact of intervention in the school context. "*The one thing, if he were able to participate again I think, I would like to have more feedback, because we didn't get any feedback, really, from school"* (Parent 2). While parents perceived that their child had improved at home, the poor home/school link made parents unable to comment about the presentation of their child in class. Parents noted that this was an issue for them in terms of evaluating

the impact of the intervention, as their children were often highly variable in their presentation across contexts.

Parents sought additional involvement with social interventions and asked for LEGO-Based therapy homework to facilitate school-based intervention further at home.

> *I definitely think that it's a shame that it's finished. I really think that we should set up a club or something. It's a shame really, I wish we could, maybe all the parents could be involved… Maybe if they came home with homework that could transition into the school, maybe if they came home with a project or something to do, we could do a bit of the club experience? We could do a bit at home as well, you know?* (Parent 3)

Theme 4: Appeal of the LEGO resource and intervention

All parents expressed their desire to continue the LEGO Club and detailed their child's interest in the LEGO resource. Many parents reported that their child had an interest in LEGO pre-intervention, and attributed this factor to the intervention's success, however others reported that their child had become increasingly interested in LEGO since being a part of LEGO Club: *"He must be interested in it because he has been telling me all about it. And, I mean, you don't get that with everything he does"* (Parent 5).

The parents felt that LEGO materials were appealing, provided flexibility in design and opportunities for a variety of construction activities and social interactions across contexts:

> *I would say that it is a very popular toy for children and it's something that they relate to, you know? It's all around them, it's everywhere they go. I mean, especially in the last few years. I think it's especially good for grabbing their interest and it's a toy that can last for many years, throughout their childhood…*

I think it is a good toy to introduce to get them to interact and share with others because they're never too old for that type of toy. (Parent 6)**.**

Theme 5: Increased engagement with construction tasks

Following intervention, some pupils demonstrated increased interest in the topic of LEGO by researching cartoons and the LEGO movie online, while others demonstrated increased interest in construction and virtual construction tasks. Engagement with LEGO materials increased at home, and some parents perceived there had been increased focus on detail and improved creativity during construction tasks.

We bought him Minecraft one Christmas and he wasn't that interested in it. All of a sudden now, he's more interested in LEGO. He's wanted to make things, create things, more than ever. He's better at focusing on things, he's more, umm, more with the detail? More interested in the detail you know? He's having more fun with it. (Parent 3).

Theme 6: The effect of extraneous variables on social competence

Although many parents perceived that their children's social competence had improved, some noted the difficulty of attributing improvement solely to LEGO-Based therapy. Some parents hypothesised that maturational effects and personal situational factors may have influenced individual outcomes.

I have definitely seen a big improvement at home, especially in the last few weeks. I mean it's hard to say exactly whether that is only down to the LEGO therapy, or whether it's down to something else, just growing up a bit or having more experiences in those kinds of situations. It's hard to tell things apart like that. I would say that he has definitely improved at home (Parent 5).

5. Discussion

4.4 Overview

There was some consistency across parent and staff narrative during the focus group and semi-structured interviews. Both parents and staff suggested that the LEGO-Based Therapy intervention was enjoyable and motivating for the participating pupils, in line with the experimental findings by LeGoff and Sherman (2006), and the recommendations for practice outlined by LeGoff et al. (2014) and Attwood (1998).

Staff felt that most pupils had demonstrated increased abilities in both construction and social competence skills during LEGO Club sessions. However, these improvements seemed to be domain and context-specific, and did not appear to generalise outside of the LEGO Club sessions when engaging with materials other than LEGO. Parents reported an increased interest in LEGO and LEGO-related materials, alongside improved initiation of interaction and social competence skills in the home context. While many parents felt confident that the improvements were a direct result of the LEGO-Based Therapy intervention, others were not confident in attributing LEGO Club to be the sole cause, but felt that it may have been contributory factor.

Both staff and parents noted a lack of communication between home and school to be able to comment on whether or not any perceived improvements had been generalised to the alternate context, or whether improvements could be attributed solely to the LEGO-Based Therapy intervention. The discourse offered to the researcher would suggest that due to the perceived improvements expressed both by staff and parents, that there was an element of generalisation of construction skills and improved initiation of communication and social interaction between therapeutic (LEGO Club sessions in school) and non-therapeutic (home) settings.

In considering the experimental results, it may be pertinent to consider that school staff were invited to be present in LEGO Club sessions. Therefore, demand characteristics may have had an effect on the experimental results. Demand

characteristics are a form of experimental bias, in which participants are aware that they are part of an experimental situation (Robson, 2015). It may be argued that as the staff were invited to attend LEGO club sessions with the aim of improving their awareness and competency of delivering LEGO-Based Therapy sessions in the future, they may have been somewhat invested in hoping for positive experimental outcomes. The researcher aimed to reduce the effect of demand characteristics by limiting the interaction between the participants and researcher (Robson, 2015). The researcher and participants interacted with one another at the beginning of the research period when seeking consent and at the end of the research period, when collecting qualitative data.

Analysis of the GARS-2 SI and C subscales across the research period did not provide a statistically significant result and fails to provide quantitative evidence of improvement in the targeted domains over time. As noted by participating staff, it could be suggested that the duration of intervention was too short to implement significant change that could be measured quantitatively. Previously published outcome studies have implemented the intervention for significantly longer periods, providing intervention for 18 weeks (Owens et al., 2008) 24 weeks (LeGoff 2004) and three years (LeGoff & Sherman, 2006). All items on the GARS-2 CI and S subscales were measured using a four-point rating scale, therefore it could be suggested that the measure was not adequately sensitive to small improvements across the limited research period. Considering the research question in more detail, the findings are as follows:

5.2 Research Question 1: *Is there a perception of improvement in social interaction and communication skills in pupils with ASD as a result of LEGO-Based Therapy?*

Evidence from both staff and parents suggest that the CYP made progress in their social competence skills as they progressed through the LEGO-Based therapy sessions. School staff reported that children made domain-specific improvement in social competence during LEGO Club, and when interacting with the LEGO resource in class. Parents also reported increased communication and initiation of interaction in the home context.

5.3 Research Question 2*: Are any effects of LEGO-Based Therapy maintained over time, once the intervention input is terminated?*

Statistical analysis using a repeated measures ANOVA of the standardised SI and C subscale scores (GARS-2) suggested that the LEGO-Based therapy intervention did not impact significantly on pupil social interaction or communication over time.

Due to the overlap in the experimental findings for research questions 3 and 4, these questions will be collapsed and addressed simultaneously:

5.4 Research Question 3 *Are there differences in any effects observed between home and school?*

and

Research Question 4: *Are any effects of LEGO-Based Therapy transferred to other social contexts?*

School staff reported some progress in pupil social competence within the therapeutic context, but did not feel that social interaction or communication skills were transferred outside of the therapeutic context. School staff reported improved construction skills and interest in LEGO materials, and felt that these skills and interests did generalise from LEGO Club into the classroom setting.

Parents also reported increased communication and initiation of interaction in the home context, and attributed this largely to the LEGO-Based Therapy intervention. The perceived improvement in social competence in the child's home setting suggests that some beneficial effects of intervention were transferred to alternative social contexts, outside of the therapeutic setting.

5.5 Research Question 5: *What are teacher perceptions of LEGO-Based Therapy as an intervention for developing social competence in pupils with ASD?*

All staff felt that the duration of the intervention was too short, and intended to continue the intervention to facilitate pupil social competence further. The staff felt that individual characteristics and their impact on group dynamics were central to the outcome of the intervention. Staff felt that the LEGO resource had an appeal to all the participating pupils, and felt that the social intervention was one of the more enjoyable weekly sessions, with which pupils were motivated to engage.

5.6 Research Question 6: *What are parental perceptions of LEGO-Based Therapy as an intervention for developing social competence in pupils with ASD?*

Parents reported that LEGO had a therapeutic appeal to children with ASD and noted increased interest in construction activities, particularly LEGO, since the beginning of the intervention. Parents reported improved communication at home and felt that the intervention provided a reference point to facilitate dialogue. All parents reported that they would like their child to continue to receive the intervention.

6. Final Conclusions

Evidence from both parents and staff suggests that pupils enjoyed the intervention and were motivated to engage with the construction materials, which is in line with Attwood's constructive application approach (1998) to promote engagement and generalisation of skills by targeting areas of individual strength and enjoyment. Application of a mixed methods research design allowed for collection of both quantitative and qualitative information regarding the pupils' perceived improvement in construction ability and social competence over time.

Although the research did not provide quantitative evidence which suggests improvement in individual social competence over time, the qualitative evidence provided staff suggested that pupils made context-specific improvement when engaging with LEGO materials in school, and evidence from parents demonstrated increased levels of interaction and communication at home. It may be suggested that

the duration of intervention was not sufficient to evidence any perceived improvements quantitatively.

Future research could consider implementing the intervention for a significantly longer period of time in order to quantitatively evidence any perceived improvement. Increasing the duration of intervention may provide opportunity for replication of the findings of LeGoff (2004), LeGoff and Sherman (2006) and Owens et al. (2008) as the parameters of the current research were limited.

While this current research aimed to contribute empirical evidence to our knowledge of LEGO-Based Therapy, the number of published outcome-based research articles to support this intervention remains extremely limited. It could be suggested that further research and evidence implementing a longitudinal design would contribute positively to the field. It is pertinent to consider that LEGO-Based Therapy is an increasingly popular intervention which is being implemented by an increasing number of practitioners across many local authorities in the UK (Owens et al., 2008).

Educational psychologists (EPs) are well placed to complete this research and to contribute to the body of empirical evidence in order to inform evidence-based practice. Ensuring an evidence base for LEGO-Based Therapy is crucial in ensuring the integrity and the value of the intervention which is increasingly implemented in a variety of educational provisions. Should a robust body of empirical evidence in support of the intervention be established, the EP may also be able to able to pinpoint pupils who may benefit from the intervention and to support the implementation of LEGO-Based Therapy in schools.

Le Goff et al (2014) suggested that the pupils who would most benefit from the intervention were pupils with a diagnosis of ASD. However, future research may wish to evaluate the delivery of this intervention to pupils that demonstrate persistent

social communication difficulties with the absence of ASD diagnosis. LEGO-Based Therapy may lend itself as a useful tool in supporting the development of social competence skills in pupils with or without diagnosis, encouraging interaction and communication between both parties.

In the current study, an important finding was the perceived lack of communication between home and school, with parents suggesting that they would like to receive further information and activities which could be implemented at home. Both staff and parents expressed their difficulty in commenting on the social competence skills in the alternate contexts, that is, teachers felt unable to comment on the pupils' presentation at home and parents felt unable to comment on the pupils' presentation in school. The EP is well placed to investigate pupils' social competence skills in both these contexts, as EPs are able to engage with parents, staff and pupils in both their homes and educational domains.

The EP may also be able to facilitate direct communication between staff and parents by opening lines of communication. In future, EPs may consider establishing a regular check-in between home and school, implementing the intervention in a variety of settings, or encouraging parents to partake in the intervention. EP's could support parents by means of training, allowing parents to observe LEGO Club sessions, or as parents suggested, provide homework tasks for pupils to practise at home. These approaches may improve the generalisation of pupil's social competence skills into a variety of social domains, by encouraging pupils to draw parallels across systems (Baron-Cohen, 2006).

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LEGO Therapy and Social Competence: An Exploration of Parental and Teacher Perceptions of LEGO-Based Therapy with Pupils Diagnosed with Autism Spectrum Disorder (ASD)

Part C: Critical Review

1. Overview

The critical review contains reflexive information relating to two main themes: the unique contribution of the current study to the field of LEGO-Based Therapy and a critical account of the research practitioner. Rather than separate these two themes into distinctive sections, both are discussed in conjunction with one another, highlighting the personal development of the research-practitioner throughout the process of research. The critical review offers an in-depth account of the process of conducting the research, detailing the researcher's epistemological and methodological choices and discussing the challenges and limitations which impacted on the research design. The research outcomes and the research's unique contribution to knowledge within the field of LEGO-Based Therapy will also be discussed. The critical review will be written in the first person to reflect that this section of the doctoral thesis provides a reflexive insight into development of the research and of the research-practitioner.

2. Development of Research Position

While designing the research, I was aware of the impact of my existing psychological training on my epistemology and ontological position. While I was an undergraduate, my education of research methods and data collection were based primarily in post-positivism and focused solely on quantitative measures and statistical analysis. The post-positivist approach posits that there is a measurable reality and that research is the process of making claims which are refined or abandoned in light of evidence, while acknowledging the impact of the researcher's perspective on experimental outcomes (Reichardt & Rallis, 1994). Post-positivists largely rely on quantitative methods and believe it is possible to describe causal relationships between factors (Robson, 2015).

Within my current role as a Trainee Educational Psychologist (TEP), I have been encouraged to employ a social constructionist framework for practice (Gameson & Rhydderch, 2008), implementing consultation methods (Wagner, 2000) with the aim of facilitating service users to promote change in problem situations. This social constructionist stance to practice, which is based in relativism, posits that each person's view of the world is socially constructed, is subjective and phenomenological. Therefore, it is not possible to establish facts or truths without acknowledgement that individuals and groups are likely to "construct many different, sometimes conflicting, but equally convincing 'truths' or 'realities,' all of which may be accepted as appropriate, relevant and valid" (Gameson & Rhydderch, 2008, p. 101).

It has been suggested that research employing constructionist or relativist approaches lends itself well to qualitative methods, such as interviewing and focus groups, as the central aim of this approach is to obtain multiple perspectives with awareness of the researcher's own constructs and belief systems (Robson, 2015). However, constructionism in its extreme form has been criticised for being incompatible with the concept of evidence-based practice (Fredrickson, 2002) which is encouraged within the EP's applied role (Kelly, 2008). The term "evidence-based practice" was later reconstructed to "informed and reasoned practice" by Gameson and Rhydderch (2008,

p. 101), who suggested that social constructionism is central to EP practice and contributory to the process of change.

Kelly (2008) suggested that EP practice is better placed within the realm of critical realism (Baskhar, 2008), which suggests that knowledge is a social and historical product and that events can be interpreted as an interface between the natural and social worlds. This position maintains that there is a single, measureable reality (Sayer, 2000) which may have multiple interpretations, and that knowledge can be obtained from uncovering causal mechanisms (Robson, 2015). With consideration of the various epistemological and ontological positions to which I have been exposed, I now consider myself to be a critical realist. I therefore acknowledge that there is a "mind-independent reality" (Morris 2008, p.10) and have awareness of my own influence, beliefs and constructions upon the current research.

I was introduced to critical realism and the invaluable contribution of qualitative methods during my TEP training and first implemented the approach during a small scale research project. These experiences shaped my confidence in using qualitative methods and broadened my understanding of the realist paradigm. During development of the current study, I was aware of the evolution of my ontological and epistemological stance over time, beginning at the under-graduate phase in post-positivism before moving to social constructionism for the purposes of professional TEP training.

I was also aware that the epistemological position applied in my professional role was inconsistent with the critical-realist approach applied to the current research methodology. I decided to employ a pragmatic view of this epistemological disparity, and would suggest that critical realism is able to place equal value upon the information provided by quantitative data measuring a single reality (Sayer, 2000) and qualitative information detailing individual constructs of their realities (Braun & Clarke, 2013). Consistent with the critical-realist approach, I decided to employ both

qualitative and quantitative paradigms using a mixed-methods approach in the current design, acknowledging the role of both paradigms to the contribution of knowledge.

2.1 The Qualitative-Quantitative Incompatibility Thesis

The epistemological position which underpin mixed-methods approaches to research has previously been criticised for being incompatible. The "qualitative-quantitative incompatibility thesis" postulates that multiple-strategy research is not possible because the paradigms which underpin both approaches are not compatible with one another (Robson 2015, p. 162). Researchers such as Sale, Lohfeld & Brazil (2002) claim that qualitative and quantitative methods cannot be combined because they do not measure the same phenomena.

Although major differences in the paradigms which have historically underpinned quantitative and qualitative designs cannot be denied, it may also be important to acknowledge that quality research methods should not be determined by dogmatic adherence to a particular epistemology in one-way fashion (Robson, 2015). It has been suggested that mixed-methods offer a comprehensive insight into complex, real-life contexts and that the steadily growing body of successful research using mixed-methods refutes the incompatibility thesis (Howe 1988; Robson, 2015).

3. Development of the Research Questions

3.1 Origins of Researcher Interest in LEGO-Based Therapy

During my professional fieldwork placement, I became aware that the local educational authority (LEA) was implementing LEGO-Based Therapy as a social intervention for pupils with ASD. Anecdotally, the intervention was reported to obtain successful outcomes in facilitating inter-personal friendships and social competence skills. Following discussions with various EPs and Cardiff University tutors, it became clear that the intervention was administered in a number of LEA's across England and Wales. An in-depth exploration of the existing literature revealed that there was a very limited number of outcome-based studies exploring the intervention. Although

LEGO-Based Therapy is described as a "novel and promising" approach to promote social competence for CYP with ASD (Kasari & Lawton, 2010, p. 138), the available literature was not sufficient to conclude that the widespread delivery of the intervention was based upon evidence-based, or informed and reasoned practice.

Evidence-based practice is imperative to EPs in their roles both as researchers and applied psychologists (Fredrickson, 2002). During development of the research questions, I felt strongly that my doctoral research should contribute knowledge which was new and useful (Burnham, 2013) to support, or alternatively, to contest the widespread implementation of the intervention, utilised "in the United Kingdom, Asia, Australia, South America and Africa" (LeGoff, Krauss & Levin-Allen, 2012, p. 116). In order to inform the development of research questions, an in-depth exploration of the evidence available from the existing research literature was completed and critically evaluated.

3.2 The Impact of LEGO-Based Therapy Over Time

It is claimed that social skills interventions are contributory to promoting positive long-term outcomes of pupils with ASD (WHO, 2013). However, there is a notable lack of historical research exploring the long-term impact of interventions on this potentially vulnerable population (Reichow & Volkamar, 2010). More recent research has emphasised the importance of an outcome-based approach in research design (Weare & Gray, 2003). The current study aimed to contribute the unique perspectives of parents and teachers regarding the LEGO-Based Therapy intervention in order to guide informed and reasoned practice. From exploration of the limited number of outcome-based studies, none had implemented qualitative analysis to explore the impact of the intervention over time.

3.3 Generalisation of Skills

Exploration of the literature relating to social skills training (SST) suggested that generalisation of skills from intervention to real-life contexts is a crucial factor in

determining the efficacy of SST (Bellini, Peters, Benner & Hopf, 2007). Barry, Gofer-Klinger, Lee, Palardy, Gilmore, and Bodin (2003) reported that generalisation was a particular challenge for pupils with ASD and suggested that although participants were able to make progress in clinical settings, SST skills were not always generalised to non-clinical, or real-life contexts. With consideration of the published literature relating to the efficacy of LEGO-Based Therapy, it was evident that only Owens et al., (2008) had explicitly evaluated the generalisation of skills to non-therapeutic contexts. I decided that generalisation of skills was an important consideration in the evaluation of an intervention tailored specifically to pupils with ASD and would be explored by the research questions and design.

3.4 Summary

In summary, the research questions were designed to address whether or not the intervention had impacted on individual social competence, whether these skills had been generalised and whether they had been maintained following termination of the intervention. I hoped that implementation of a mixed-methods approach would provide a unique perspective in answering the research questions and allow for the consideration of any generalisation of skills between the home and school contexts. Upon reflection, the number of research questions could have been reduced, as Research Questions 3 and 4 were collapsed in the results section of Part B, due to significant overlap in the data which detailed generalisation of skills from therapeutic to non-therapeutic contexts.

3.5 Methodological Issues in Previous Research

Reviewing the existing outcome-based studies relating to LEGO-Based Therapy (LeGoff 2004; LeGoff & Sherman, 2006) revealed some methodological issues, such as a lack of emphasis placed on generalisation of skills to non-therapeutic contexts and a possibility of experimental bias (Rosenthal, 2003), as discussed in Part A of this document. In developing the current research questions, I felt that it was important to reduce experimental bias by encouraging staff to complete experimental measures, to focus on the ability of participants to generalise any obtained skills to non-therapeutic

contexts and to collect the constructions of both teachers and parents in regards to the efficacy of the intervention over time.

Exploration of the existing literature revealed that the majority of the published research was conducted or co-conducted by the developers of LEGO-Based Therapy (LeGoff et al., 2014). While this may have not affected experimental validity, I was mindful that the researchers conducting behavioural observations, as outlined in LeGoff and Sherman (2006) may have fallen prey to some expectancy effects (Blanck, 1993) or experimenter bias (Rosenthal, 2003).

In the study conducted by LeGoff and Sherman (2006), LeGoff completed the pre-intervention experimental measures (GARS, 1995) based on individual observation. No detail was included regarding the researcher responsible for completion of the post-intervention measures, but one may assume for the purposes of consistency, that LeGoff was also responsible for post-intervention measures, leaving the research vulnerable to expectancy effects. While these reflections may not be wholly accurate, the published research does not detail inter-observer agreement tests or "blind coding" (Robson, 2015, p. 343) to counteract such possibilities.

4. Development of Research Design

4.1 Avoiding Expectancy Effects

During the development of the current research design, I decided that school staff should be responsible for completion of the pre and post experimental measure (GARS-2, 2006) to eliminate the possibility of such confounding effects. Due to the implementation of LEGO-Based Therapy as a school-based intervention, school staff, rather than parents, were invited to complete the GARS-2 (2006) to accommodate their in-depth knowledge and familiarity with the pupils' communication and social interaction skills in the classroom context.

4.2 Participants

The guidelines published by LeGoff et al., (2014) states that LEGO-Based Therapy was originally designed for use with individuals in Key Stage 2 (KS2) and Key Stage 3 (KS3) with a diagnosis of ASD. With consideration of the most current guidance, the research sampled from the KS2 and KS3 population. Discussion with advisory, specialist ASD practitioners within the local educational authority was helpful in determining which educational provisions were considering implementation of LEGO-Based Therapy and could be approached to discuss potential involvement in the current study.

4.3 Implementation of the Intervention

Following the sourcing of participants, the content of the LEGO-Based Therapy sessions was discussed with the LEGO-Based Therapy practitioner to ensure adherence to the structure and intervention guidelines outlined by LeGoff et al. (2014). The number of participants available to partake in the intervention was limited, which impacted on the design and analysis which could be conducted. The ABA design is commonly used by researchers analysing small sample size (Solso & Jonson, 1994) and is consistent with the critical realist epistemology, as collected measures "make a valid concluding statement" (Solso & Johnson, 1994, p. 60) regarding the effect of the independent variable (LEGO-Based Therapy sessions) on the dependent variables (social interaction and communication skills).

5. Experimental Measures

5.1 GARS-2

A quantitative measure of social competence was required to measure the participants' social competence skills on three occasions, pre and post intervention. A number of alternative measures were considered in the early stages of research development, including the Autism Diagnostic Observation Schedule (ADOS-2: Lord, Rutter, DiLavore, Risi, Gotham, 2012) and the Vineland Adaptive Behaviour Scales (VABS: Sparrow, Cicchetti & Balla, 2005). However, these alternative assessments were comprehensive, some of which required training or accreditation and were unfeasible as a repeated measure within the experimental timeframe. Furthermore, I

felt strongly that school staff should be able to complete the social competence measures in order to avoid expectancy effects or experimenter bias.

The GARS-2 lent itself well to the proposed design as it is relatively short and user-friendly, allowing staff to complete the measure without training or accreditation. However, an important consideration was that the GARS-2 subscales were based upon the definition of ASD as outlined in the DSM-IV (2000). The diagnostic criteria for ASD was revised by the American Psychiatric Association (APA) in the Diagnostic and Statistical Manual, 5th Edition (DSM-V, 2013) and updated in May 2013. As a result of this change, a third edition of the GARS was published to ensure consistency with the updated diagnostic criteria (GARS-3: Gilliam, 2013).

The GARS-3 is comprised of six subscales: Restrictive and Repetitive Behaviours, Social Interaction, Social Communication, Emotional Responses, Cognitive Style and Maladaptive Speech. As reflected by the number of subscales, the GARS-3 measures a range of difficulties in greater depth than the GARS-2. Items on both the GARS-2 and GARS-3 assessments are grouped into three broad categories: Stereotyped Behaviours (SB), Communication (C) and Social Interaction (SI) suggesting a level of consistency across the measures in identifying core difficulties in ASD. The SI and C areas of experimental interest were consistent with the updated diagnostic criteria and included in both the GARS-2 and GARS-3 measures.

The decision to employ the GARS-2 as an experimental measure (as opposed to the GARS-3) was based upon a number of considerations. The current study was originally designed in September 2014 and very little evaluative material was published regarding the GARS-3. During the research design period, the GARS-3 tool had been published for a limited time and was not purchased, or familiar to any professionals within the LEA. Careful consideration of the GARS-2 included discussion with various professionals, familiarisation with test materials, and research of available test reviews. An evaluation of the GARS-2 suggested that the measure was “quick and simple to complete” with a “flexible format” (Montgomery, Newton & Smith, 2008,

p.400). The GARS-2 was able to be completed by teachers in order to reduce expectancy effects as “parents need not be the sole raters: ratings can be provided by anyone who knows the individual well in the absence of the examiner.” (Montgomery et al., 2008, p.400).

5.1.1 Additional considerations

The GARS-2 scale was the first screening instrument based upon the definition of ASD outlined in the DSM-IV which had been norm-referenced against an ASD population (Gilliam, 2006). The GARS-2 has been demonstrated to have internal consistency in content validity, test-retest reliability and interrater reliability (Oswald, 1998; Gilliam, 2006) and is described as “an accurate, multidimensional assessment of autistic pathology which is sensitive to changes over time” (LeGoff, 2004 in Gilliam, 2006, p. vi).

The GARS (Gilliam, 1995) and GARS-2 measures have previously been implemented in outcome-based studies relating to LEGO-Based Therapy. LeGoff (2004) suggested that quantitative data collected using GARS in the school setting were in line with anecdotal parental comments and demonstrated significant increase in the frequency and duration of spontaneous social exchanges. Owens et al. (2008) also implemented the GARS-2 to quantify the pupils’ social competence over time and reported a significant improvement in SI. The results of the current study did not find a statistically significant improvement in CI and SI over time, but qualitative teacher and parental reports did suggest improvements in initiation of interaction and communication over time. These results are discussed further in the ‘Experimental Findings’ section, below.

The SB scale was purposefully omitted from data collection because its content was not relevant to the research questions posed by the current study. Items on the SB scale explore a variety of individual behaviours, including staring at objects in the environment, rapid eye movements, smelling or sniffing objects, rocking back and

forth, stimming and frequency of high pitched vocalisations. Omission of the SB sub-scale did not affect the validity of the current research, as the tool was not implemented as a screening tool for ASD (Gilliam, 2006). As specified in the GARS-2 guidance, individual subscales may be used to monitor the pupils' social competence skills to "document progress" and "evaluate individual performance" over time (Gilliam, 2006, p.12).

4.5 Staff Focus Group

The staff focus group was semi-structured to allow for flexibility and opportunities for group interaction. The focus group approach to interview is considered to "encourage participation from people reluctant to be interviewed on their own" (Kitzinger, 1995, p. 299) and is increasingly popular amongst researchers in applied social and psychological research (Robson, 2015). The focus group is considered to be a "highly efficient technique" for qualitative data collection because it allows gathering a large amount of qualitative data from several participants at the same time (Robson, 2015, p. 294).

Critics of the focus group method suggest that the approach can limit the number of questions which may be asked within a set time and that facilitating the group process requires careful administration and expertise (Robinson, 1999). Some researchers have also highlighted the importance of group size and composition. Administration of a focus group to a homogenous group of people who are familiar with one another, with established dynamics and inter-personal relationships, may have significant impact on their contributions (Halcomb, Gholizadeh, Digiacomo, Phillips & Davidson, 2007). Careful consideration should also be given to the number of participants invited to partake in the focus group. Morgan (1998) suggests that 6-10 participants is an optimum number for encouraging participation and meaningful group interaction.

Following consideration of the guidance outlined by Morgan (1998) and Halcomb et al. (2007), the staff focus group conducted as part of the current research design included

six individuals who were not all familiar with one another. Familiarity between some of the focus group members could not be avoided, as some of the participants were employed within the same educational provision.

The process of familiarisation with the data set for the purposes of analysis allowed further reflection on the quality of the data obtained. Completing the focus group transcription allowed me to consider some of the methodological concerns outlined by Halcomb et al. (2007). I felt that more senior and experienced members of staff tended to assert greater dominance over dialogue than less experienced staff members. It could be suggested that there was an element of power imbalance within the group between the familiar members of staff, which may have influenced the data collected. Future research may consider invitation of just one member of staff from each educational provision to partake in the focus group. Due to the small number of provisions involved in the current study, the avoidance of familiarity between all staff members was not possible and may be considered a limitation of the research design.

4.6 Parental Semi-Structured Interviews

Semi-structured interview is widely used in multi-strategy designs due to its flexibility. This method allows the interviewer to prepare a set of questions and prompts, but also to be guided by the responses and perceptions of the interviewee. The semi-structured interview is considered to be most appropriate when the interviewer is closely involved with the research process, particularly if the research is small-scale or includes a limited number of participants (Robson, 2015).

Semi-structured interviews allow the interviewer to explain the purpose of particular questions and promotes a natural questioning environment between the interviewee and interviewer (Coolican, 2014). In planning the current research, I aimed to conduct face-to-face interviews with parents to explore their perceptions of their child's social competence skills at home and in other social contexts. Due to the restrictions posed

by parental schedule, the study was re-designed according to parental preference and the interviews were conducted over the telephone.

Gwartney (2007) suggested that there were a number of advantages and disadvantages associated with telephone interviewing. Telephone interviews reduce visual cues and non-verbal communication between the interviewer and interviewee and make gathering contextual information difficult (Gwartney, 2007). However, telephone interviews are also considered to be more accessible and may reduce social desirability bias on the part of the interviewee (Gwartney, 2007). Although the data collected from the semi-structured telephone interviews were crucial in analysis of parental perceptions of the LEGO-Based Therapy intervention, I felt that there were also a number of methodological concerns. Firstly, although efforts were made to allocate a specific time for the telephone interview, parents often requested an alternative time. While this was not concerning, I hypothesised that parents may have felt pressured to engage in the telephone interview at the re-arranged time, which was perhaps inconvenient.

The average duration of telephone interviews was approximately fifteen minutes, which based upon my previous experience of conducting face-to-face interviews, was significantly shorter than I had anticipated. I felt that face-to face interviews would have guaranteed that the parent was ready and willing to discuss the intervention, that they would be free from contextual distractions and perhaps more obliged to provide greater detail in their responses. Face-to-face interviews may also have allowed me to read non-verbal cues and to seek additional clarifications. Although the parents provided useful information via telephone interview, I felt that this method may be better suited to research which is designed to include a larger sample of participants, employing a lesser depth of qualitative analysis.

As indicated by the theme of 'Home/School Links,' which is detailed within the results section of the empirical paper, the parents felt that they had received limited communication with school regarding the LEGO-Based Therapy intervention.

Consequentially, several parents sought additional information regarding the intervention during the telephone interviews, which required me to deviate somewhat from the scheduled interview questions and prompts. I felt that telephone interviewing required a higher level of reciprocal dialogue than would be required during a face-to-face interview, with less room for pause to prompt participant elaboration. While these concerns may have influenced the data set, I felt that the parents' perceptions were communicated clearly and the themes generated from thematic analysis were representative of parental narrative.

6. Analysis

Analysis of both qualitative and quantitative data provided valuable insight into whether or not LEGO-Based Therapy promoted real-life opportunities for spontaneous social interactions, and gathered parent and staff perceptions of the generalisation of learned skills to a variety of social domains, including both home and school.

6.1 Statistical Analysis of the GARS-2

The GARS-2 SI and C subscales were analysed separately, using two within subjects, repeated measures ANOVA and SPSS software. The ANOVAs were completed to analyse whether or not the pupils standard scores on the C and SI subscales demonstrated a significant effect across Time 1 (immediately pre-intervention), Time 2 (immediately following termination of the 6-week intervention) and Time 3 (6 weeks subsequent to a period of no intervention). A small proportion of the data was not included in the statistical analysis as a set of three pupil scores were not returned at Time 3 from one of the participating schools (School 3).

While I found this outcome disappointing, I reflected on the difficulty posed to researchers by reliance on participants to engage with proceedings until the point of experimental completion. Baruch and Holton (2008) found that the average response rate for survey data collected from individuals was 52.7%. The current study generated a response rate of 100% at Times 1 and 2, and a response rate of 77% at

Time 3. While the omission of data was discouraging, I reflected that the response rate was higher than the suggested average rate of return and provided useful data for statistical analysis.

Neither ANOVAs demonstrated a significant effect, suggesting that the pupils' social interaction and communication skills did not improve over time as a result of the LEGO-Based Therapy intervention. These results should be interpreted alongside a number of considerations. Firstly, the greatest limitation of the current research was the limited time available to implement intervention. As noted by school staff, the duration of the intervention may not have been sufficient to demonstrate a significant improvement by implementation of quantitative measures. As outlined in Section B of this document, previously published outcome-based studies relating to LEGO-Based Therapy have implemented the intervention for much longer, delivering the intervention for up to three years (LeGoff & Sherman, 2006).

The quantitative analysis may have also been hindered by the lack of sensitivity provided by the GARS-2 measure. All items on the GARS-2 CI and S subscales were measured using a four-point rating scale (Never Observed, Seldom Observed, Sometimes Observed and Frequently Observed), which may not have been adequately sensitive to evidence small improvements made across the limited research period. Future research may consider implementation of a more comprehensive measure, such as the VABS (Sparrow et al., 2005). While this measure is more in-depth and arguably less 'user-friendly' than the GARS-2, its implementation as a repeated measure may be more illustrative of any changes in social competence over time as part of a longitudinal design.

6.2 Thematic Analyses: Focus Group and Semi-Structured Interviews

With consideration of the epistemological position which underpins the current research, thematic analysis was deemed the most appropriate method of analysing the qualitative data obtained. During the process of research design, I also considered

interpretative phenomenological analysis (IPA) and grounded theory, which are both tied to pre-existing theoretical frameworks, being based in phenomenological epistemology (Braun & Clarke, 2006). In line with the epistemological stance of critical realism, I utilised a qualitative and pattern-based method of inductive thematic analysis (Braun and Clarke, 2006; Braun & Clarke, 2013) to identify and explore key themes from the focus group and interview data. Thematic analysis is considered to be a platform for interpretation of subjective experiences and is a flexible method of qualitative research which "does not prescribe theoretical positions, epistemological or ontological frameworks" (Braun & Clarke, 2013, p. 178).

Thematic analysis was selected with awareness of some of the historical criticisms of the approach, namely, that the researcher is responsible for constructing emerging themes by interpretation of participant data (Cohen, Manion & Morrison, 2011). However, there were no pre-existing theories or hypotheses for this research. The analysis aimed to identify and explore emerging themes which were representative of the body of data provided by participant responses in addressing the research questions. Some themes identified from the data may not be considered wholly positive, which I feel is testament to my efforts to avoid experimenter bias or expectancy effects. The thematic analysis identified a number of important considerations and methodological issues in the delivery of LEGO-Based Therapy, including the importance of contact between home and school, the effect of pupil characteristics on outcomes and the limited duration of the intervention delivery.

Thematic analysis (Braun & Clarke, 2013) began by listening to audio recordings and producing anonymised transcriptions, which allowed me to familiarise myself with both the focus group and interview data sets. I utilised complete coding to identify aspects from both bodies of data that related to the research questions outlined within the empirical paper. I decided not to utilise selective coding, as this approach is utilised to support underlying theories or hypotheses, neither of which were employed in the current research.

On completion of coding, candidate themes began to emerge, consistent with central organising concepts across the codes. Candidate themes were reviewed and organised into main themes and sub-themes, as appropriate. Although there were some similarities between the themes from both the staff and parental thematic analyses, different themes were identified from both data sets, suggesting some differences between staff and parental perceptions of the LEGO-Based Therapy intervention.

6.2.1 Inter-rater Reliability in Qualitative Research

It may be considered a weakness of the current research design that the codes were not submitted for consideration by inter-raters. While testing inter-rater reliability is not explicitly subscribed in the approach to thematic analysis outlined by Braun & Clarke (2013), I feel that submission of the complete codes to inter-raters may have strengthened the research design.

Consideration of the literature around the subject of inter-rater reliability in qualitative analysis highlighted some interesting points for discussion. Gilbert & Mulkay (1984) felt that the formal criteria for evaluation of quantitative research was often presented as the criteria for evaluation of qualitative research. Some researchers have contested this practice, claiming that upholding both approaches to the same criteria is not viable, as both paradigms measure different phenomena (Sale et al., 2002). Braun and Clarke (2013) claimed that there is no "*absolute* criteria for judging whether a piece of qualitative research is any good" (p. 278).

Qualitative researchers acknowledge their impact on the context of data collection alongside their interpretation of codes and themes on experimental outcomes (Yardley, 2008). As Yardley (2008) notes, seeking to minimise the influence of the researcher would "make it difficult to retain the benefits of qualitative research" (p.237). The concept of 'reliability' and 'replicability' is deeply rooted in the epistemological position of realism, in which there is a single, measurable reality, whereas qualitative approaches acknowledge multiple, or context-bound realities

(Yardley, 2008). Braun and Clarke (2013) concluded that "reliability is not an appropriate criterion for judging qualitative work and procedures such as calculating 'inter-rater reliability' are problematic" because of the assumption that coding should be objective" (p. 279). With consideration of the critical realist position employed in the current research, I acknowledge my interpretation of the narrative has influenced the generated codes, and I was acutely aware that my interpretation shaped the identification of overarching themes and the subsequent interpretation of experimental results.

7. Further Considerations and Limitations

7.1 Pupil Voice

The current research design did not explore the views of the participatory pupils. I feel that this is a significant limitation and is inconsistent with the ethos of my applied role as a TEP. The importance of pupil voice in decision-making and evaluation is highlighted by Whitty and Wisby (2007), who claim that pupil voice provides opportunity for a collaborative approach to practice. The contribution of pupil voice would have added a greater depth of knowledge to the research, but was outside of the parameters of the current design. Future research may consider direct evaluation of pupil perceptions and triangulate findings with the perceptions of staff and parents. This approach may provide a valuable insight in to whether the reported levels of pupil engagement and enjoyment were accurate.

7.2 Power Imbalances

It is important to acknowledge the impact of power imbalance on the process of research. Miller, Strier and Pessach (2009) outlined the shift of power throughout the research process. Examples of this include participant recruitment and analysis of data were largely in my control, while engagement with the study until the end of the research period was in the hands of the participants. It was disappointing that some quantitative data had to be omitted from the study and that not all parents chose to participate in the semi-structured interview. I was also mindful that in "real world research" (Robson, 2015, p. xiii), any number of unforeseen circumstances may have

impacted on their availability for contribution. The ethical standards outlined by the Cardiff University ethical committee and the British Psychological Society (BPS) Code of Ethics and Practice (2006) were adhered to throughout the research process and allowed participants to withdraw at any time without explanation.

7.3 Control Group

The lack of an experimental control group in the research design may be considered a limitation of the current research. In research designs utilising a control group, the experimental group is exposed to the independent variable (in this case, the LEGO-Based Therapy intervention), while the control group is not. Implementation of a control group often leads the researcher to attribute any difference in outcomes between the experimental and control groups to the independent variable (Coolican, 2014).

The current study may have benefitted from implementation of a control group, perhaps using a waiting-list design, as was implemented by LeGoff (2004) in his analysis of LEGO-Based Therapy. This approach would have allowed all participants to receive the LEGO-Based Therapy intervention across the course of the research period, but would also have provided a controlled, baseline measure for comparative purposes. Unfortunately, implementation of a control group was not possible within the current study due to the limited time available to conduct the research. An additional consideration was that sourcing participants to take part in the research proved to be challenging. Reducing the existing participant numbers by allocating them into an experimental and control group as part of a waiting-list design would have significantly reduced the statistical power available for data analysis (Coolican, 2014).

The current study implemented a mixed-methods design to explore the perceptions of staff and parents of the LEGO-Based Therapy intervention. A control group was not implemented and the statistical, quantitative analysis did not return a significant

result, however, the qualitative data obtained provided a wealth of information which was able to answer the research questions posed. Control groups are rarely utilised in a qualitative approach to research and some researchers have questioned their application when implementing qualitative methods: "control, as conceived in quantitative research terms, conflicts with the respect paid to context and naturalism in qualitative research" (Lloyd-Jones, 2003, p.5). It has also been suggested that "greater control may influence the data in ways that compromise the representativity of the subsequent analysis" (Lloyd-Jones, 2003, p.5).

It may be suggested that the decision to implement a control group is a difficult one for researchers implementing a mixed-methods design as there is a discord between the value placed on control in both qualitative and quantitative paradigms (Lloyd-Jones, 2003). Nevertheless, future researchers with a larger number of participants and a longer research period may wish to consider implementation of a waiting-list design. This would allow a control group to be implemented for comparative purposes and to increase the researcher's confidence in attributing any significant effects to the intervention.

7.4 Therapy or Therapeutic?

LeGoff et al. (2014) refer to those who facilitate the LEGO-Based Therapy intervention as "LEGO Therapists" and "therapy staff" (p.54). This title may be misleading, as adult facilitators are not necessarily qualified therapists or psychologists. While the literature suggests that most LEGO Therapists have usually obtained a bachelor's degree in education or psychology, there are no particular qualifications required to implement the intervention (LeGoff et al., 2010). While describing the approach, LeGoff et al. (2012) outlined a number of key features which it was claimed had "therapeutic benefit" (p.116).

The first therapeutic feature outlined was the "high levels of motivation that many children with autistic spectrum conditions have for this particular activity and play

materials" (LeGoff et al., 2012, p. 116). This statement is in line with the current research findings, as 'Pupil Engagement' and 'Increased Engagement with Construction Tasks' were identified as key themes from staff and parent narrative. In describing the therapeutic appeal of interaction with LEGO, LeGoff et al. (2012) place value on the "high rate of discrete actions and repetitions" required and claim that "LEGO play is very systematic and capitalises on the strong systematic reasoning abilities of pupils with Autism" (p.116).

These therapeutic features may be considered consistent with the identified theme 'Appeal of the LEGO Resource and Intervention' outlined by parents, which described the structured approach to the implementation of LEGO Club and the sensory appeal of the resource. Teaching staff also highlighted the appeal of the resource:

> Well, learning through play is good for a child whether they are mainstream, whether they have autism, whatever. But obviously, with ASD, many things can be therapeutic and calming, but also, I'm not saying we could just use it as a reward, but they look forward to coming to LEGO, it's something they enjoy. It does sort of calm them down, because they've got small pieces, they've got to be really focused, so it sort of distracts them, say from something that is bothering them at home or in the classroom. You could say it's sort of an escapism for them then, through play (Staff 1).

It may be argued that in practice, LEGO-Based Therapy is not always implemented in a manner which adheres to the structure outlined by LeGoff et al. (2014) and is not currently supported by sufficient research to secure "informed and reasoned practice" (Gameson and Rhydderch, 2008, p.101). Discussion of whether or not the intervention is a therapy, or merely therapeutic is complex, but based upon the current experimental findings it could be suggested that pupils found the approach therapeutic, at the very least.

The appeal of the LEGO resource was evidenced by both teachers and parents but it is not clear whether the same results would be demonstrated should an alternative construction toy be implemented. Future research may consider implementation of an

alternative resource for use as a comparison with LEGO materials, in order to explore whether the "strong systematic" (LeGoff et al, 2012, p.116) appeal of the intervention may be attributed solely to LEGO, or whether an alternative resource may replicate any therapeutic effects.

8 Final Conclusions

By collecting the views of both staff and parents, I was able to contribute a unique perspective regarding the effectiveness of LEGO-Based Therapy and the generalisation of skills from the therapeutic to the non-therapeutic context. Exploration of these perceptions allowed the identification of several themes which may inform future practice. The limitations of the current research were discussed and suggestions made to better the methodology. Future research may be able to build upon the current methodology by implementing a longitudinal design, utilising a more comprehensive quantitative measure of social competence, explore pupil voice and apply a triangulation approach.

The original founders of the LEGO-Based Therapy intervention (LeGoff et al., 2014) claim that the intervention has an intrinsic appeal to pupils with ASD as a result of their attraction to systems (Baron-Cohen, 2006). While the results of the current study implied that all participating pupils enjoyed the intervention, consideration should be given to individual differences and changing preferences. In a review of the evidence by the National Academy of Science (NRC, 2001) regarding the effectiveness of SST, it was concluded that no single approach is best for all individuals with ASD, or for the same individual across time.

The qualitative evidence presented by the current research suggests that LEGO-Based Therapy is a motivating and appealing approach to development of social competence. The participating pupils made context-specific improvements in their social competence in school and demonstrated increased initiation of dialogue and interaction at home. I would conclude that LEGO-Based Therapy is a promising

intervention, but further outcome-based research is required to substantiate the impact of the intervention, to explore pupil perceptions and to inform evidence-based practice.

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Appendix A: Gatekeeper letter

Dear [Head teacher],

Thank you for taking the time to read this letter. My name is Caryl Griffiths and I am a second year trainee educational psychologist at Cardiff University. I am writing to ask your permission to conduct a research project with the parents, teachers and pupils at your school/ provision. I am currently working within the educational psychology service (EPS) and inclusion service in _____.

I would like to explore the impact of the LEGO-Based Therapy on the development of social skills in pupils with autism spectrum disorder (ASD) from the perspective of their classroom teachers and parents. In order to do so, I would like to ask your consent to run a weekly LEGO-Based Therapy group intervention with four KS2 or KS3 pupils from your school, for a period of six weeks. This intervention will need to be conducted in a safe, quiet space in which pupils can work together with a LEGO therapist (a member of staff on roll within the inclusion service in _____) to collaboratively construct LEGO projects. The aim of the LEGO-Based therapy intervention is to promote social skills such as communication, turn-taking and collaboration through creative construction projects. Each session should last approximately 45 minutes and be scheduled in advance of the intervention period, at a time which is convenient for you. Please note that pupils must have a diagnosis of autism spectrum disorder (ASD) to take part in the LEGO intervention. To ensure safety, pupils who are considered to be violent, aggressive or a danger to staff, therapists and peers will not be included in the participant pool and should not be invited to take part in the research.

LEGO Therapy is an increasingly popular social intervention in promoting the development of social skills in pupils with ASD. It is used in many local authorities throughout the USA and UK. There are anecdotal reports of significant improvement in social skills, motivation to engage with others and long term friendships established as a result of the LEGO intervention. However, LEGO-Based Therapy remains a very under-researched area. In order to explore improvements in social competence skills, the perceptions of teachers will be collected with use of the Gilliam Autism Rating Scale- 2nd edition, (GARS-2) which is a simple checklist measuring communication and social interaction skills. For more information or for a copy of the measure please contact the researcher on the address provided below.

Parental and staff perspectives of the LEGO intervention will be collected at the end of the research period (July, 2015) using focus groups and individual interviews, in which parents and staff will be invited to share their views openly and honestly about the intervention. The researcher will conduct a 30 minute focus group with staff and 30 minute interviews with parents. These discussions will be based around the following research questions:

1. Is there a perception of improvement in social interaction and communication skills in pupils with ASD as a result of LEGO-Based Therapy?
2. Are any effects of LEGO-Based Therapy maintained over time, once the intervention input is terminated?
3. Are there differences in any effects between home and school?
4. Are any effects of LEGO-Based Therapy transferred to other social contexts?
5. What are teacher perceptions of LEGO-Based Therapy as an intervention for developing social competence in pupils with ASD?
6. What are parental perceptions of LEGO-Based Therapy as an intervention for developing social competence in pupils with ASD?

The discussion will be recorded using a digital voice recorder and be transcribed to assist with analysis. Any information will remain confidential and will be anonymised so that it cannot be traced back to individuals. In the case of the individual pupil GARS-2 assessments, the pupil data will be stored under an individual number, so that results are not traceable to any individual names. This anonymised data may be retained indefinitely. Therefore, it should be noted that the researcher may be able to provide general feedback regarding the pooled data, but will be not be able to comment on information provided by individuals.

I would very much like your school/provision to be involved in this research. If you agree to take part, I would like to send information sheets to parents and pupils about the LEGO-Based Therapy intervention and the subsequent research with which they will be involved. If more than four pupils with ASD in KS2/KS3 show an interest in taking part, the participants will be chosen at random. Parents will also be provided with an information sheet about the nature of the research, including its aims and methods, so that they are able to provide informed consent if they wish for their child and themselves to take part. Please find the enclosed copies of the information sheet and consent forms for parents and pupils. A 'Head-teacher consent form' for you to sign if you are happy to take part in this research, I would be most grateful if you could read and sign the gatekeeper consent form.

In line with ethical obligations, I would like to reiterate that the school's, pupils' and parents' participation in this research project is voluntary and can be withdrawn. There is no obligation to participate. All data collected will be confidential (unless indicative of a person being at risk) and anonymised within two weeks of the focus groups/ interviews. School procedures for disclosure of sensitive information will be followed. Parents and pupils will be informed of their right to withdraw without explanation at any point.

Thank you again for your time in reading this letter and I look forward to hearing from you. If you have any questions or concerns, please do not hesitate to contact myself or my supervisor, Dale Bartle, using the contact details below.

Yours sincerely,

Caryl Griffiths,

Trainee Educational Psychologist. Cardiff University.

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Appendix B: Gatekeeper Consent Form

By signing below, I give permission/ agree that:

1. Pupils from my school/provision will take part in LEGO-Based Therapy (LEGO Club) sessions which will be conducted by a LEGO therapist on a weekly basis. These sessions will last approximately 45 minutes for a period of six weeks. These sessions will be scheduled in advance.

2. During the research period, staff will be asked to report on pupils' social competence skills a total of three times using the GARS-2 checklists. These measurements will be taken at periodic intervals throughout the study (at baseline, in the middle and at the end of the project).

3. At the end of the research period, estimated June 2015, staff and parents will be invited to take part in a focus group/ interviews conducted by the researcher, lasting approximately 30 minutes to share their views on the impact of LEGO-based therapy.

4. I have been provided with a gatekeeper letter outlining the aims and methods of the research project, including the nature of the research questions.

5. I understand the gatekeeper letter and LEGO-Therapy information sheet provided. I have been given an opportunity to ask any questions and to have these answered satisfactorily.

6. I understand that I will receive feedback regarding the pooled data collected, but not concerning information provided by specific individuals.

7. I understand that the school/provisions participation is voluntary, and that I can withdraw at any time.

8. I understand that the data will be stored on a secure computer, confidentially. All data will be anonymised after two weeks so that information cannot be traced back to individuals. This information may be retained indefinitely.

9. I understand that the results of this research will be written up and submitted as a piece of assessed work as part of the Doctorate in Educational Psychology course at Cardiff University.

10. I have been provided with researcher contact details allowing me the opportunity to seek clarification on any matters of concern.

If you agree to the statements above, please sign below:

Name of school/provision:
Head-teacher name (printed):
Head-teacher signature:
Date:

Appendix C: Parent/ Guardian Covering Letter

Dear Parent/ guardian,

Thank you for taking the time to read this letter. My name is Caryl Griffiths and I am a second year trainee educational psychologist at Cardiff University. I am currently working within the educational psychology service (EPS) and inclusion service in _____. I am writing to ask your permission to include you and your child in a research project based on LEGO-Based Therapy. For more specific information about LEGO-Based Therapy, please refer to the attached information sheet.

My aim is to explore the impact of the LEGO-Based Therapy on the development of social skills in pupils with autism spectrum disorder (ASD) from the perspective of their classroom teachers and parents. In order to do so, I would like to ask your consent to include your child in a weekly LEGO-Based Therapy group intervention with three other pupils (with ASD) from their school, for a period of six weeks. This intervention will be conducted in a safe, quiet space in school in which pupils can work together with a LEGO therapist (a member of staff on roll within the inclusion service in _____) to collaboratively construct LEGO projects. The aim of the LEG-Based Therapy intervention is to promote social skills such as communication, turn-taking and collaboration through creative construction projects. Each session will last approximately 45 minutes and be scheduled in advance.

LEGO Therapy is an increasingly popular social intervention in promoting the development of social skills in pupils with ASD. It is used in many local authorities throughout the USA and UK. There are anecdotal reports of significant improvement in social skills, motivation to engage with others and long term friendships established as a result of the LEGO intervention. However, LEGO-Based Therapy remains a very under-researched area. In order to explore your child's development of social skills during the research period, the perceptions of their teachers will be collected with use of the Gilliam Autism Rating Scale- 2nd edition, (GARS-2) which is a simple checklist measuring communication and social interaction skills. For more information or for a copy of the measure please contact the researcher on the address provided below.

The perspectives of both staff and parents of the LEGO intervention will be collected at the end of the research period (July, 2015) using a focus group and interviews, in which you and staff will be invited to share their views openly and honestly about the intervention. The researcher will conduct focus groups with teachers, and will invite parents to a 30 minute interview. These discussions will be based around the following research questions:

1. Is there a perception of improvement in social interaction and communication skills in pupils with ASD as a result of LEGO-Based Therapy?
2. Are any effects of LEGO-Based Therapy maintained over time, once the intervention input is terminated?
3. Are there differences in any effects between home and school?
4. Are any effects of LEG-Based Therapy transferred to other social contexts?
5. What are teacher perceptions of LEGO-Based Therapy as an intervention for developing social competence in pupils with ASD?
6. What are parental perceptions of LEGO-Based Therapy as an intervention for developing social competence in pupils with ASD?

The responses will be recorded using a digital voice recorder so that they can be transcribed. Any information will remain confidential and will be anonymised so that it cannot be traced back to individuals. In the case of the individual pupil GARS-2 assessments, the pupil data will

be stored under an individual number, so that results are not traceable to any individual names. This anonymised data may be retained indefinitely. Therefore, it should be noted that the researcher may be able to provide general feedback regarding the pooled data, but will be not be able to comment on information provided by individuals.

I would very much like you and your child to be involved in this research and would very much appreciate your involvement in this study. If you are happy to take part in this research, I would be most grateful if you could read and sign the parental consent form. Your child will also be consulted in regards to their willingness to take part, and asked to sign a pupil consent form inviting them to be part of the LEGO Club. Copies of these pupil consent forms are available, on request, from the researcher.

In line with ethical obligations, I would like to reiterate that the school's, pupils' and parents' participation in this research project is voluntary and can be withdrawn. There is no obligation to participate. All data collected will be confidential (unless indicative of a person being at risk) and anonymised within two weeks. School procedures for disclosure of sensitive information will be followed. You have a right to withdraw without explanation at any point.

Thank you again for your time in reading this letter and I look forward to hearing from you. If you have any questions or concerns, please do not hesitate to contact myself or my supervisor, Dale Bartle, using the contact details below.

Yours sincerely,

Caryl Griffiths,

Trainee Educational Psychologist.

Cardiff University.

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Appendix D: Consent Form for Parents/ Guardians

By signing below, I give permission/ agree that:

1. My child will be invited to take part in LEGO-Based Therapy (LEGO Club) sessions which will be conducted by a LEGO therapist on a weekly basis. These sessions will last approximately 45 minutes for a period of six weeks in my child's school/provision. These sessions will be scheduled in advance.

2. During the research period, teachers will be asked to report on pupils' social competence skills a total of three times using the GARS-2 checklists. These measurements will be taken at periodic intervals throughout the study (at baseline, in the middle and at the end of the project).

3. At the end of the research period, estimated June 2015, I will be asked to take part in a semi-structured interview, lasting approximately 30 minutes to share my views on the impact of LEGO-based therapy.

4. I have been provided with an information sheet and covering letter outlining the aims and methods of the research project, including the nature of the research questions.

5. I understand the covering letter and LEGO-Therapy information sheet provided. I have been given an opportunity to ask any questions and to have these answered satisfactorily.

6. I understand that I will receive feedback regarding the pooled data collected, but not concerning information provided by specific individuals.

7. I understand that my participation is voluntary, and that I can withdraw at any time.

8. I understand that the data will be stored on a secure computer, confidentially. All data will be anonymised after two weeks so that information cannot be traced back to individuals. This information may be retained indefinitely.

9. I understand that the results of this research will be written up and submitted as a piece of assessed work as part of the Doctorate in Educational Psychology course at Cardiff University.

10. I have been provided with researcher contact details allowing me the opportunity to seek clarification on any matters of concern.

If you agree to the statements above, please sign below:

Name of pupil:
Name of school/ provision:
Parent/ guardian name (printed):
Parent/ guardian signature:
Date:

Appendix E: Staff Covering Letter

Dear [Teacher],

Thank you for taking the time to read this letter. My name is Caryl Griffiths and I am a second year trainee educational psychologist at Cardiff University. I am writing to invite you to take part in a research project with the parents, teachers and pupils at your school/ provision. I am currently working within the educational psychology service (EPS) and inclusion service in _____.

I would like to explore the impact of the LEGO-Based Therapy on the development of social skills in pupils with autism spectrum disorder (ASD) from the perspective of their classroom teachers and parents. In order to do so, I will be organising a weekly LEGO-Based Therapy group intervention with four KS2 or KS3 pupils from your school, for a period of nine weeks. Pupils can work together with a LEGO therapist (a member of staff on roll within the inclusion service in _____) to collaboratively construct LEGO projects. The aim of the LEGO-Based therapy intervention is to promote social skills such as communication, turn-taking and collaboration through creative construction projects. Each session should last approximately 45 minutes and be scheduled in advance of the intervention period, at a time which is convenient for you.

LEGO Therapy is an increasingly popular social intervention in promoting the development of social skills in pupils with ASD. It is used in many local authorities throughout the USA and UK. There are anecdotal reports of significant improvement in social skills, motivation to engage with others and long term friendships established as a result of the LEGO intervention. However, LEGO-Based Therapy remains a very under-researched area. In order to explore improvements in social competence skills, the perceptions of teachers will be collected with use of the Gilliam Autism Rating Scale- 2nd edition, (GARS-2) which is a simple checklist measuring communication and social interaction skills. For more information or for a copy of the measure please contact the researcher on the address provided below.

Parental and staff perspectives of the LEGO intervention will be collected at the end of the research period (estimated to be June, 2015) using focus groups (staff) and interviews (parents), in which you will be invited to share your views openly and honestly about the intervention. This should last no more than thirty minutes. These discussions will be based around the following research questions:

1. Is there a perception of improvement in social interaction and communication skills in pupils with ASD as a result of LEGO-Based Therapy?
2. Are any effects of LEGO-Based Therapy maintained over time, once the intervention input is terminated?
3. Are there differences in any effects between home and school?
4. Are any effects of LEGO-Based Therapy transferred to other social contexts?
5. What are teacher perceptions of LEGO-Based Therapy as an intervention for developing social competence in pupils with ASD?
6. What are parental perceptions of LEGO-Based Therapy as an intervention for developing social competence in pupils with ASD?

The interviews will be recorded using a digital voice recorder so that responses can be transcribed. Any information will remain confidential and will be anonymised so that it cannot be traced back to individuals. In the case of the individual pupil GARS-2 assessments, the pupil data will be stored under an individual number, so that results are not traceable to any individual names. This anonymised data may be retained indefinitely. Therefore, it should be

noted that the researcher may be able to provide general feedback regarding the pooled data, but will be not be able to comment on information provided by individuals.

I would very much like for you to be involved in this research. If you are happy to take part in this research, I would be most grateful if you could read and sign the teacher consent form attached.

In line with ethical obligations, I would like to reiterate that the school's, teachers', pupils' and parents' participation in this research project is voluntary and can be withdrawn. There is no obligation to participate. All data collected will be confidential (unless indicative of a person being at risk) and anonymised within two weeks of the focus groups. School procedures for disclosure of sensitive information will be followed. All parties will be informed of their right to withdraw without explanation at any point.

Thank you again for your time in reading this letter and I look forward to hearing from you. If you have any questions or concerns, please do not hesitate to contact myself or my supervisor, Dale Bartle, using the contact details below.

Yours sincerely,

Caryl Griffiths,

Trainee Educational Psychologist.

Cardiff University.

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Email: BartleD@cardiff.ac.uk

Appendix F: Staff Consent Form

By signing below, I give permission/ agree that:

1. Pupils from my class will take part in LEGO-Based Therapy (LEGO Club) sessions which will be conducted by a LEGO therapist on a weekly basis. These sessions will last approximately 45 minutes for a period of six weeks. These sessions will be scheduled in advance.

2. During the research period, I will be asked to report on pupils' social competence skills a total of three times using the GARS-2 checklists. These measurements will be taken at periodic intervals throughout the study (at baseline, in the middle and at the end of the project).

3. At the end of the research period, estimated June 2015, I will be invited to take part in a focus group conducted by the researcher, lasting approximately 30 minutes to share my views on the impact of LEGO-based therapy.

4. I have been provided with a gatekeeper letter outlining the aims and methods of the research project, including the nature of the research questions.

5. I understand the covering letter and LEGO-Therapy information sheet provided. I have been given an opportunity to ask any questions and to have these answered satisfactorily.

6. I understand that I will receive feedback regarding the pooled data collected, but not concerning information provided by specific individuals.

7. I understand that my participation is voluntary, and that I can withdraw at any time.

8. I understand that the data will be stored on a secure computer, confidentially. All data will be anonymised after two weeks so that information cannot be traced back to individuals. This information may be retained indefinitely.

9. I understand that the results of this research will be written up and submitted as a piece of assessed work as part of the Doctorate in Educational Psychology course at Cardiff University.

10. I have been provided with researcher contact details allowing me the opportunity to seek clarification on any matters of concern.

If you agree to the statements above, please sign below:

Name of school/provision:
Staff name (printed):
Staff signature:
Date:

Appendix G: Information Sheet for Pupils, Parents, Staff and Gatekeepers.

LEGO- Based Therapy

LEGO Club: A summary for pupils, school and parents.

LEGO Therapy is an increasingly popular social intervention in promoting the development of social skills in pupils with autism spectrum disorder (ASD). It is used in many local authorities throughout the UK and USA. There are anecdotal reports of significant improvement in pupil social skills, motivation to engage with others and long term friendships established as a result of LEGO Club.

The end goal of LEGO-Based Therapy is that pupils will work together, collaboratively. It must be remembered that the aim of this approach is to *improve interaction, collaboration, social competence and communication.* As well as being a source of fun and motor skill development, the LEGO elements (and completed LEGO projects) are merely a means to facilitate this goal.

Materials

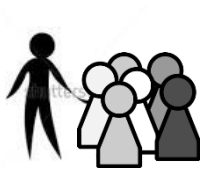
- An assortment of LEGO pieces
- Cork board (to display photographs of completed projects, plans and designs, and certificates of achievement).
- LEGO Club rules poster (the LEGO club rules should be displayed clearly at all times).
- Visual clock or timer

Laying the groundwork: Individual therapy and pivotal skills

Before children or young people (CYP) are able to begin on collaborative projects, the following basic skills must be met:

- **Appropriate conduct:** Able to sit at a table without wandering and respond to verbal instructions and nonverbal prompts, including pointing and eye gaze. No aggressive or disruptive behaviour, waiting appropriately, following the LEGO club routine.
- **Sorting and grouping** LEGO pieces by shape, colour and size.
- **Matching** LEGO pieces to images.
- **Identifying and labelling** LEGO pieces accurately by verbal descriptions of their function and appearance (please visit the LEGO factory website for the correct terminology: "Pick a brick" pages at http://shop.lego.com/en-US/Pick-A-Brick-ByTheme).

- **Following simple visual instructions** to begin very simple projects, first with the therapist, then with peers.
- **Inspecting a completed set** and spotting errors between the model and the visual plan.
- **Thematic preferences-** therapist to observe and discuss with the pupils so that information can be gathered about their thematic preferences for LEGO construction during the collaborative phase.



LEGO-Based Therapy Group Sessions: LEGO Club Structure

1. **Transition and "check-in":** This is a *hands-off* time, with no access to LEGO. All members should enter the room and greet one another in an age appropriate manner, eye contact and use of pupils' names should be explicitly encouraged. Pupils should be encouraged to **"check-in"** and describe a significant life event from the last week which they would like to share with the group. Members are encouraged to respond by relaying sympathy, but less encouraged to relate strategies, inappropriate comments are ignored or invited to be commented on by other members. *"Did you think that comment was helpful? How might that have Lisa's comment made Peter feel?"*

2. **Planning stage:** The process of choosing a set or freestyle build is very important and modelling correct methods of debate, discussion, agreement or disagreement is very important. Once a theme is agreed upon, **roles should be assigned by the project leaders (Engineers).** This may provoke discussion. This stage requires visual instructions, or a structured plan, for the pupils to follow.

3. **Structured phase:** All group members are engaged in the chosen, structured LEGO project according to their roles (Please see the overview of roles, in Table 1).

(If a group activity is chosen wisely and roles are very clear, the therapist should be able to focus almost entirely on social and communication coaching through peer-mediated responses.)

4. **Creative (freestyle) phase:** This stage includes pupils **designing and building** their own creations. This stage is more advanced because it includes **increased collaboration and communication skills.** This can be individual is a good opportunity to link members and promote friendships between those who are exploring similar themes. Problem-solving, compromise and turn-taking should be modelled by the therapist, but pupils are encouraged to take responsibility and provide directions for their own projects.

5. **Clean-up time:** Members will be given a 15 minute warning with 5 minute reminders before clean up time. All members must contribute to this process, and clean up all the LEGO, not just the pieces they have been using. Younger pupils may be offered points or rewards for their cooperation.

6. **Farewells:** Members should farewell each other in an age appropriate manner, using names and eye contact. Each member should be addressed by every member of the group.

LEGO Club Rules

1. **If you break it, you have to fix it.**
2. **If you can't fix it, ask for help.**
3. **If someone else is using it, don't take it, ask first.**
4. **No yelling. Use indoor voices.**
5. **No climbing or jumping on the furniture.**
6. **No teasing, name-calling or bullying.**
7. **No hitting or wrestling- keep hands and feet to yourself.**
8. **Clean up- put things back where they belong.**

Important points

Displaying projects

Wherever possible, ongoing projects should be displayed safely within the LEGO-Based Therapy room. This improves pride, group identity and motivation.

Peer-mediated feedback:

If the LEGO Club rules are broken, therapists will encourage peers to identify and correct the behaviour by referring to the rules, which are on display. Therapist: *"LEGO Club, is someone in here breaking a rule?"... "What should they have done?"*

Therapists will avoid correcting behaviours explicitly as a teacher would, but will encourage corrections from peers, so that all members become more reflective and monitor their own behaviour accordingly. In example:

Therapist: *"Charlie, do you think that it's OK that Lisa talks to you without looking at you? No? Why don't you ask her to look at you next time?"*

"Is he doing your job? Tell him that he's doing your job."

(Please see Table 1 below for an overview of the roles and responsibilities in the LEGO Club.)

During transition to the various roles, pupils are given a certificate to record their achievement. The transition and awarding of roles should be voted on by all LEGO Club members, with the aim of increasing group identity, pride and intrinsic motivation.

The LEGO Club: Roles and levels

Awarding these levels and corresponding "diploma" certificates are based upon a whole group vote. The levels begin at LEGO Helper and progress to the most advanced level, LEGO genius.

Role	Responsibilities
LEGO Helper	This is the first level within the hierarchy. Duties include sorting and organising pieces, supplying pieces to the builder, checking sets for consistency with plans, ordering and cleaning the room and LEGO pieces.
LEGO Builder	These pupils have demonstrated that they are able to independently construct moderate builds and are able to fulfil the key roles such as builder, supplier and engineer duties.
LEGO Creator	This role involves the ability to design, find parts for, and construct an original and complex freestyle creation. The final construction must resemble the design.
LEGO Master	Leads a whole group project, must present their idea to the while group and try to convince them that their idea is worth working on collaboratively during freestyle building time. The plan must constitute at least 300 pieces and the Master must be responsible for designating roles and coordinating the project.
LEGO Genius:	Must write a movie script or story which is presented to the group, open to critique, this story must then translate to a detailed plan, or a stop-motion film of the project until completion. The level may also be awarded for extremely complex LEGO creations, engineering skill and leadership.

Conclusion

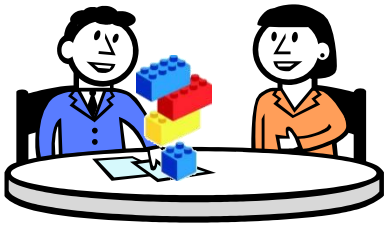
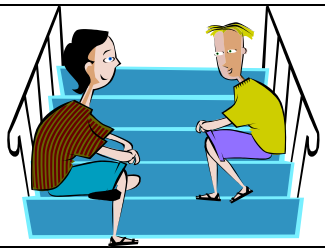
LEGO-Based therapy practitioners are not in the role of teacher, and view themselves as facilitators, fostering collaborative and social skills in the club members via peer-mediation.

Wherever possible, the LEGO therapist is merely a facilitator, always encouraging LEGO club members to address issues sensitively and appropriately. Where appropriate, issues with conduct and rule-breaking will be corrected via peer-mediation. The aim of this peer-mediated approach in the group is that it encourages onus on the pupil, builds intrinsic motivation to co-operate and utilise social skills, and builds a cohesive group identity.

The main focus of this approach is to encourage communication and to build social skills and behaviours in pupils with ASD. However, it is likely that the completed LEGO projects will also be a source of great pride and enjoyment for the LEGO Club members.

<u>Appendix H</u>: Pupil Consent Form

Please tick if you understand ✓

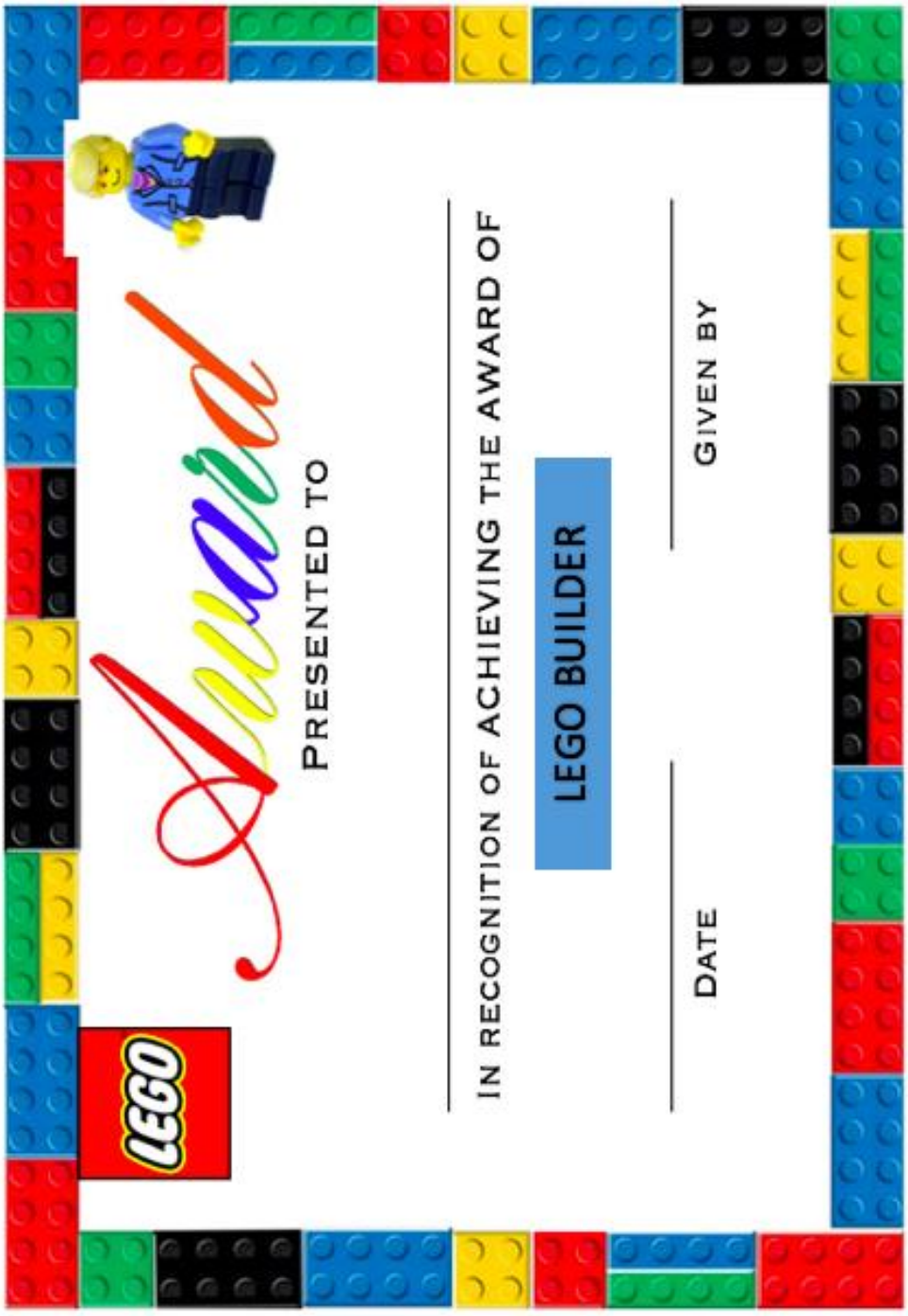
	I have been invited to take part in LEGO Club. If I want to take part in the club, I will be expected to do my best to follow the LEGO Club rules. I know that the rules are on the club poster and on my information sheet. I can ask for information about the rules, and about the club from the LEGO therapist at any time.	
	I know that in LEGO club, sometimes I will have my own LEGO pieces to work with, but sometimes I will have to share and work together with the other members of the club. I will have to take turns in doing different roles. I know that although sometimes we will concentrate on LEGO, sometimes we will talk about lots of things, like home, school and friends.	
NO	I know I can say 'no' to any questions or any tasks that I do not wish to take part in. I know that I do not have to be a member of the LEGO Club if I don't want to, and I can choose to leave the club at any time.	
	I know that if I say something that may harm me or others, the LEGO therapist will have to tell someone else. This is to make sure nobody gets hurt.	

	I am happy for what I say to be shared with teachers and my parents/carers. I am also happy for information about LEGO Club and the tasks that I have taken part in to be shared with my teachers and parents/carers. I understand that I am welcome to talk about LEGO Club with teachers, friends and parents/carers too.	
	I know that what happens in LEGO Club will be written into a report which my parents, teachers and I, will be able to read if we wish to. I understand that private information about me, such as my name or school, will not be written in this report. This information will be not be included, so that nothing can be traced back to me individually.	
	I know who I can talk to in school if I want more information about LEGO Club.	
	I understand all of these things.	
Name: Signature: Date:		

Appendix I: Example of LEGO Club Session Plan (Session 6)

Task	Description	Equipment
Check-in	Pupils greet one another in an age-appropriate manner. All pupils will be encouraged to make eye contact and address each other by name.	None.
Rules	Read through the rules of LEGO Club. Ensure the pupils understand the rules to ensure that the Club's expectations are understood.	Rules poster.
Planning Phase	Discussion regarding the pupil's selected collaborative large-scale build project. Consideration given to the visual plans provided in the LEGO set. Sections of the build are delegated to the various roles.	LEGO set and visual plan.
Structured Phase	All group members work collaboratively on the chosen project. Pupils take turns to fulfil the LEGO Club roles (Builder, Engineer, etc.). Collaborative project is displayed in the LEGO Club room.	LEGO set and visual plan. Timer.
Creative Phase	Speed build- all the bricks are placed in the middle of the table. A timer is set and children have to build as big a structure as possible in the time limit (30 secs) Children encouraged to beat their personal best rather than each other.	Loose selection of LEGO pieces. Timer.
Celebration	Praise of the effort and achievements. Add to the success board showing photos from last week.	Certificate of completion for each child.

<u>Appendix J:</u> Example of LEGO Club Certificate



Appendix K: Parent, Staff, Gatekeeper Debrief Sheet

Dear Parent/ Guardian, Teacher, Head-teacher,

Thank you very for being a part of this research.

The aim of the project was to explore the impact of the LEGO-Based Therapy on the development of social skills in pupils with autism spectrum disorder (ASD) from the perspective of their classroom teachers and parents. In order to do so, pupils were part of a weekly intervention (LEGO Club) with other members with diagnosis of autism spectrum disorder (ASD).

LEGO Therapy is an increasingly popular social intervention in promoting the development of social skills in pupils with ASD. It is used in many areas throughout the UK and is being piloted within your local authority. There are anecdotal reports of significant improvement in social skills, motivation to engage with others and long term friendships established as a result of the LEGO intervention. However, LEGO-Based Therapy remains a very under-researched area. In order to explore improvements in social competence skills, the perceptions of staff were collected using the Gilliam Autism Rating Scale- 2nd edition, (GARS-2), a simple checklist measuring communication and social interaction skills. The results of the GARS-2 were taken as a quantitative indicator of teacher perceptions of the pupils' social and communication skills before, during, and following the termination of the LEGO club intervention.

Upon completion of the intervention, parental and staff perspectives of the LEGO Club was collected using focus groups and semi-structured interviews, in which parents and staff were invited to share their views openly and honestly about the intervention. Discussions during the focus groups were based on the following research questions:

1. Were there perceptions of improvement in social interaction and communication skills in pupils with ASD as a result of LEGO-Based Therapy?
2. Were any effects of LEGO-Based Therapy maintained over time, once the intervention input was terminated?
3. Were there differences in any effects between home and school?
4. Were any effects of LEGO-Based Therapy transferred to other social contexts?
5. What were teacher perceptions of LEGO-Based Therapy as an intervention for developing social competence in pupils with ASD?
6. What were parental perceptions of LEGO-Based Therapy as an intervention for developing social competence in pupils with ASD?

This information provided qualitative data about the intervention and whether any effects of the LEGO Club were significant over time, even after the intervention had come to an end. Please remember that any information collected is confidential and anonymised, so that it cannot be traced back to individuals. This anonymised data may be retained indefinitely. Therefore, it should be noted that the researcher may be able to provide general feedback regarding the pooled data, but will be not be able to comment on information provided by individuals.

I would like to thank you very much for your involvement in this research. Your contributions have informed thinking and may have added to the literature in LEGO-Based Therapy. Please do not hesitate to direct any questions or concerns to myself, or my research supervisor, Dale Bartle, using the contact details below.

Yours sincerely,

Caryl Griffiths,

Trainee Educational Psychologist.

Cardiff University.

Caryl Griffiths
Trainee Educational Psychologist
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Appendix L: Pupil Debrief Sheet

Dear Pupil,

Thank you very for being a part of LEGO Club!

The LEGO Club was part of a research project that aimed to explore the impact of the LEGO-Based Therapy on the development of social skills in pupils with autism spectrum disorder (ASD) from the perspective of your classroom teachers and parents.

LEGO Therapy (LEGO Club) is an increasingly popular social intervention in promoting the development of social skills. That is, it is thought that being part of LEGO Club helps children and young people to improve their ability to take turns, share, communicate appropriately, and to build friendships while working on collaborative LEGO projects. There are many other LEGO Clubs being run across the country and within your local area. In order to measure whether or not LEGO Club was a successful social intervention, staff from your school were asked to report on the development of LEGO Club members using a checklist (Gilliam Autism Rating Scale- 2nd edition, GARS-2).

At the end of LEGO Club, the parents/guardians and school staff of the LEGO Club members discussed the LEGO Club and whether or not they thought it had been beneficial for development. These discussions were based on the following research questions:

1. Were there perceptions of improvement in social interaction and communication skills in LEGO club members as a result of LEGO Club?
2. Did LEGO Club improve social interaction and communication skills in LEGO club members?
3. Were any effects of LEGO Club maintained over time, once the LEGO Club finished?
4. Were there differences in any effects between home and school?
5. Were any effects of LEGO Club transferred to other social contexts?
6. What were teacher perceptions of LEGO Club as an intervention for developing social competence in LEGO Club members?
7. What were parental perceptions of LEGO Club as an intervention for developing social competence in LEGO Club members?

This information helped the researcher to explore whether the LEGO Club was successful and whether any effects of the LEGO Club were significant over time, even after the intervention had come to an end. Please remember that all the information collected about LEGO Club is confidential and anonymised, which means that private information, such as your name and your school will not be named or shared. This anonymised data may be retained indefinitely. Therefore, if you have any questions about the impact of LEGO Club, you are welcome to ask school staff or the researcher named below. However, remember that individual information, specifically about you or other members cannot be shared, but you can ask for information about the LEGO Club as a whole.

I would like to thank you very much for your involvement in LEGO Club. I hope you have enjoyed taking part and working on collaborative LEGO projects. Remember that you are able to continue to work with LEGO and with your peers if you wish to do so, even though this

research project has come to an end. Please do not hesitate to direct any questions or concerns to myself, or my research supervisor, Dale Bartle, using the contact details below.

Yours sincerely,

Caryl Griffiths,

Trainee Educational Psychologist.

Cardiff University.

Caryl Griffiths
Trainee Educational Psychologist
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Dale Bartle
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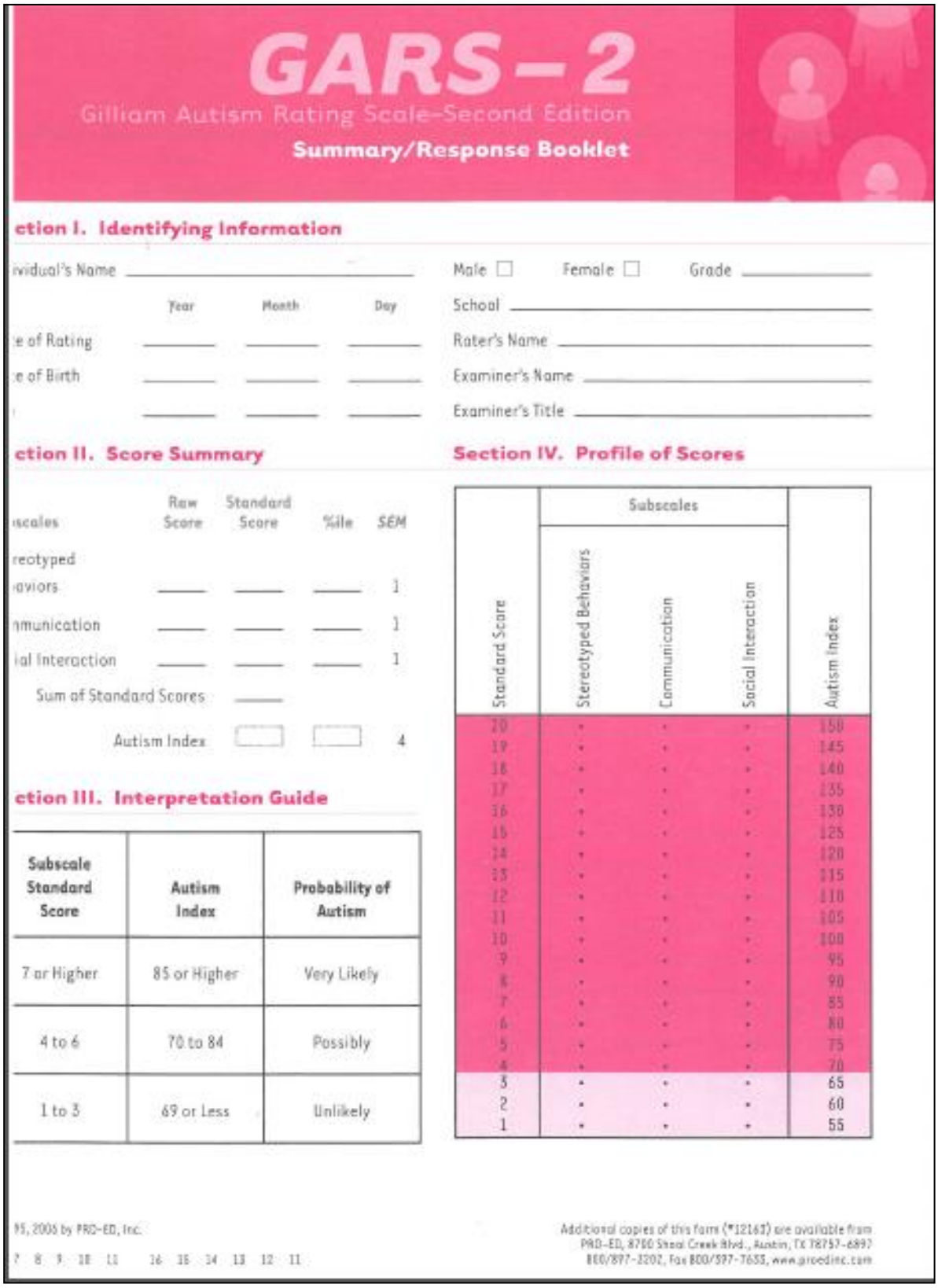
<u>Appendix M:</u> Gilliam Autism Rating Scale -2nd Edition (GARS-2): Communication and Social Interaction Subscales.



GARS–2

Gilliam Autism Rating Scale–Second Edition

Summary/Response Booklet

ction I. Identifying Information

ividual's Name _____ Male ☐ Female ☐ Grade _____

	Year	Month	Day
e of Rating			
e of Birth			

School _____

Rater's Name _____

Examiner's Name _____

Examiner's Title _____

ction II. Score Summary

scales	Raw Score	Standard Score	%ile	SEM
reotyped aviors				1
mmunication				1
ial Interaction				1
Sum of Standard Scores				
Autism Index				4

ction III. Interpretation Guide

Subscale Standard Score	Autism Index	Probability of Autism
7 or Higher	85 or Higher	Very Likely
4 to 6	70 to 84	Possibly
1 to 3	69 or Less	Unlikely

Section IV. Profile of Scores

Standard Score	Subscales: Stereotyped Behaviors	Subscales: Communication	Subscales: Social Interaction	Autism Index
20	•	•	•	150
19	•	•	•	145
18	•	•	•	140
17	•	•	•	135
16	•	•	•	130
15	•	•	•	125
14	•	•	•	120
13	•	•	•	115
12	•	•	•	110
11	•	•	•	105
10	•	•	•	100
9	•	•	•	95
8	•	•	•	90
7	•	•	•	85
6	•	•	•	80
5	•	•	•	75
4	•	•	•	70
3	•	•	•	65
2	•	•	•	60
1	•	•	•	55

7 8 9 10 11 16 15 14 13 12 11

Additional copies of this form (#12162) are available from PRO-ED, 8700 Shoal Creek Blvd., Austin, TX 78757-6897 800/897-3202, Fax 800/397-7633, www.proedinc.com

ction V. *Continued.*

bscale 2: Communication

ections: Rate the following items according to the frequency of occurrence. Use the following guidelines for your ratings:

0 Never Observed—You have never seen the individual behave in this manner.
1 Seldom Observed—Individual behaves in this manner 1–2 times per 6-hour period.
2 Sometimes Observed—Individual behaves in this manner 3–4 times per 6-hour period.
3 Frequently Observed—Individual behaves in this manner at least 5–6 times per 6-hour period.

cle the number that best describes your observations of the individual's typical behavior under ordinary cir-nstances (i.e., in most places, with familiar people, and in usual daily activities). Remember to rate every item. ou are uncertain about how to rate an item, delay the rating and observe the individual for a 6-hour period to termine your rating. REMEMBER, EVERY ITEM SHOULD RECEIVE A SCORE.

w does this individual communicate? Talks ___ Signs ___ Does not Talk or Sign ___
he individual does not talk, sign, or use any other form of communication, omit this subscale.

	Never Observed	Seldom Observed	Sometimes Observed	Frequently Observed
Repeats (echoes) words verbally or with signs.	0	1	2	3
Repeats words out of context (i.e., repeats words heard at an earlier time; e.g., repeats words heard more than 1 minute earlier).	0	1	2	3
Repeats words or phrases over and over.	0	1	2	3
Speaks or signs with flat tone, affect, or dysrhythmic patterns.	0	1	2	3
Responds inappropriately to simple commands (e.g., "sit down," "stand up").	0	1	2	3
Looks away or avoids looking at speaker when name is called.	0	1	2	3
Does not ask for things he or she wants.	0	1	2	3
Does not initiate conversations with peers or adults.	0	1	2	3
Uses "yes" and "no" inappropriately. Says "yes" when asked if he or she wants an aversive stimulus, or says "no" when asked if he or she wants a favorite toy or treat.	0	1	2	3
Uses pronouns inappropriately (e.g., refers to self as "he," "you," "she").	0	1	2	3
Uses the word *I* inappropriately (e.g., does not say "I" to refer to self).	0	1	2	3
Repeats unintelligible sounds (babbles) over and over.	0	1	2	3
Uses gestures instead of speech or signs to obtain objects.	0	1	2	3
Inappropriately answers questions about a statement or brief story.	0	1	2	3
Subtotals	___	+ ___	+ ___	+ ___ =

Communication Total Raw Score ☐

ection V. *Continued.*

ubscale 3: Social Interaction

rections: Rate the following items according to the frequency of occurrence. Use the following guidelines for your ratings:

0 Never Observed—You have never seen the individual behave in this manner.
1 Seldom Observed—Individual behaves in this manner 1–2 times per 6-hour period.
2 Sometimes Observed—Individual behaves in this manner 3–4 times per 6-hour period.
3 Frequently Observed—Individual behaves in this manner at least 5–6 times per 6-hour period.

cle the number that best describes your observations of the individual's typical behavior under ordinary cir-mstances (i.e., in most places, with familiar people, and in usual daily activities). Remember to rate every item. ou are uncertain about how to rate an item, delay the rating and observe the individual for a 6-hour period to termine your rating. REMEMBER, EVERY ITEM SHOULD RECEIVE A SCORE.

	Never Observed	Seldom Observed	Sometimes Observed	Frequently Observed
. Avoids eye contact; looks away when someone looks at him or her.	0	1	2	3
. Stares or looks unhappy or unexcited when praised, humored, or entertained.	0	1	2	3
. Resists physical contact from others (e.g., hugs, pats, being held affectionately).	0	1	2	3
. Does not imitate other people when imitation is required or desirable, such as in games or learning activities.	0	1	2	3
. Withdraws, remains aloof, or acts standoffish in group situations.	0	1	2	3
. Behaves in an unreasonably fearful, frightened manner.	0	1	2	3
. Is unaffectionate; does not give affectionate responses (e.g., hugs and kisses).	0	1	2	3
. Shows no recognition that a person is present (i.e., looks through people).	0	1	2	3
. Laughs, giggles, cries inappropriately.	0	1	2	3
. Uses toys or objects inappropriately (e.g., spins toy cars, takes action toys apart).	0	1	2	3
. Does certain things repetitively, ritualistically.	0	1	2	3
. Becomes upset when routines are changed.	0	1	2	3
. Responds negatively or with temper tantrums when given commands, requests, or directions.	0	1	2	3
. Lines up objects in precise, orderly fashion and becomes upset when the order is disturbed.	0	1	2	3

Subtotals ___ + ___ + ___ + ___ =

Social Interaction Total Raw Score ☐

Appendix N: Schedule for Parental Semi-Structured Interview

1. Have you noticed a change in ____'s social interaction and communication skills since receiving the LEGO-Based therapy intervention?

If 'yes,' take details of:

a) What kind of changes have been observed?
b) Have the changes occurred within the research period?
c) How have changes impacted upon functioning?

If 'no,' take details of:

a) How are her/his social communication and interaction skills at home?
b) Have her/his skills stayed the same?
c) In what way have her/his skills stayed the same?

2. Has _____ ever been involved in any other social interventions?

If 'yes', clarify:

a) How do you feel LEGO-Based Therapy compared to the other interventions?
b) Did you notice any change in ____'s social skills as a result of those interventions?
c) How did LEGO-Based Therapy compare to other interventions in terms of his/her interest in taking part?

If 'no,' move on to next question.

3. Do you think that _____ behaves similarly in all social contexts, or are there some situations which are more challenging or easier than others?
a) Could you tell me a little bit more about that?

4. (If answered 'yes' to question 1) Do you think the LEGO-Based Therapy has any impact across different social contexts, or are any effects limited to one location?
a) In which contexts have you noticed a change?
b) What changes did you observe in that context?

5. Do you perceive that the LEGO-Based Therapy approach has any particular strengths?

If 'yes,', take details of:

a) What strengths have you identified?
b) Are any strengths due to the approach, or the resource?

If 'no,' move on to next question.

6. Do you perceive that the LEGO-Based Therapy approach has any particular areas for development?
a) Which improvements do you feel could be made?

7. Would you consider using LEGO-Based Therapy again in the future?

8. Would you like to add any additional comments?

General Prompts and Clarification:

1. "Can you tell me a little bit more about that?"
2. "Can I clarify what you mean when you say…?"
3. "Are you able to provide me with some examples of…?"

The interviewer may also repeat back some of the statements provided by parents to clarify that the correct meaning has been inferred, and to allow for exploration of additional themes.

Appendix O: Schedule for Staff Focus Group

1 Have you noticed a change in the pupil's social interaction and communication skills since receiving the LEGO-Based Therapy intervention?

If 'yes,' take details of:

d) What kind of changes have been observed?
e) Have the changes occurred within the research period?
f) How have changes impacted upon their functioning?
g) Have the changes been observed within the context of the sessions, or have they been generalised in to other social contexts?

If 'no,' take details of:

d) Pupil functioning and presentation.

2 Has _____ ever been involved in any other social interventions?

If 'yes', clarify:

d) How do you feel LEGO-Based Therapy compared to the other interventions?
e) Did you notice any change in ____'s social skills as a result of those interventions?
f) How did LEGO-Based Therapy compare to other interventions in terms of his/her interest in taking part?

If 'no,' move on to next question.

3 (If answered 'yes' to question 1) Do you think the LEGO-Based Therapy has any impact across different social contexts, or are any effects limited to one location?
c) In which contexts have you noticed a change?
d) What changes did you observe in that context?
e) Were changes observed inside the LEGO-Based Therapy sessions?
f) Were changes observed outside (generalised) to outside of the LEGO-Therapy sessions?

4. Are you aware of whether the LEGO-Based Therapy had any impact on the pupil's social competence skills at home?

If 'yes,', explore:

a) What changes occurred at home?
b) Are you aware whether the skills have transferred to any other social contexts outside of school?

If 'no,' move on to next question.

5. Do you perceive that the LEGO-Based Therapy approach has any particular strengths?

If ‘yes,’, take details of:

c) What strengths have you identified?
d) Are any strengths due to the approach itself, or the resource?

If ‘no,’ move on to next question.

4 Do you perceive that the LEGO-Based Therapy approach has any particular areas for development?
b) Which improvements do you feel could be made?

5 Would you consider using LEGO-Based Therapy again in the future?

6 Would you like to add any additional comments?

General Prompts and Clarification:

1.“Can you tell me a little bit more about that?”
2. “Can I clarify what you mean when you say…?”
3. “Are you able to provide me with some examples of…?”

The interviewer may also repeat back some of the statements provided by parents to clarify that the correct meaning has been inferred and to allow for exploration of additional themes.

Appendix P: Phases of thematic analysis (Adapted from Braun & Clarke, 2013, p. 202).

Stage	Phase of thematic analysis	Description of my process as a researcher
1	Transcription.	The process began by listening to the audio recordings to gain a general impression of the narrative. The data was transcribed verbatim.
2	Reading and familiarisation, taking note of items of potential interest.	The transcriptions were read and re-read several times. Initial ideas for codes were noted by the researcher.
3	Complete coding across entire dataset.	Patterns of codes across the data sets were recorded. The codes were cross-checked across the transcripts.
4	Searching for themes.	The codes were collated into candidate themes.
5	Reviewing themes (producing a map of the provisional themes, and relationships between them-aka the 'thematic maps.'	The candidate themes were checked in relation to extracts from the transcripts. 'Thematic Maps' were generated and consideration given to which themes could be considered main themes or sub-themes.
6	Defining and naming themes.	The themes central organising concepts were reviewed. Clear names were generated for each theme.
7	Writing-finalising analysis.	Illustrative quotations were selected to demonstrate the themes within the body of the report. The original research questions were considered alongside the generated themes.

Table 1: Phases of thematic analysis

Appendix Q: Thematic Maps: Staff Focus Group.

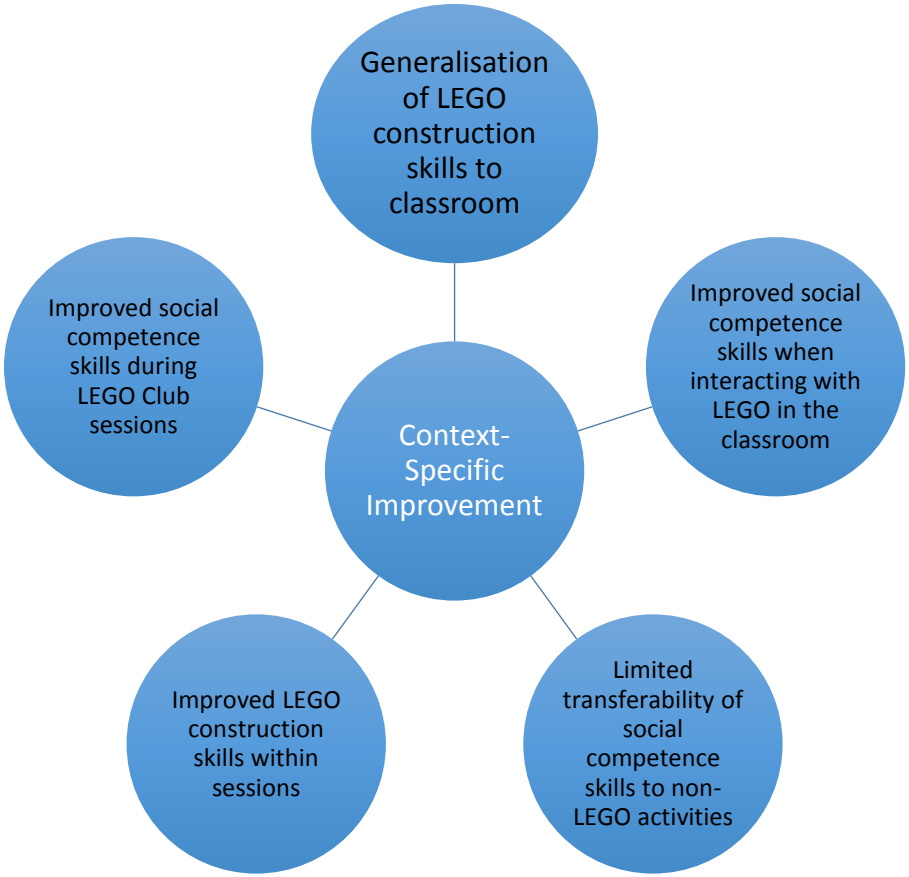
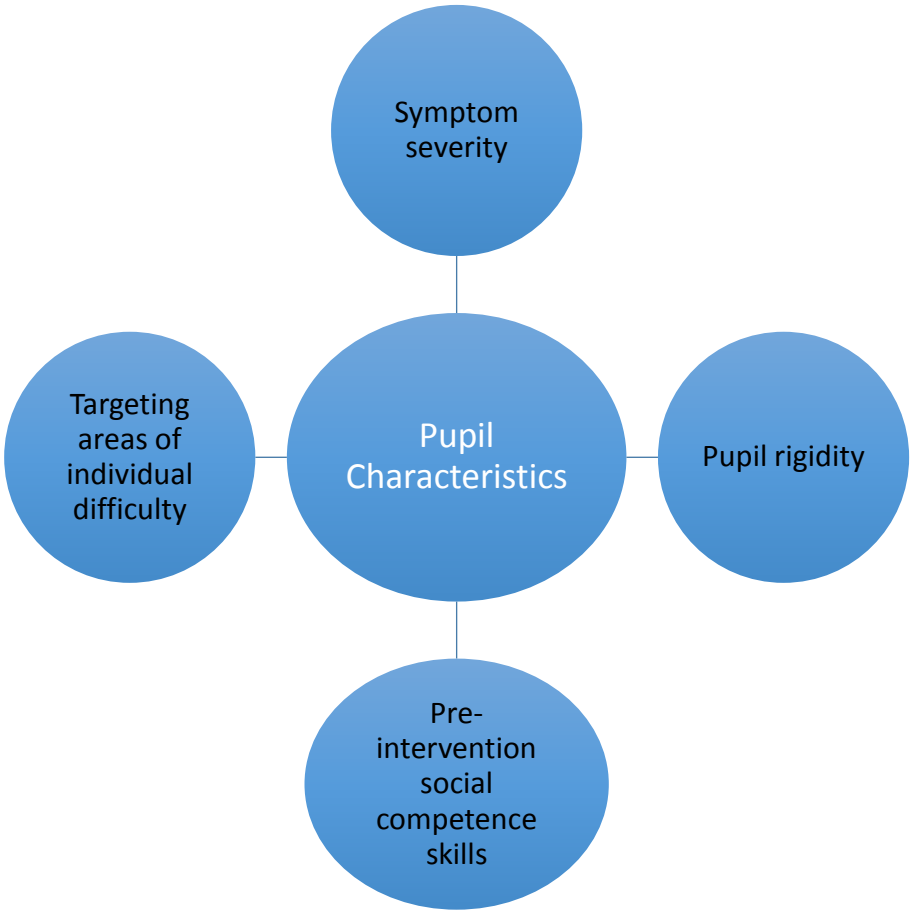
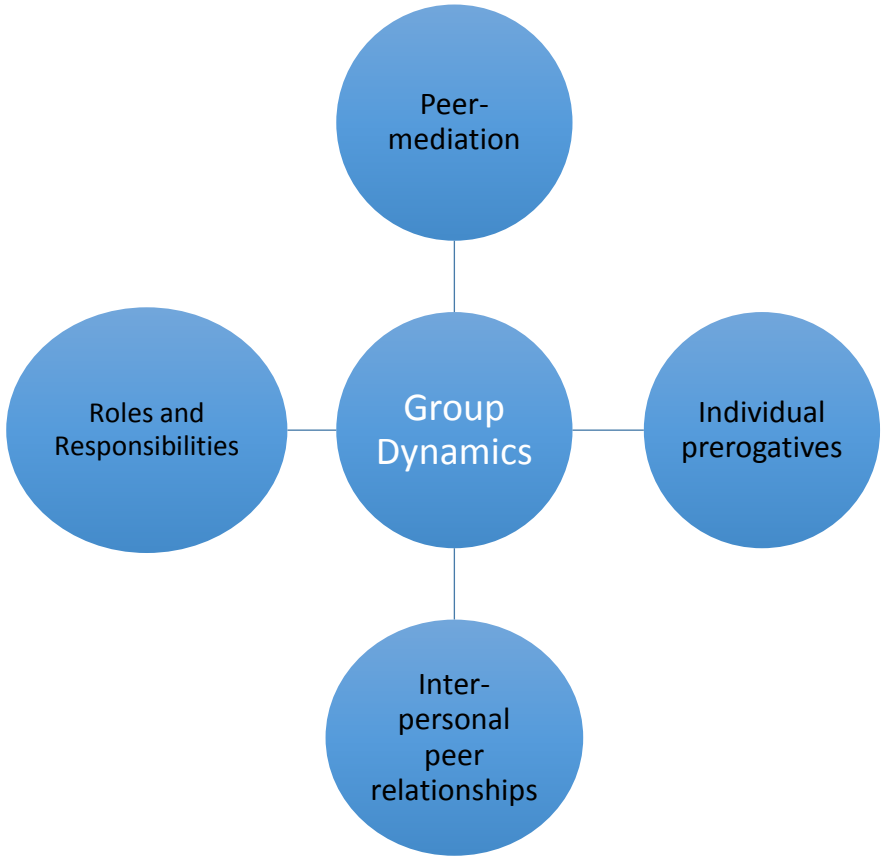


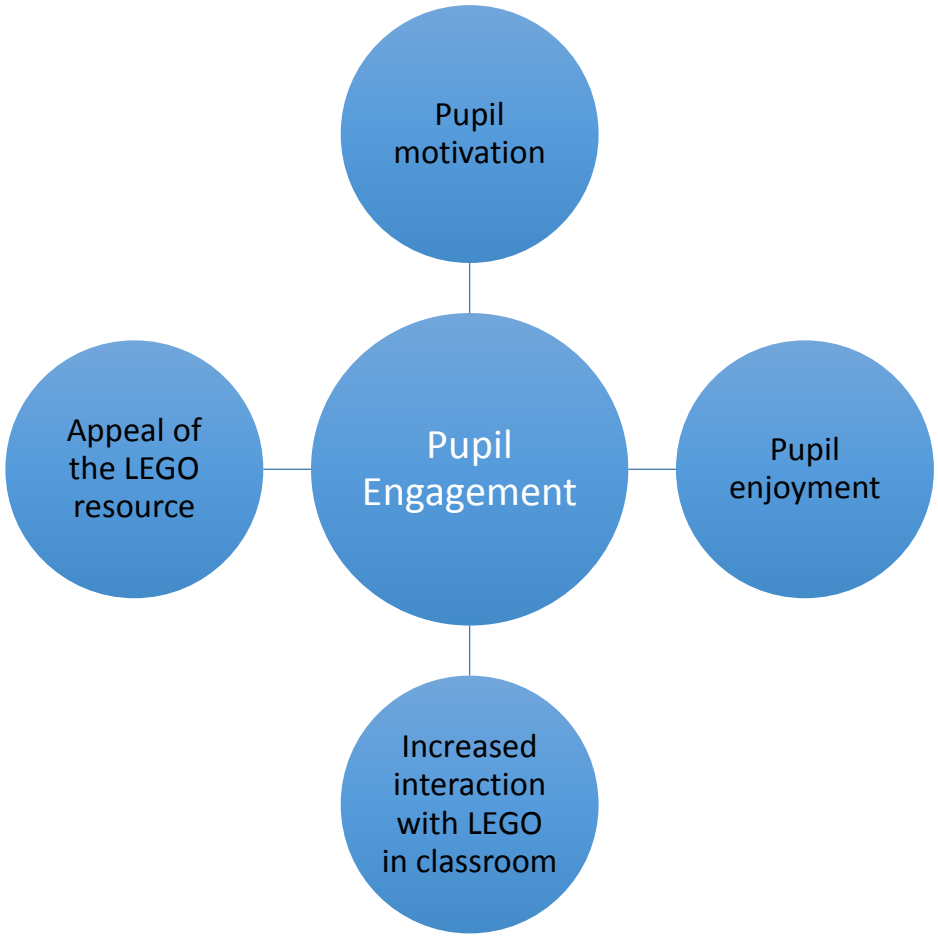
Figure 1: Thematic map detailing the sub-themes within the theme of Context Specific Improvement



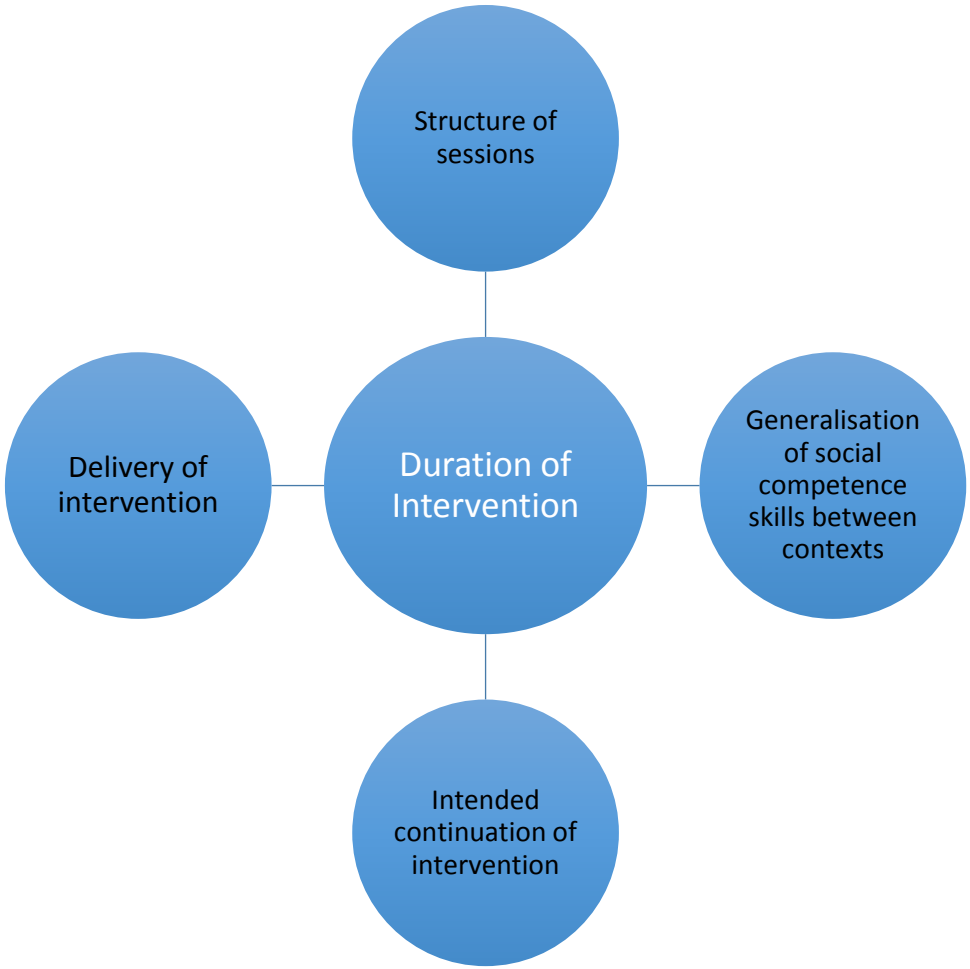
<u>Figure 2:</u> Thematic map detailing the sub-themes within the theme of Pupil Characteristics.



<u>Figure 3:</u> Thematic map detailing the sub-themes within the theme of Group Dynamics.



<u>Figure 4:</u> *Thematic map detailing the sub-themes within the theme of Pupil Engagement.*



<u>Figure 5:</u> Thematic map detailing the sub-themes within the theme of Duration of Intervention

Appendix R: Examples of supporting quotations for sub-themes identified within the Staff Focus Group

Main Theme: Context- Specific Improvement	
Sub-themes	**Example Quotations**
Improved social competence skills during LEGO Club sessions	**"**… as the weeks went on it was really interesting to see how they improved. They were more able to ask each other for different pieces voluntarily. I mean they were doing that voluntarily, of their own accord, whereas at the beginning, you would have to encourage them to say "ask so and so for the red piece." (Staff 3) "I mean, you could see in the sessions that they were happier to ask things of each other". (Staff 3)
Generalisation of LEGO construction skills to classroom	"When I think about the children in class now, specifically because it was a LEGO group, I mean, whenever we get anything out to do with construction, whether its Stickle Bricks, LEGO, etc., their communication is always stronger. They're better at getting into their roles with construction activities, they will wait more patiently to for their turns and they will listen more carefully to instructions." (Staff 1)
Improved social competence skills when interacting with LEGO in the classroom	[Discussing the construction area within the classroom] "I think it's affected teambuilding, whereas at the start, say January, I'd come down and there would be a lot of miscommunication. We could only have say three people on the LEGO table, whereas now we can develop that group and they don't need so much support on the table, so it's definitely helps with their listening and communication." (Staff 1) "I mean, it's everything really, it's taking turns, sharing, it's listening, communication. So, although it's just LEGO, it's obviously a lot more than that. Especially with autism, I mean the importance of communication, and with the age that they are, sharing is massive! So it's been good, and it's definitely been reflected in the classroom as well." (Staff 1) "Socially, I think there has been an improvement in sharing… (Pupil 2's name) used to go into his tray and (Pupil 4's name) used to say "No, no" I mean, definitely not, but now there are other times where he can share, like at play time." (Staff 1)

Improved LEGO construction skills within sessions	"It's good to see their motor skills, they're handling the small pieces, but I think it's good because it embeds the social skills into their class work as well. That's definitely a positive". (Staff 1) **"**Yes, definite improvement in the sessions, but it didn't improve things outside the LEGO group, no." (Staff 4) [Discussing improvements in collaborative building] "In the LEGO Club sessions, yes, but in the class, no, no, they choose what they want to do and then they construct on their own." (Staff 4)
Limited transferability of social competence to non-LEGO activities	"When we were doing listening activities, like the other day, we were doing a listening group, where one had to take on the character of a fireman, and then you had to change to the policeman. So where they had practiced different LEGO roles, they could then apply the same sort of skills, the instructions, you know? It's good for them to take instructions from an adult and to actually apply it, through play, and it can be then portrayed in the classroom, in a different activity." (Staff 1) **"**No it didn't generalize. However, as the weeks went on it was really interesting to see how they improved [referring to social competence within sessions]." (Staff 3) "It's like a lot of the things that we do, even if it's just like a 'Socially Speaking' game, or "Time to Talk", you're spending so long getting them to do as they're supposed to, taking turns and all the rest of it. It takes a long time to establish those skills within that setting before you can get to the point where you can start to transfer that then on to other games." (Staff 2) "It's the same with anything we do in this classroom, it's always the generalising of the skill that they find very, very difficult. That takes a long time." (Staff 2)

Table 1: Example quotations to support sub-themes within the main theme of Context-Specific Improvement.

Main Theme: Pupil Characteristics	
Sub-themes	**Example Quotations**
Targeting areas of individual difficulty	[In reference to difficulties experienced by pupils with ASD] "I noticed that when they do swap roles, it does take them a little bit longer to get used to the change, to switch and swap? But to be honest, that has been good in class." (Staff 1) [Referring to some of Pupil 12's individual difficulties] "I mean, right now (Pupil 12's name) is having behavioural problems at home. He has had every gadget taken off him because of his behaviour. But also, I think the transition that (Pupil 12's name) is facing at home is impacting massively on his behaviour and his mood" (Staff 6) "…our pupils, they're all stubborn. It's hard for them to hear the words "Right, swap over!" You know, because they might be enjoying what they're doing, say (Pupil 3's name) is enjoying sorting the bricks and someone else is starting the build, it's really hard for them to think "OK. I've had my five minutes, I've got to swap now." (Staff 1)
Symptom severity	**"**Yeah. I'd also like to say as well that it depends on the severeness of where they are on the spectrum. (Pupil 12's name) is more advanced on the spectrum than the others." (Staff 6) "Different needs it is. It's not about that, it's not just about the spectrum, I mean I know what you're saying, but it's the differences in needs." (Staff 5)
Pre-intervention social competence skills	"I think generally, sometimes they're more motivated than other times. That's what I find sometimes and, you know, it depends, because they do, they change. They change from one day to another anyway. What they might be focused on one day and really good at, if you did it another day, they might not be as good. So you know you could do exactly the same thing on another day and they might not be so good, or they'd be better!" (Staff 3) "There has definitely been improvements from when our new pupils joined us in September, probably because of a whole host of different approaches that were using." (Staff 2) [Referring to listening, eye contact and turn-taking skills being targeted within school as a part of a continual provision] "We try to encourage and include those skills in

	nearly everything that we do. So it's difficult then to divorce these things." (Staff 2)
Pupil rigidity	[Discussing difficulties experienced within the LEGO sessions] "Well, really we could speak to you about (Pupil 12's name), he was the main issue really.... I mean, with (Pupil 12's name) he caused a lot of the problems because of his attitude and behaviour." (Staff 6) [Discussing Pupil 12's rigidity and communication style within sessions] "All ASD pupils are individual, although they all have the traits, whereas, (Pupil 12's name) is very obsessed with his gaming, everything like that. (Pupil 1's name) wasn't, you know, umm, and the thing was, the three share a taxi together, and he's not stop about this game, game, game, game, game, and then [within the LEGO sessions] he was non-stop; "It's my turn, come on," all the time in their face. He's got that obsessiveness." (Staff 5) "When (Pupil 12's name) did try and lead on the blind build game, an argument broke out and he wasn't giving adequate instructions, but then he was getting frustrated with the others and saying "you're doing it wrong." I was then trying to say to (Pupil 12's name) "they're not getting it because you're not explaining it well enough" but he couldn't accept that. To him, he was doing it right and they were doing it wrong." (Staff 6)

Table 2: Example quotations to support sub-themes within the main theme of Context-Specific Improvement.

Main Theme: Group Dynamics	
Sub-themes	**Example Quotations**
Roles and Responsibilities	[Discussing the certificates awarded for the successful completion of the LEGO Club Roles] "Another strength I'd like to mention as well is the certificates, I think it was really good that at the end of it they got something to show what they have done. It gives them a chance when they go home, with their parents, to have that visual, so they can say "Oh, this is what I did today in school, this is what I learnt about!" And then they can say "(Pupil 3's name) had this role and I had this role." (Staff 1) "So if you've got someone who is quite evidently distracted or wound up about something, and then they come into the LEGO group, the atmosphere is calm and he's got to be focused. He has got to do a role, it's giving him that importance, that authority and responsibility, because it's like dominoes, if one goes down, they can't build that final project." (Staff 1) "Yes, yes. He wants to be the boss. He wants to be in command, telling you what to do. He will want to tell you what pieces he's allowed to have" (Staff 6)
Peer-mediation	"I think one thing, once they have reached a certain level, I think it would be good to let the children give each other instructions. So then, that's improving the levels of peer to peer interaction a bit further. I think that would be really good." (Staff 1) "Pupil 1's name) was initially reluctant until he saw the slightly older pupils getting into the group so then he wanted to do it too. I mean, you have that positive peer influence. I feel that you have got to start this at primary school and continue it into through." (Staff 6) [Discussing a peer-mediated incident where pupils had difficulty with sharing during one of the pivotal skills sessions] "It got to the point where actually (Pupil 1's name) tipped all his blocks out and spread them out for others. It was only (Pupil 12's name) that wouldn't let go." (Staff 5) "(Pupil 1's name) was initially reluctant until he saw the slightly older pupils getting into the group so then he wanted to do it too. I mean, you have that positive peer influence. I feel that you have got to start this at primary school and continue it into through. Maybe then, by the end of Year 8, they wouldn't need it anymore?" (Staff 6)
Individual prerogatives	[Discussing an individual pupil] **"**With regards to the sharing and taking turns, he has no interest in changing that perception. It's

	his way or no way." (Staff 5) "Yes, yes. He wants to be the boss. He wants to be in command, telling you what to do. He will want to tell you what pieces he's allowed to have." (Staff 6) "(Pupil 12's name) wanted to win, he wanted to build things the fastest, whereas other members of the group wanted to build things correctly. It didn't matter who beat her time-wise, everything for (Pupil 13's name) had to be spot-on, perfect. Whereas, (Pupil 1's name) didn't want to do the planning, you know, the drawing and the colouring, the just wanted to get bricks and put them all together." (Staff 6)
Inter-personal peer relationships	[Discussing Pupil 12's ability to share and take-turns] "The only time he did was the final session, where he had to listen to (Pupil 13's name), and I think that was purely because he has a bit of respect for (Pupil 13's name). He has never had any issues with (Pupil 13's name). I know he has sat with her and listened to her in the past. I think that the relationship that the pupils have plays a major part. If it was anybody else, I don't think he would have listened. He would have wanted to be the instructor. You listen to my rules." (Staff 5) "I would say that the relationships within the group had an effect on how successful it could be." (Staff 6) [Discussing whether or not personal relationships within groups influenced outcomes] "Yeah, like, in group situations in class, (Pupil 12's name) always wants to be the leader, he wants to be the boss, and it just can't always work like that sorry, he needs to learn. Whereas someone like (Pupil 1's name), although he likes to be the boss and can get irate, he is quite happy for someone else to take the charge too." (Staff 5) "Yeah, because our results would probably have been different if the groups were different, or setup differently even with the pupils we have now. The importance of group dynamics is really important I think." (Staff 4) "Yeah, I mean you know your pupils, but I also think, that where they are all so different, you need to think about which pupils will gel together. You know who won't rub each other's backs up." (Staff 5)

Table 3: Example quotations to support sub-themes within the main theme of Group Dynamics

Main Theme: Pupil Engagement	
Sub-themes	**Example Quotations**
Appeal of the LEGO resource	"It does sort of calm them down, because they've got small pieces, they've got to be really focused, so it sort of distracts them, say from something that is bothering them at home or in the classroom. You could say it's sort of an escapism for them then, through play." (Staff 1) "It's quite popular at the moment too isn't it, you've got the games, and the films and stuff. I mean, a lot of them were very interested in LEGO before they did the therapy sessions." (Staff 6) "I think it's because, I mean, all our pupils are quite active, they like fidget toys, they like to be doing things, practical things. They're better with the hands on lessons. So I think it just keeps them engaged, and because they're doing something, they just find it more entertaining. They see it more as a game rather than a lesson." (Staff 6)
Pupil motivation	**"**I mean, there are things that they doing the working week that they find more motivating than others. They were very enthusiastic, really motivated about LEGO." (Staff 2) "It was a great motivator! I found that my group improved as the weeks went on." (Staff 3) **[**Addressing staff members 2 and 3] "They were extremely motivated, weren't they, in the group?" (Staff 4)
Pupil enjoyment	"I'm not saying we could just use it as a reward, but they look forward to coming to LEGO, it's something they enjoy." (Staff 1) More often than not, they would ask to stay on a little bit during break time because they were enjoying what was happening." (Staff 3) **"**I mean, I think we were at an advantage here because the pupils were already interested in LEGO." (Staff 2)
Increased interaction with LEGO in classroom	"…we have a timetabled session on Friday afternoons, we call it "Techno Time," which is like our version of reward or golden time. We split the children into different groups and they can go around the iPads, the computers, or they can choose what construction toy that they want to play with for a twenty minute period. I think there has been a bit more of an interest. I definitely think that LEGO has

	been chosen a little more since the sessions." (Staff 2)

Table 4: Example quotations to support sub-themes within the main theme of Pupil Engagement.

Main Theme: Duration of Intervention	
Sub-themes	**Example Quotations**
Delivery of intervention	"I mean, I know that this is a short research project, I don't think six weeks is long enough anyway." (Staff 6) **"I**t's my feeling that the intervention would have to be sustained for much longer to see more of an improvement in what you're asking." (Staff 2) "You have to remember that this was six weeks, it was one lesson a week for 6 weeks, you know?" (Staff 3) "My personal thought is that, with time, I think that you might well see that collaborative building, of their own choice, but I don't think that you're going to see it within the short time that they have received the LEGO Therapy." (Staff 2)
Structure of sessions	"I think that's calming, it's bringing their mood down and it's very structured." (Staff 1) "The structure of the sessions was nice, umm, obviously, say she had 45 minutes, she knew what sort of thing she could complete, she had a plan, she knew who had to do what, so it was very organised as well." (Staff 1) [Discussing the structure of LEGO-Based Therapy and the delivery of pivotal skills sessions at the beginning of the intervention] "I mean for me, it wasn't so much a problem but you know the very early sessions, where they had to do those basic skills, before building, they had to follow instructions, etc. Because they had their separate pots, when they purposefully weren't given enough blocks and they had to ask somebody else for some blocks, oh, they were so reluctant weren't they!" (Staff 6) "I think one thing, once they have reached a certain level, I think it would be good to let the children give each other instructions. So then, that's improving the levels of peer to peer interaction a bit further. I think that would be really good. I think that's about it to be honest, because it's a relatively short session there's only so much you can do in that amount of time. The lady who came did cover all the skills that needed to be covered I think. " (Staff 1)
Generalisation of social competence skills between	"Yes. I think that if it was sustained for a little bit longer then it's probably would have a greater impact on them

contexts	and they would be able to generalise what they've had from the sessions a lot more." (Staff 2) [Discussing the difficulty in generalisation after intervention] "It's like a lot of the things that we do, even if it's just like a 'Socially Speaking' game, or "Time to Talk", you're spending so long getting them to do as they're supposed to, taking turns and all the rest of it". (Staff 2)
Intended continuation of intervention	"I can think of two pupils that this would be absolutely perfect for. Yeah we would try to take it on here. It's a difficult one to implement with all the things that's going on at home with the pupils, you know? But I think now were getting this three-in-one, because we've got lots of LEGO in school. What we saw with (LEGO Therapist's name), it did work. We are going to continue it in here, I do like the LEGO Therapy. OK, that's what we're going to do, and if you would like to come in at any time, please do." (Staff 5) "I really liked it. It was very nice, I think it might be easier if we were able to carry it out rather than have someone come in. As lovely as that was, we could also do it ourselves." (Staff 3)

Table 5: Example quotations to support sub-themes within the main theme of Duration of Intervention.

Appendix S: Thematic Maps: Parental Interviews

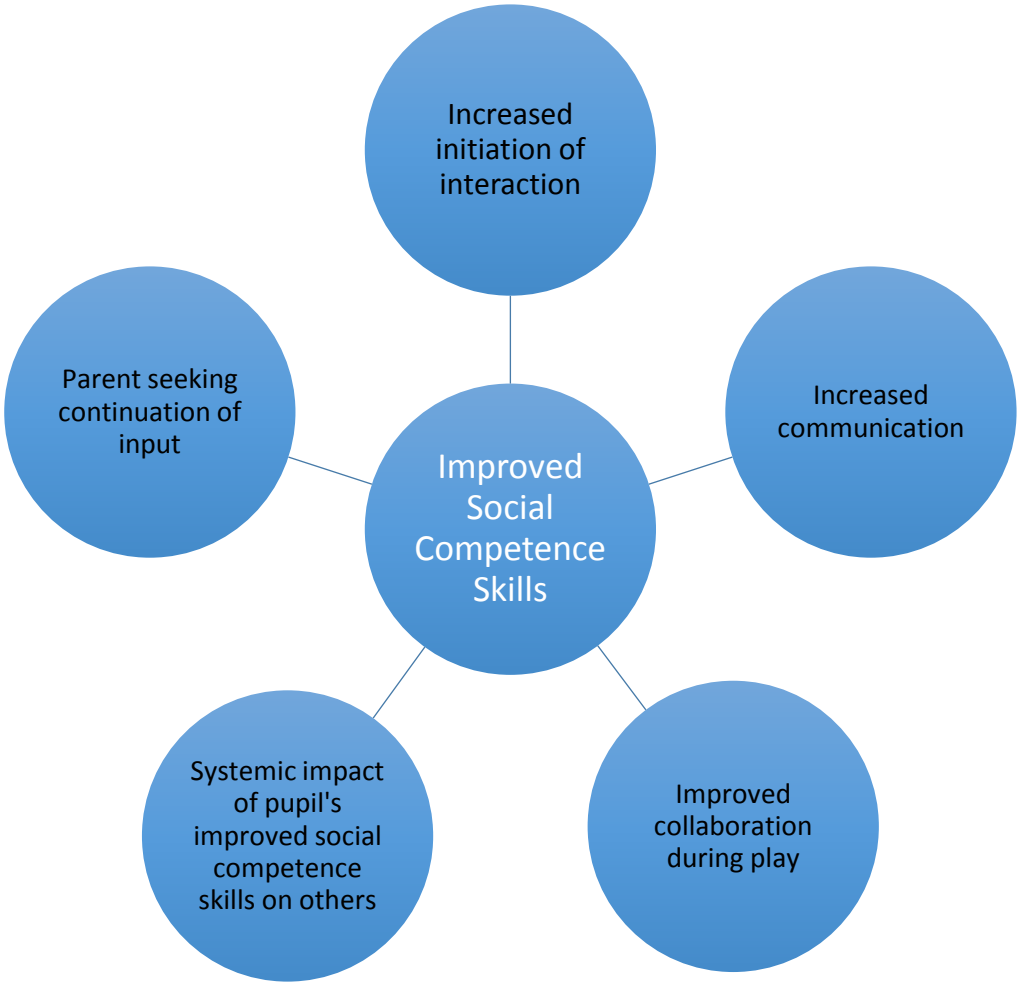


Figure 6: Thematic map detailing the sub-themes within the theme of Improved Social Competence Skills.

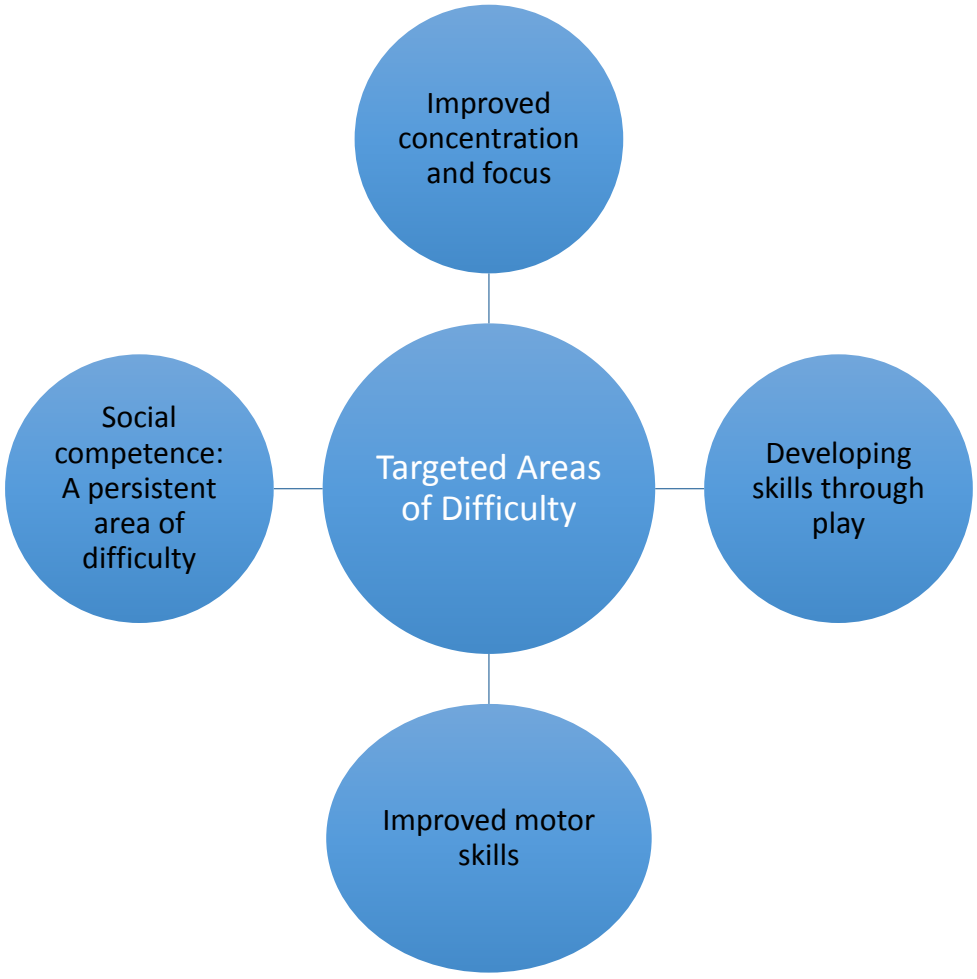


Figure 7: Thematic map detailing the sub-themes within the theme Targeted Areas of Difficulty.

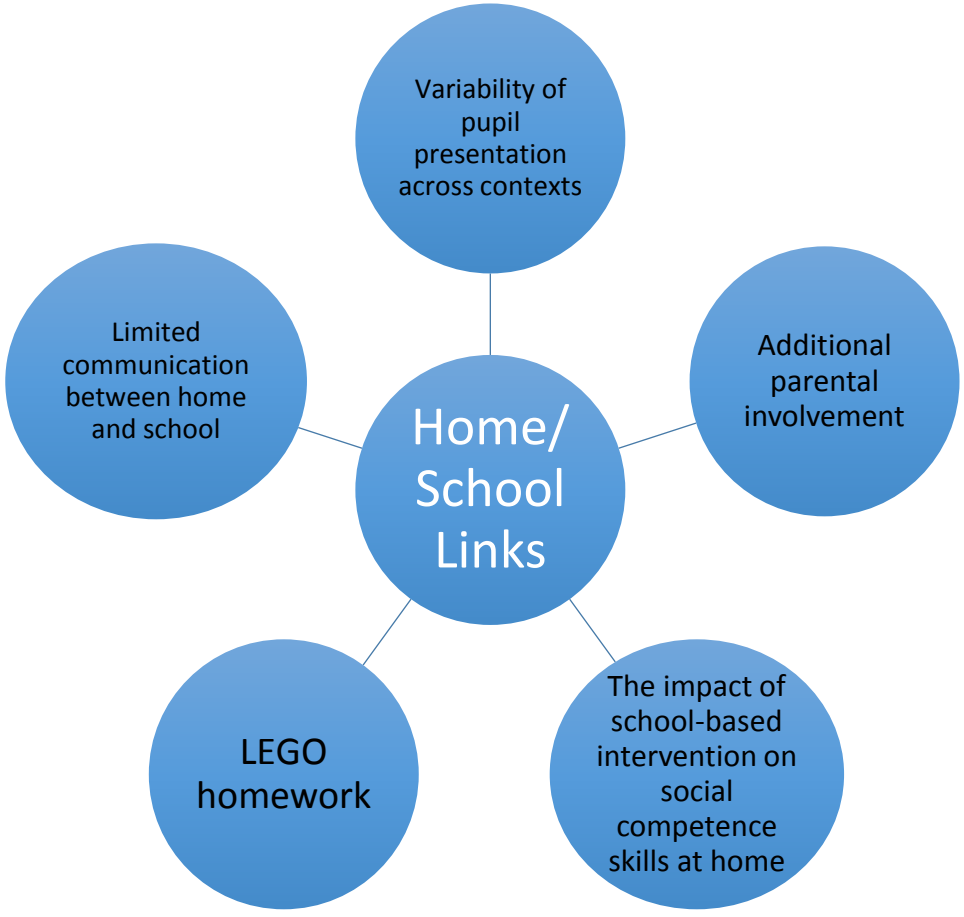


Figure 8: Thematic map detailing the sub-themes within the theme of Home/School Links

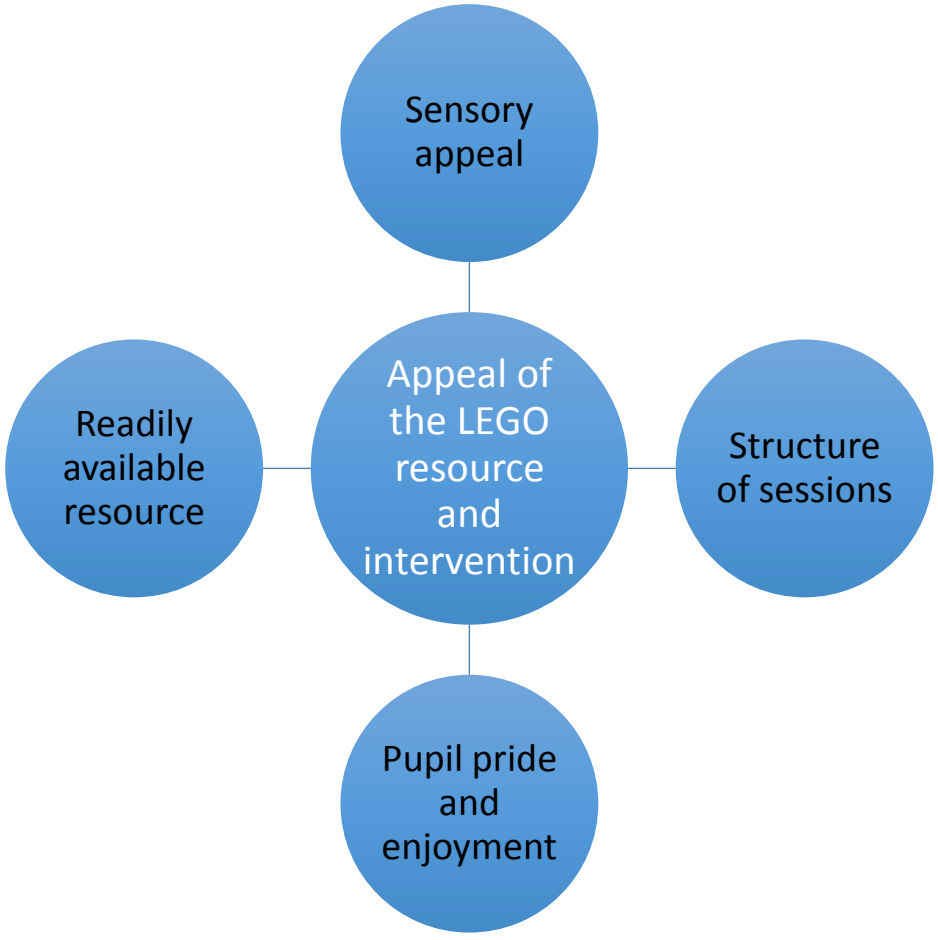
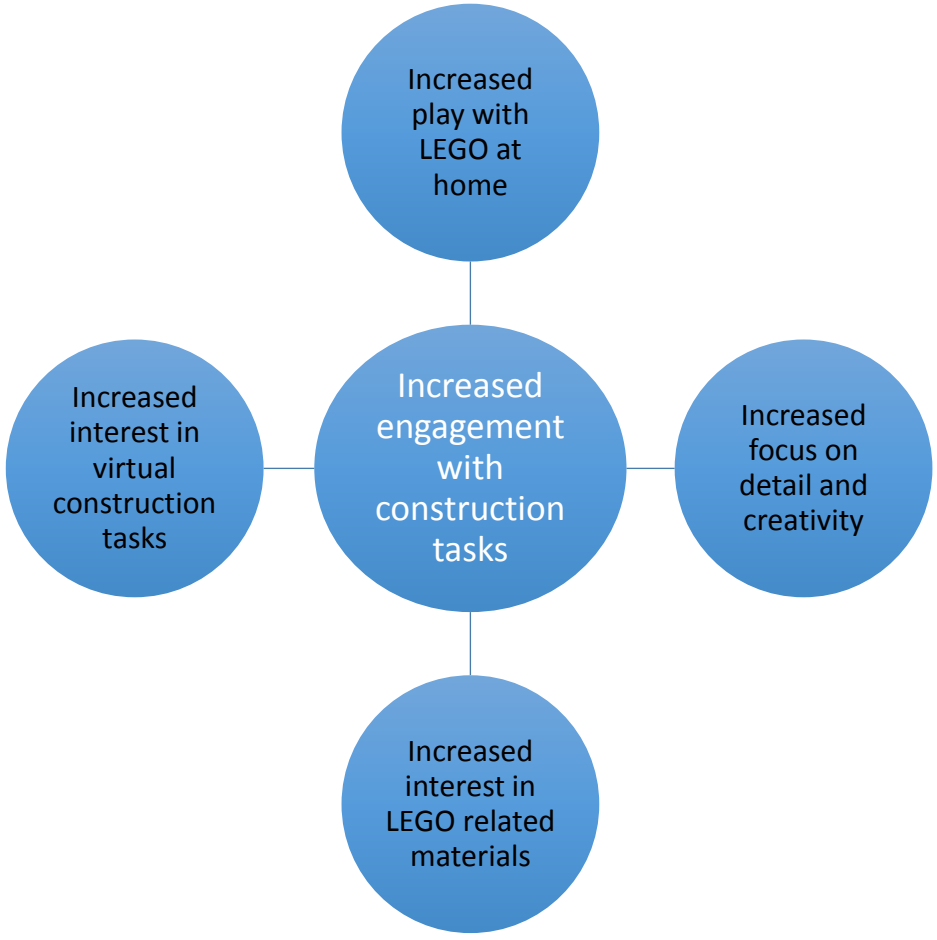


Figure 9: Thematic map detailing the sub-themes within the theme of Appeal of the LEGO Resource and Intervention



<u>Figure 10:</u> Thematic map detailing the sub-themes within the theme of Increased Engagement with Construction Tasks

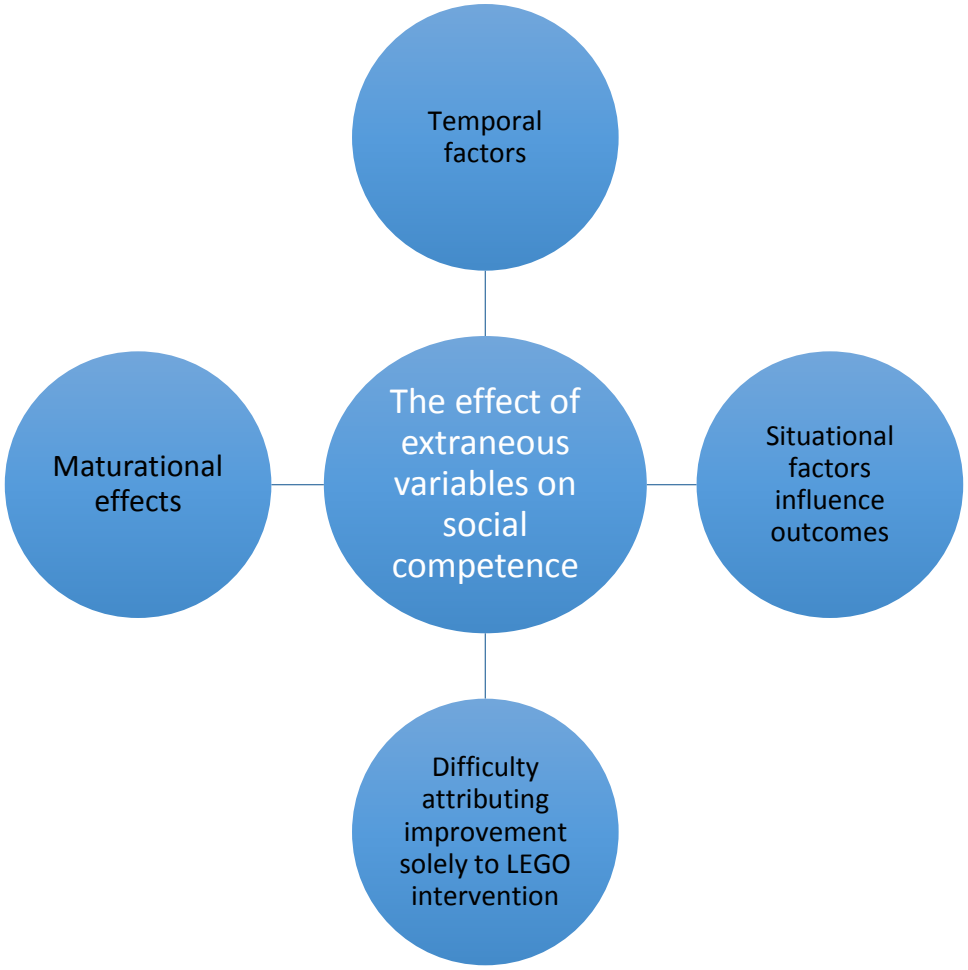


Figure 11: Thematic map detailing the sub-themes within the theme of The Effect of Extraneous Variables on Social Competence

Appendix T: Examples of supporting quotations for sub-themes identified within the Parental Interviews

Main Theme: Improved Social Competence Skills	
Sub-themes	**Example Quotations**
Parent seeking continuation of support	**Interviewer:** "So, would you consider using LEGO therapy in the future? Or allowing him to access LEGO therapy in the future?" **Parent 1: "**Yeah, yeah!" **Interviewer: "**Great. Are there any reasons behind that decision?" **Parent 1: "**Well, like I said, his interest is a good sign. I have seen a little bit of an improvement I think. If it does him any good, it's worth a try isn't it, you know?" **Parent 2:** [Referring to the LEGO intervention] "I mean it's obviously a bit too late now for this but I mean if it was to start again in September, something like that, would be great." **Interviewer:** "Those are all of my questions, would you like to add anything else, to make any comments or reflections?" **Parent 2: "**No, just that if the opportunity for him to participate comes again, definitely yes." **Parent 3: "**I definitely think that it's a shame that it's finished. I really think that we should set up a club or something." **Parent 3: "**It's made a difference for my son anyway. I think so. If it ever came up again, please put him forward!" **Parent 3:** "I mean, if there was some group or whatever, if I got to know about it then, I would definitely bring him along." **Interviewer:** "OK, great. So would you consider including (Pupil 6's name) in LEGO therapy groups in the future at all?" **Parent 6: "**Yes, definitely. Yes."

	Parent 5: "Yes, if it was made available to him, yes I think I probably would. I mean, yes I would."
Systemic impact of pupil's improved social competence skills on others	**Parent 2:** "I would say that this is the intervention that I, as a parent, have been most aware of, and I've noticed some changes, some improvements then, at home. Definitely." **Parent 3:** [Referring to LEGO Club] "Oh, I mean, I'm really, I can't thank you enough! Whoever decided to do that, it's really made a difference with (Pupil 3's name), definitely! I am so pleased." **Parent 2:** [Referring to her child's relationship with others] "Umm, I mean, he's gone through a phase where, umm, we usually spend quite a bit of time with one of my friends and her children and he hasn't really wanted to be spending time with them. Now whether that's just because these kids are six, seven and below, and (Pupil 2's name) is obviously nine. I'd certainly say that in the last six months he has grown up an awful lot, he's taken on a sense of responsibility." **Parent 3:** "Whereas before, we bought him the stuff [referring to LEGO pieces], we tried to do things with him, and with him doing it at school and then doing it at home as well, and him wanting to do it. It makes me realise that it has really helped me, with things we've bought him as well."
Improved collaboration during play	**Parent 3:** [Referring to LEGO] "I mean, he's come up to me and he'll bring it, or we've got friends and they've got LEGO at home and he will build something with the younger brother and the older one" **Parent 3:** [Referring to her child playing with LEGO with his peers] "I mean, like the other night, he was over his friends and he built a caravan type thing, stuff like that." **Interviewer: "**So, he has been using the LEGO with his friends as well?" **Parent 3: "**Yeah, yeah!" **Interviewer: "**And did that happen before the LEGO club? **Parent 3:** "No, no, never." **Interviewer:** "So you mentioned that he has been interested in

	LEGO, have you seen any interactional play, any social interactions with other children, family or peers? Has that improved at all over the last few weeks?**"** **Parent 4: "**He does do good imaginary play, and I would say that is getting better and better. He's got a very good imagination, and he seems to want to do a lot more with his sister. His sister is younger, so they'll pretend that pillows are a house, they'll hide under a sheet, so it's that sort of imaginary play, that's got better definitely, that imaginary play with her."
Increased communication	**Parent 1: "**Yeah... I mean, it was his birthday and we went out, me and him, and he was quite good, you know, we had food and we had a nice little conversation, which I mean, he wouldn't do before, you know what I mean? So maybe he has learnt something from it that way." **Parent 3:** "I definitely think that this LEGO group has really taken off with him, he really enjoys it and he wants to talk about it." **Interviewer: "**So, just to clarify, have you felt that there has been any difference in (Pupil 3's name) social communication or social interaction as a direct result of the LEGO therapy?" **Parent 3: "**Yes, definitely! He will come up to me now and he will talk to me about, I mean, in-depth, about what he has made." **Parent 5: "**Umm, his communication is better, you know, speaking with others." **Parent 7: "**He is obsessed with LEGO anyway, it was something that he was really, really, really in to it. So I found it did improve with him because he was coming home and telling me about it. Where, normally, he comes home and you can ask him 'How's your day been?' and he will say 'Crap! Didn't do nothing!' You know? So he did really, really enjoy himself. He loved doing it."
Increased initiation of interaction	**Parent 3: "**I think (Pupil 3's name) definitely feels more confident." **Interviewer: "**Can you think of any examples? **"** **Parent 3: "**Umm, like I said, when we go over our friends and they are all playing together, and that has happened quite a few

	times now. My son will say to them "they're doing this in my school!" They're all talking about it!" [Referring to LEGO Club]. **Parent 4: "**Ummm, I suppose I would say that recently he has been more forthcoming in asking questions. In recent weeks or months, he seems to notice more and he seems to be asking more. I mean, before, if one of his siblings didn't come home, he wouldn't notice, whereas now, I noticed the other day he said "Where's (sibling's name)?" Usually he is in his own little world as to what he's doing and I think he just seems to ask a few more questions recently." **Parent 7: "**It was something he was interested in and he was coming home and he was just itching to tell me about his day, and what he'd been doing. So I think yes, it really did improve on it for him." **Parent 7:** "Well, we did go to Folly Farm yesterday, and he was really good, he was really enthusiastic to go. Most of the time if I mention that to him he refuses to go, he doesn't want to go at all. And yesterday he was happy to go and he was playing with all new children as well, which is huge for him!"

Table 6: Example quotations to support sub-themes within the main theme of Improved Social Competence Skills.

Main Theme: Targeted Areas of Difficulty	
Sub-themes	**Example Quotations**
Improved concentration and focus	**Parent 3**: "I think this has helped him to concentrate more**.** The concentration just wasn't there, he's wasn't focused. But, this, it's made a hell of a difference, well that's what I think." **Parent 6:** [Referring to her child's ability to turn his focus to a directed task] "That's something that he has got much better at in this time. He will stop something that he enjoys doing to have another go, that seems to have improved." **Parent 2:** "It's helping his concentration and understanding of cause and consequence. So for me, those are the things that I'm working with him at home constantly; his concentration, to keep on task, cause and consequence; good choices and bad choices. So LEGO Therapy massively plays into that doesn't it."
Social competence: A persistent area of difficulty	**Parent 1: "**Umm, well he seems to communicate a little bit more. He's not listening very good, but that's one of his traits, he doesn't listen very good" **Parent 2:** "Oh well, I know they target these skills in school don't they. But I mean, I'm not sure of the names of the different things, but I know it's always a struggle, they're always working hard to improve their social skills." **Parent 3:** "Yeah, yes, I mean, he generally tends to find social situations quite difficult and he is better at home, that's what I find." **Parent 6:** "He is generally quite quiet, he keeps himself to himself and you won't always know what's upset him at the time. Sometimes you come home and he has a big meltdown then, once he is removed from the situation, so it's hard to always put your finger on what has bothered him as he doesn't always tell you exactly what it was, or who it was then. So, I mean, yeah there's some situations I know he will probably find hard and then actually he's ok, and other times I was right and he's not OK with it. He is usually at his best when he is

	at home, with his familiar things, with his own toys and his own surroundings. “
Improved motor skills	**Interviewer: “**Do you think that there are any particular strengths in the LEGO based therapy approach?” **Parent 2: “…**(Pupils 2’s name) struggles massively with his motor skills so having that time where he is focusing on his dexterity and his fine motor skills, anything that’s going to improve that is great.” **Interviewer:** “Are there any factors which contribute to the success that you feel you’ve had?” **Parent 3: “**Oh, I think so! You can get so many different types, different sizes, so you can get that really complex detail using it. It’s colourful, yeah, it makes them use their fingers more, to manipulate things more, yeah.”
Developing skills through play	**Parent 3: “**Yes I think LEGO does help between different contexts, and as well as that, I mean, I don’t know about you, but I feel that there is too much technology these days, and not what I would regard as basic games, like we used to have years ago. It’s a shame that sort of thing isn’t there. So doing something like LEGO, like this with parents, is a brilliant idea.**”** **Parent 6: “**I know he loves LEGO though, so it would make sense that he was interested in it, as long as he was getting a chance to play with LEGO.” **Parent 2:** “I would have very happily gone into a session to have a little look what they were doing, so we can then replicate some of the tools in the house. Replicate not just with the LEGO but with other play sessions, you know. “ **Parent 6:** “I think it is a good toy to introduce to get them to interact and share with others because they’re never too old for that type of toy.” **Parent 1: “**My little boy, he would love that, he loves LEGO, and I know it’s not just about the LEGO, building things, it’s about getting

	them to do stuff and that [referring to social competence skills], but yeah, I think it's quite good because you're doing something to play to them, isn't it?**"** **Parent 3:** [Referring to the strengths of LEGO-Based Therapy] **"**It's basic play, that's what I call it. That's the value of it. You can't ever beat it."

Table 7: Example quotations to support sub-themes within the main theme of Targeted Areas of Difficulty

Main Theme: Home/School Links	
Sub-themes	**Example Quotations**
Variability of pupil presentation across contexts	**Parent 3:** "I mean, he generally tends to find social situations quite difficult and he is better at home, that's what I find. From the conversations I've had with school staff in the past, I think he responds well in school, because it's so structured, you know?" **Parent 1:** "We're going away tomorrow now for a week so it's going to be a bit of an eye-opener, to see how it works then, do you know what I mean? When you're away and you're not in your own surroundings... sometimes they don't, you know, how can I say? It's quite disruptive for them then, they don't settle very well." **Parent 1: "**There's definitely situations that you know is going to bother him more than others, like, you know, large groups of people, noisy places, strangers, that type of thing. He is better with his family." **Parent 2:** "I mean there's always certain situations which I know he is going to find hard. And then other things then he can cope with a bit better, sometimes it's hard to know though." **Parent 6:** "There's some situations I know he will probably find hard and then actually he's ok, and other times I was right and he's not OK with it. He is usually at his best when he is at home, with his familiar things, with his own toys and his own surroundings."
Additional parental involvement	**Parent 2: "**Yeah, I mean I would have very happily gone into a session to have a little look what they were doing, so we can then replicate some of the tools in the house. Replicate not just with the LEGO but with other play sessions, you know."

	Parent 3: "I definitely think that it's a shame that it's finished. I really think that we should set up a club or something. It's a shame really, I wish we could, maybe all the parents could be involved as well?" **Parent 3:** "I mean with this LEGO now, that's what I'm saying, see if you can find a link between home and school when you do it again maybe, the parents could be involved somehow maybe, with the child." **Parent 6: "**No, but I mean, it would have been nice to have seen a bit of it? Maybe we could have gone in to, or I mean, maybe we could have got a bit more involved in homework? That would have been really nice. But, hopefully that is something that we may see in the future?"
The impact of school-based intervention on social competence skills at home	**Parent 2:** "I know they target these skills in school don't they. But I mean, I'm not sure of the names of the different things, but I know it's always a struggle, they're always working hard to improve their social skills. I would say that this is the intervention that I, as a parent, have been most aware of, and I've noticed some changes, some improvements then, at home. Definitely." **Parent 3:** [Referring to the impact of intervention at home] "Yes I think LEGO does help between different contexts, and as well as that, I mean, I don't know about you, but I feel that there is too much technology these days, and not what I would regard as basic games, like we used to have years ago. It's a shame that sort of thing isn't there. So doing something like LEGO, like this with parents, is a brilliant idea.**"** **Interviewer:** [Discussing the impact of intervention at home] "Have you noticed any difference in his communication and social interaction skills with others? With yourselves or with friends?" **Parent 5: "**I've just noticed an overall change with him. I

	mean, he has come on so well within this year anyway, but I have noticed an improvement." **Interviewer: "**Brilliant, what sort of improvements have you seen?" **Parent 5: "**Umm, his communication is better, you know, speaking with others. His behaviour is more calm and he is just generally more chilled out."
LEGO homework	**Parent 2**: "So maybe if there was a way that parents could be part of it, or maybe you could give them some homework to do with us, that might not be a bad idea?" **Parent 3:** "Maybe if they came home with homework that could transition into the school, maybe if they came home with a project or something to do, we could do a bit of the club experience? We could do a bit at home as well, you know?" **Parent 4: "**Umm, I think there could be more homework really, more parental involvement. I don't know if it could be like a visual diary of what he has done at home? Maybe he could take a photo in as a discussion point? Because we have the LEGO at home? I'm not sure if that would be helpful?" **Parent 6: "**I mean it would be good if we could have some kind of work booklet, some homework? So we could see exactly what they had been doing? Something like that maybe."
Limited communication between home and school	**Parent 2**: "The one thing, if he were able to participate again I think, I would like to have more feedback, because we didn't get any feedback, really, from school. So I don't think, I mean, I obviously read the contract that you sent home to us, but I don't really know how he coped with it and how school got out of it because we haven't really had a meeting or heard much from them about it to be honest."

	Interviewer: "Has (Pupil 4's name) ever been involved in any other social interventions?" **Parent 4:** "Well I don't know to be honest, I think in school maybe, but nothing like this, no. I couldn't really say much about that." **Parent 5:** "Yeah, I mean they do work on this type of thing in school, talking, taking turns, don't they? I mean, I hadn't heard of LEGO therapy until this, and I obviously got all that information from you when we agreed to take part in your project. I haven't had that much info in the past about any other of these type of things, you know? From school I mean." **Interviewer:** "So, are you aware of whether there has been any effect on his social communication and interaction in school?" **Parent 6: "**Nothing has been sent back to me from school." **Interviewer**: "OK, so that's quite difficult for you to answer.**"** **Parent 6: "**Yeah, sorry. That could be improved really. I would like to hear a bit more from school." **Parent 7**: "I'm sure they work on all things like this in school but we just don't get to know about it necessarily. It's hard to say then exactly what he's had and what he hasn't had."

Table 8: Example quotations to support sub-themes within the main theme of Home/School Links

Main Theme: Appeal of the LEGO resource and intervention	
Sub-themes	**Example Quotations**
Sensory appeal	**Parent 4: "**Ummm... It's very methodical. The models themselves appeal to young boys and ASD is more prevalent in boys than in girls. I mean whether it's a digger or a plane or a train, those types of things, they have a wide appeal." **Parent 5: "**Umm, yeah I think it's probably the colours as well. The visual side of it. Well I think so, yes." **Parent 3:** "You can get so many different types, different sizes, so you can get that really complex detail using it. It's colourful, yeah, it makes them use their fingers more, to manipulate things more, yeah." **Parent 2:** [Referring to LEGO at home] "It's there for him to go to but all he wants to do with it is to put his hand in it and to rustle it around. You know what I mean? He likes the texture, he's tactile with it. It's the sensory side of things rather than the building side of things."
Structure of sessions	**Parent 2:** [Discussing the value of rules within the intervention] "I mean the one thing I can definitely say is that he obviously participated in the group contract, it was three strikes and you're out or something? Is that what the policy was?" **Parent 2:** [Discussing the structure and rules operating within the LEGO intervention] "It wasn't a discussion he had with me, he was talking to my Mum about it, and he said "Granny I've been in a bit of trouble with LEGO again I don't think I'm going to have another chance." So, he was obviously aware in some way, he knew that there was three strikes and out, and I think he had one, if not the second strike, and he had said to Granny, "Yes I think I might be in trouble with it."

	Interviewer: "Fantastic! So the clear structure within the group was beneficial for him?" **Parent 2: "**Yeah. He needs super, super, super strict boundaries because his concentration is so poor. For him, just having that contract, I mean, did they physically sign a contract?" **Interviewer:** "They did have a set of rules that they were expected to abide by; they didn't have to sign a contract, but I mean the rules were up on a poster and they were reminded of the rules at the beginning of every session." **Parent 2:** "Yeah I think definitely, I mean he definitely took that on board anyway." **Parent 6:** [Discussing school-based interventions] "I think they do bits and bobs with them in school but I don't think he has been involved in an intervention, you know, like a structured, specific intervention."
Pupil pride and enjoyment	**Parent 4: "**I think that LEGO as a toy already has an appeal. Because he already liked it, it seemed like a natural way of getting him to access a group, you know? Because he liked the LEGO before, so, it ticks the right boxes. It's a good tool isn't it." **Parent 4:** Yes, definitely. It goes hand in hand with the interest he has already. Whether that would be the same for anyone else, I don't know, but for (Pupil 4's name), he really enjoys LEGO, so for him, it's been very well-suited. **Parent 6:** "He absolutely loves LEGO so I know that the LEGO club really would have been good to hold on to his interest and the fun element of things." **Parent 7:** "Put it this way, (Pupil 7's name) is obsessed with LEGO, he really does enjoy it, so if anything was going to work with him, I mean, well LEGO would be it!" **Parent 3**: "It's really strange, definitely in the last few weeks. He went through a phase where he really wasn't that bothered with it [LEGO], now all of a sudden, he can't stop playing with it now! It's unbelievable!"

Readily available resource	**Parent 2:** "…we do have copious amounts of LEGO in the house" **Parent 2:** "I mean, he's got a drawer which is, I'm not joking, it must have, well, it would probably fill half a bin bag worth in the garage." **Parent 3:** "I mean, he's come up to me and he'll bring it [LEGO], or we've got friends and they've got LEGO at home and he will build something with the younger brother and the older one, and they'll come up with some really strange ideas!" **Parent 4:** "In the last few weeks he's been looking online, on YouTube, he's been searching for LEGO movies, and not just the LEGO film. He really enjoys watching animations, well, there's loads of different ones, they're short animations using LEGO." **Parent 4: "**Yes he has LEGO. He has got quite a bit." **Parent 6: "**Umm, well I mean, I would say that it is a very popular toy for children and it's something that they relate to, you know? It's all around them, it's everywhere they go. I mean, especially in the last few years." **Parent 7:** "It is really good, and I find it does help with him, I mean we have some LEGO in the house and it's easy enough for us to play with it and get a little conversation going, you know?"

Table 9: Example quotations to support sub-themes within the main theme of Appeal of the LEGO Resource and Intervention

Main Theme: Increased engagement with construction tasks	
Sub-themes	**Example Quotations**
Increased play with LEGO at home	**Parent 3:** "Like I say, he has had things [referring to LEGO] for Christmas and he hasn't played with them and it was worrying me, because I thought well, he wanted things but he hasn't been involved with it, and he's really got into those things now. So that's made a big difference to us." **Parent 7:** "I mean, LEGO is brilliant, because you can, well this is how me and (Pupil 7's name) do Maths as well you know, we have LEGO set out, if I ask him to do 3+4, or something like that, I get him then to add the LEGO to it, and then we count it out together. So, I mean, that's how we have got him to learn to add up and take away. We'll take pieces away then too, you see?" **Parent 3:** "He went through a phase where he really wasn't that bothered with it [LEGO], now all of a sudden, he can't stop playing with it now! It's unbelievable!"
Increased interest in virtual construction tasks	**Parent 5: "**I've noticed he has been using the iPad more, he has been enjoying completing building tasks, things like Minecraft. " **Parent 5**: "I think that the construction side of it definitely has improved too, he's definitely more interested. You know, he loves the Minecraft now."
Increased interest in LEGO related materials	**Parent 4:** "Well he hasn't been talking about the LEGO Club so much, but he is more interested in LEGO generally. In the last few weeks he's been looking online, on YouTube, he's been searching for LEGO movies, and not just the LEGO film. He really enjoys watching animations, well, there's loads of different ones, they're short animations using LEGO." **Parent 6**: "He loves LEGO, but I think he seems to like

	watching other people play with it. He loves watching people around him, and he loves 'LEGO Landing', you know?" [Referring to a LEGO game] **Parent 5**: "He must be interested in it because he has been telling me all about it. And, I mean, you don't get that with everything he does, you know?" **Parent 3:** "Yes, I mean, before, (Pupil 3's name) wasn't as interested in it [LEGO] as he is now. (Pupil 3's name) is now definitely more interested. I mean, he has really missed not having the club anymore to be honest!"
Increased focus on detail and creativity	**Parent 3**: "He's wanted to make things, create things, more than ever. He's better at focusing on things, he's more, umm, more with the detail? More interested in the detail you know? He's having more fun with it." **Parent 3:** "…definitely more focused on the detail of whatever he's doing. " **Parent 3:** [Referring to a LEGO construction made at home] "He was telling me the detail of it, which he has never done before." **Parent 5: "**I think it keeps them focused and they have got to use their imagination." **Parent 7**: "**(**Pupil 7's name) uses his own imagination, you know? He likes to build his things, he makes up his own stories then in his head. He likes to, ummm, what's the word I'm looking for? His imagination is excellent."

Table 10: Example quotations to support sub-themes within the main theme of Increased Engagement with Construction Tasks.

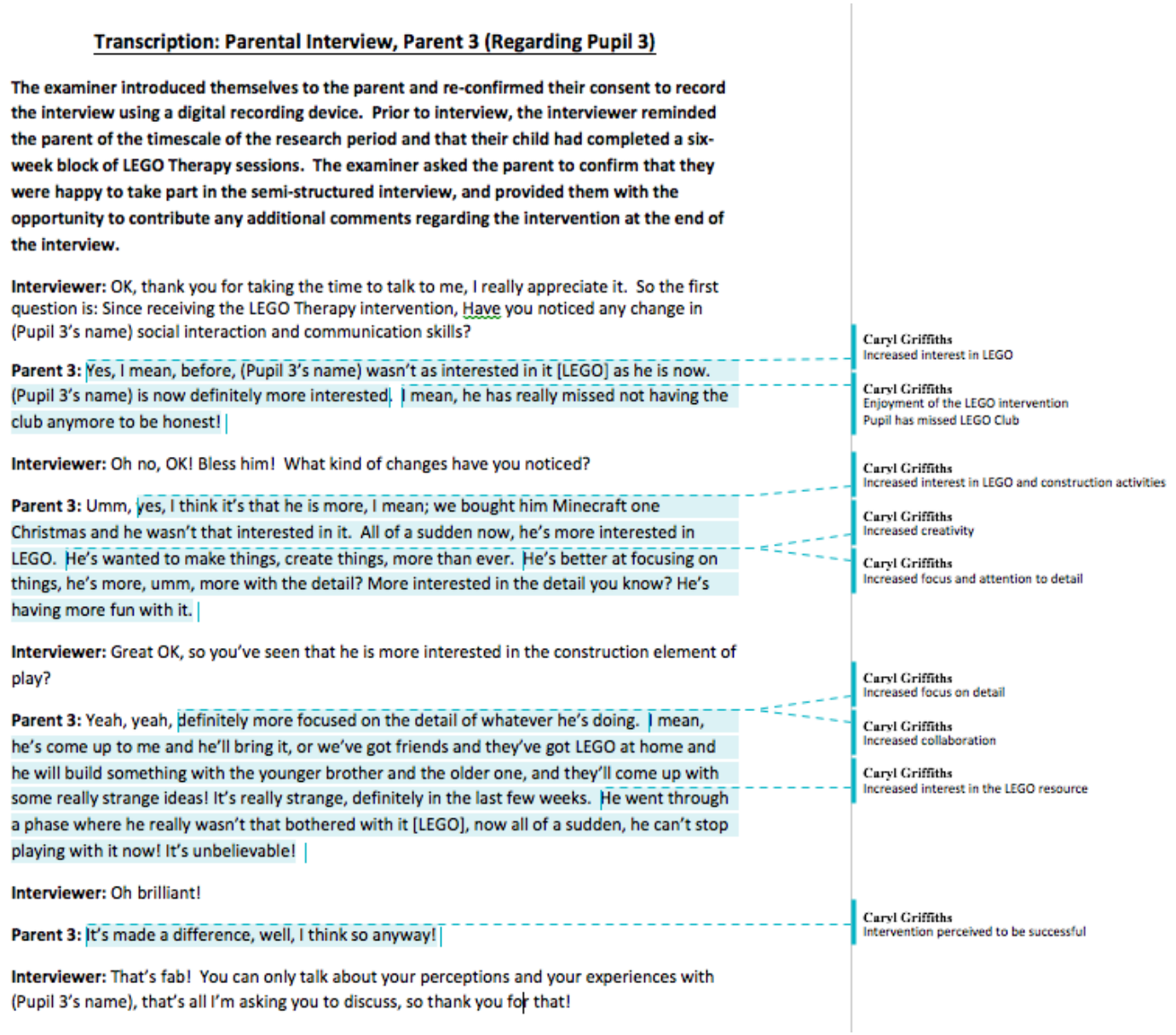
Main Theme: The effect of extraneous variables on social competence	
Sub-themes	**Example Quotations**
Maturational effects	**Parent 5:** "I mean it's hard to say exactly whether that is only down to the LEGO therapy, or whether it's down to something else, just growing up a bit or having more experiences in those kinds of situations." **Parent 2:** "I'd certainly say that in the last six months he has grown up an awful lot, he's taken on a sense of responsibility." **Parent 4:** "Usually he is in his own little world as to what he's doing and I think he just seems to ask a few more questions recently. Whether that's LEGO, or whether that's just general development from being in his class, I don't know?"
Temporal factors	**Parent 2: "**If it had happened at any other time of the year, I could have maybe given you a different answer. But, with so much going on for him personally at the time, I think it would be very difficult for me to say." **Interviewer:** "The first question is; Have you noticed any change in Pupil 1 communication skills since the LEGO therapy intervention?" **Parent 1: "**Ummm, a tiny little bit, but he's having a little bit of a wobble at the minute so it's hard to say. Do you know what I mean?" **Interviewer: "**So is he going through a bit of a difficult time?" **Parent 1: "**Yes, it's a very difficult time at the moment. I think it's because we're approaching the end of term, and all that, you know what I mean?"
Situational factors influence outcomes	**Interviewer:** "So it's difficult to determine what's caused that change?" **Parent 2: "**Yeah, because he spends four nights or five nights a week with me and two nights with his Dad. He often has one night a week with my parents as well, so some weeks he might only have been with me for four

	out of seven nights? So, we don't do clubs, we don't have any siblings with me, we don't have children in the neighbourhood, so most of his social interaction with children will come from school." **Parent 1:** [Discussing possible improvements to social competence in school] "In the last four, five weeks he's been really up and down, we've been trying to get an emergency appointment to see CAMHS and that, it's everything, he's just not himself at the minute, you know?" **Parent 2: "**I've definitely seen a change in him in the last few weeks, whether or not I can attribute it to the LEGO Therapy, umm, how he... umm from November last year until Easter, (Pupil 2's name) had been slowly, slowly, slowly deteriorating; his behaviour, his concentration, his participation. Not just at home but at school as well, to the point that at Easter, I got called into school for what they called a 'Child in Crisis' meeting and they were seeing quite extreme deterioration in his behaviour, over a period of time, and then suddenly a very swift deterioration in behaviour, which we could attribute it to family circumstances. Unfortunately, (Pupil 2's name)'s Dad, who adores his son, I cannot say that there is a man that loves his child more, but... his Dad suffers with mental health issues and at that time there had been issues with his Dad that were having a direct, knock-on effect with (Pupil 2's name), which accumulated in me temporarily stopping contact. Umm, so slowly, since Easter until now, were starting to see the old (Pupil 2's name) come back. School definitely support this, I mean, they definitely, you know, the time that he's had contact with his dad, and the concentration that he's able to show is very different than when he is coming back from my care. We definitely see correlation between Dad's contact and (Pupil 2's name)'s behaviour." **Parent 2: "**We have all noticed a massive improvement, yeah, but like I said, things with his Dad have improved massively."

Difficulty attributing improvement solely to the LEGO intervention	**Interviewer:** "So it's all, yeah, it's difficult to disentangle?" **Parent 2: "**Yeah it's really difficult to say. I'm sure that the LEGO Therapy has a part to play, and I'd like to think that it's had its part to play, I mean if it was offered to him again I would most definitely like him to try again. Certainly when, hopefully, the issues with his Dad had passed, the next time then it might be a clearer indication as to what and when it's happening." **Parent 5:** "It's hard to tell things apart like that. I would say that he has definitely improved at home, slowly, since September, starting this class and that. I would say that he's come along a bit faster in the last few weeks. School think he has improved since he started there, but whether the LEGO has improved things for him in school, I'm not sure you see. I mean, my hunch would be that it has, because he is better at home!" **Parent 4:** "Usually he is in his own little world as to what he's doing and I think he just seems to ask a few more questions recently. Whether that's LEGO, or whether that's just general development from being in his class, I don't know?"

Table 11: Example quotations to support sub-themes within the main theme of The Effect of Extraneous Variables on Social competence.

Appendix U: Example of a Coded Transcript (Parent 3)



Transcription: Parental Interview, Parent 3 (Regarding Pupil 3)

The examiner introduced themselves to the parent and re-confirmed their consent to record the interview using a digital recording device. Prior to interview, the interviewer reminded the parent of the timescale of the research period and that their child had completed a six-week block of LEGO Therapy sessions. The examiner asked the parent to confirm that they were happy to take part in the semi-structured interview, and provided them with the opportunity to contribute any additional comments regarding the intervention at the end of the interview.

Interviewer: OK, thank you for taking the time to talk to me, I really appreciate it. So the first question is: Since receiving the LEGO Therapy intervention, Have you noticed any change in (Pupil 3's name) social interaction and communication skills?

Parent 3: Yes, I mean, before, (Pupil 3's name) wasn't as interested in it [LEGO] as he is now. (Pupil 3's name) is now definitely more interested. I mean, he has really missed not having the club anymore to be honest!

Interviewer: Oh no, OK! Bless him! What kind of changes have you noticed?

Parent 3: Umm, yes, I think it's that he is more, I mean; we bought him Minecraft one Christmas and he wasn't that interested in it. All of a sudden now, he's more interested in LEGO. He's wanted to make things, create things, more than ever. He's better at focusing on things, he's more, umm, more with the detail? More interested in the detail you know? He's having more fun with it.

Interviewer: Great OK, so you've seen that he is more interested in the construction element of play?

Parent 3: Yeah, yeah, definitely more focused on the detail of whatever he's doing. I mean, he's come up to me and he'll bring it, or we've got friends and they've got LEGO at home and he will build something with the younger brother and the older one, and they'll come up with some really strange ideas! It's really strange, definitely in the last few weeks. He went through a phase where he really wasn't that bothered with it [LEGO], now all of a sudden, he can't stop playing with it now! It's unbelievable!

Interviewer: Oh brilliant!

Parent 3: It's made a difference, well, I think so anyway!

Interviewer: That's fab! You can only talk about your perceptions and your experiences with (Pupil 3's name), that's all I'm asking you to discuss, so thank you for that!

Caryl Griffiths
Increased interest in LEGO

Caryl Griffiths
Enjoyment of the LEGO intervention
Pupil has missed LEGO Club

Caryl Griffiths
Increased interest in LEGO and construction activities

Caryl Griffiths
Increased creativity

Caryl Griffiths
Increased focus and attention to detail

Caryl Griffiths
Increased focus on detail

Caryl Griffiths
Increased collaboration

Caryl Griffiths
Increased interest in the LEGO resource

Caryl Griffiths
Intervention perceived to be successful

Parent 3: I definitely think that it's a shame that it's finished. I really think that we should set up a club or something. It's a shame really, I wish we could, maybe all the parents could be involved as well? Something like that? Maybe if they came home with homework that could transition into the school, maybe if they came home with a project or something to do, we could do a bit of the club experience? We could do a bit at home as well, you know?

Interviewer: OK, well what I was...

Parent 3: (Laughs) Sorry, I work in a school myself!

Interviewer: No, no, thank you! It's really brilliant that you're so enthusiastic about it. I'm glad that you seem to have had a very positive experience from it.

Parent 3: Oh, I mean, I'm really, I can't thank you enough! Whoever decided to do that, it's really made a difference with (Pupil 3's name), definitely! I am so pleased.

Interviewer: Oh brilliant, OK, well I facilitated groups, umm, so starting it off in a few different schools in the authority. So as you know, this is part of a research project, um, and your interview today contributes towards that research, it helps to evaluate...

Parent 3: I've been concerned about him because I'm trying to get him statemented right, because it's been, well, before that, and before other things, there's a few different things that he was having problems with. I think this has helped him to concentrate more. The concentration just wasn't there, he's wasn't focused. But, this, it's made a hell of a difference, well that's what I think.

Interviewer: Oh, great! Well, if you're happy, I've got some more questions...

Parent 3: It meant a lot to be honest.

Interviewer: Brilliant, I'm so glad.

Parent 3: I did put a note in to school, to say thank you to whoever organised it, but I don't think it got through?

Interviewer: Oh, thank you! I don't think it has come to me, but thank you ever so much. It's nice to be able to speak to you and to hear it from you. I've got some more questions to ask you, you may have answered a bit of them already in what you've said, but I'll ask you them anyway if that's OK, in case you have anything more to add?

Parent 3: Yeah sure.

Caryl Griffiths
Intention to continue intervention

Caryl Griffiths
Seeking increased parental involvement

Caryl Griffiths
Improved social competence at home

Perception that intervention was successful

Caryl Griffiths
Improved concentration

Interviewer: Thanks OK, so the next question is; Has (Pupil 3's name) ever been involved in any other social interventions? And how did the LEGO therapy compare to those in terms of keeping (Pupil 3's name)'s interest?

Parent 3: Well, I think in school yes, I know from my work as well that they do a lot of work to establish these skills don't they. I couldn't give you specific detail as to what (Pupil 3's name) has actually been doing mind, I wouldn't be completely sure on that, you know, the names. But I definitely think that this LEGO group has really taken off with him, he really enjoys it and he wants to talk about it.

Caryl Griffiths
Limited parental knowledge of other social interventions

Caryl Griffiths
Appeal of intervention
Increased communication about intervention

Interviewer: That's great, I'm really glad that he has enjoyed it and has been able to speak with you about what he's been doing. So, just to clarify, have you felt that there has been any difference in (Pupil 3's name) social communication or social interaction as a direct result of the LEGO therapy?

Parent 3: Yes, definitely! He will come up to me now and he will talk to me about, I mean, in-depth, about what he has made. I mean, like the other night, he was over his friends and he built a caravan type thing, stuff like that. He was telling me the detail of it, which he has never done before.

Caryl Griffiths
Improved communication about LEGO

Initiating interaction

Interviewer: So, he has been using the LEGO with his friends as well?

Caryl Griffiths
Increased collaboration

Parent 3: Yeah, yeah!

Interviewer: And did that happen before the LEGO club?

Parent 3: No, no, never.

Interviewer: Ok, great, so do you think it has helped in that way?

Parent 3: Definitely, definitely. I just wish there was a club that would carry on, but there's not.

Caryl Griffiths
Intervention continuation

Interviewer: Well, there may be, because the aim is to feedback to the schools, I mean the types of views that were collected overall. When we conducted the LEGO clubs, there were always members of staff from the school present within the groups, so the aim was, we promoted the school staff to carry the intervention on, if they thought it was helpful, after the research period had finished. It has, I mean, all the staff that I have spoken to so far have said that they would like to carry on with the LEGO and that they're intending to use it in the future. So it may be that (Pupil 3's name) may be able to access this sort of input again. Umm, so I'm glad you think that it has made a difference. So, sorry, let me just get back to the questions as this may help us establish the way in which you've found this helpful, as you say. Is that OK?

Parent 3: Yeah, course!

Interviewer: Thanks, OK, so do you think that (Pupil 3's name) behaves similarly in all social contexts, or are there some situations which are more challenging or easier than others?

Parent 3: Yeah, yes, I mean, he generally tends to find social situations quite difficult and he is better at home, that's what I find. From the conversations I've had with school staff in the past, I think he responds well in school, because it's so structured, you know? I mean with this LEGO now, that's what I'm saying, see if you can find a link between home and school when you do it again maybe, the parents could be involved somehow maybe, with the child.

Interviewer: Aha, OK! So that links in with one of the questions I was going to ask you later on, umm, do you think that anything could be improved? Where there any difficulties?

Parent 3: Haha, sorry, I mean, yes, homework! Well, no not homework as such, but can they do some of the sorting or something, so that the parents can be involved as well? So we can understand more about it, what the project was, do you know what I mean?

Interviewer: Ah OK, yes I understand, OK, thank you. Because, the next question is: Do you think the LEGO therapy has helped across different social contexts or are any effects that you've seen been limited to one location… such as, only to school, or only at home?

Parent 3: Yes I think LEGO does help between different contexts, and as well as that, I mean, I don't know about you, but I feel that there is too much technology these days, and not what I would regard as basic games, like we used to have years ago. It's a shame that sort of thing isn't there. So doing something like LEGO, like this with parents, is a brilliant idea.

Interviewer: OK, I see, thank you. So you mentioned that you have noticed an improvement at home. Are you aware of any improvements in social communication and interaction at school, due to the LEGO?

Parent 3: Umm, I think so. I think (Pupil 3's name) has, I think his confidence in himself has improved as well. Because, I mean, obviously, having him talking to me about this in detail…to me, it meant a lot. Whereas before, we bought him the stuff [referring to LEGO pieces], we tried to do things with him, and with him doing it at school and then doing it at home as well, and him wanting to do it. It makes me realise that it has really helped me, with things we've bought him as well.

Interviewer: Yeah? So has it facilitated conversation? So are you aware whether it has helped him in school, with his friendships, or communicating with others?

Parent 3: Ummm…

Caryl Griffiths
Different presentation in different contexts

Caryl Griffiths
Different presentation at home and school

Caryl Griffiths
Structure is appealing

Caryl Griffiths
Seeking increased parental involvement

Caryl Griffiths
Seeking parental involvement with intervention

LEGO Homework

Caryl Griffiths
LEGO skills transfer between contexts

Caryl Griffiths
LEGO is a traditional toy

Caryl Griffiths
Improvement across contexts

Improved confidence

Caryl Griffiths
Improved communication with parents

Caryl Griffiths
Improved interaction with LEGO resource

Interviewer: Have you had any correspondence with school about that? Or maybe (Pupil 3's name) has said something?

Parent 3: No, not really, that's the only problem see.

Caryl Griffiths
Limited communication with school

Interviewer: Ok, that's no problem. So what about any other contexts, sort of, family, friends, any improvement there?

Parent 3: I think (Pupil 3's name) definitely feels more confident.

Caryl Griffiths
Increased confidence

Interviewer: Can you think of any examples?

Parent 3: Umm, like I said, when we go over our friends and they are all playing together, and that has happened quite a few times now. My son will say to them "they're doing this in my school!" They're all talking about it! (Parent 3 laughs).

Caryl Griffiths
Increased peer collaboration

Caryl Griffiths
Increased initiation of interaction

Interviewer: Brilliant, that's really positive. So, do you perceive that there are any strengths in LEGO Therapy, particularly, as an intervention for children with ASD and are there any factors which contribute to the success that you feel you've had?

Parent 3: Oh, I think so! You can get so many different types, different sizes, so you can get that really complex detail using it. It's colourful, yeah, it makes them use their fingers more, to manipulate things more, yeah.

Caryl Griffiths
Appeal of the LEGO resource

Interviewer: So, is it to do with what you mentioned earlier, that it's a traditional toy? Is there that element to it?

Parent 3: I feel that it's nice to have the technology, but I still believe in the old fashioned...well I mean, LEGO isn't old fashioned.

Caryl Griffiths
LEGO as a traditional toy

Interviewer: Well, yes, I know what you mean, but I mean, LEGO has been around since the 1960's, so it is quite traditional I suppose.

Parent 3: It's basic play, that's what I call it. That's the value of it. You can't ever beat it.

Caryl Griffiths
LEGO characteristics
Developing skills through play

Interviewer: Brilliant, OK. So would you feel that LEGO Therapy is a useful tool for working with pupils with ASD?

Parent 3: Oh god, yes. Definitely, without a shadow of a doubt. It's made a difference for my son anyway. I think so. If it ever came up again, please put him forward!

Caryl Griffiths
Positive impact of intervention
Intention to continue intervention

Interviewer: Aha, OK. I know we discussed this a little bit earlier, but, do you think there are any areas for development in the LEGO based therapy approach?

Parent 3: Yeah, well, like I said I'd like to have better communication with school, to be able to link things that they're doing in LEGO group with their playing at home. But other than that, no, he loved it and I think keep doing what it is you're doing, we're so, so pleased.

Caryl Griffiths
Communication between home and school

Parents seeking additional involvement

Interviewer: Great, so would you consider using LEGO therapy in the future?

Parent 3: Oh yes, God, definitely. I mean, if there was some group or whatever, if I got to know about it then, I would definitely bring him along.

Caryl Griffiths
Intention to continue intervention

Interviewer: OK, well thank you for taking the time to answer those questions. Is there anything else that you would like to add about LEGO therapy or anything about your experiences with LEGO that I may not have asked you? Any additional comments or anything at all?

Parent 3: Umm, no, I mean, you know, from this process, hopefully it will lead on to something else in time? I know everything takes time and everything costs money, I appreciate that, but hopefully something else will come from this.

Caryl Griffiths
Seeking continuation of input

Interviewer: Oh thank you, that's great. I mean, so far, some of the things that I've heard anecdotally from school and staff have been positive, and this will all be fed back in my research. The school staff have told me that they would like to continue it so there is some hope that the LEGO club could continue. I'm so pleased that you think he has developed some skills.

Parent 3: It has made a hell of a difference to us as a family anyway.

Caryl Griffiths
Systemic impact of pupil's improved social competence

Interviewer: That's lovely to hear, thank you ever so much for speaking to me today and...

Parent 3: Like I say, he has had things for Christmas and he hasn't played with them and it was worrying me, because I thought well, he wanted things but he hasn't been involved with it, and he's really got into those things now. So that's made a big difference to us.

Caryl Griffiths
Increased interaction with LEGO

Increased play with other toys

Interviewer: Brilliant. With other toys as well, you mean?

Parent 3: Yeah. Definitely with the LEGO, but he seems more engaged with other toys as well.

Caryl Griffiths
Increased interaction with LEGO

Increased play with other toys

Interviewer: That's great, thank you ever so much for your time, I hope you enjoy the summer holidays with (Pupil 3's name).

Parent 3: Yes, I'm sure it will be quite busy. (Parent laughs) Thank you ever so much once again.