The effectiveness of strategies that promote the inclusion of children with Autism in mainstream classrooms

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Abstract
Autism Spectrum Disorders (ASD) are characterised by impairments in social interaction, social communication and social imagination. Due to the pervasiveness of these difficulties, children with ASD face challenges and encounter many barriers to learning when educated within mainstream settings. Educational practitioners require considerable knowledge and specialist skills in order to respond to the needs of these children, providing individual and targeted support so that they may achieve their full educational potential. The purpose of this small-scale project is to investigate three interventions, commonly used to support children with ASD, in terms of their efficacy for use in mainstream primary schools. Recent research studies into the use of Social Stories™, LEGO® Play and Circle of Friends® were identified and a synthesis of their methodologies and results was undertaken. Some promising results for all three strategies are found. In the case of Social Stories™, results are also found to be inconsistent and highly variable both between children and between trials, and some possible reasons for this are explored. The evidence for LEGO® Play is the most positive, with significant gains in social interaction being reported in all papers. However, for Circle of Friends® (CoF), the results indicate that, although gains in the inclusion of the focus children followed the whole class meetings, these gains were not maintained during the weekly CoF meetings. It is therefore concluded that there is no compelling evidence in support of the weekly CoF meetings at this time. The implications of all these results in terms of using these strategies in mainstream primary classrooms are discussed. The need for further research into all three interventions is highlighted and specific recommendations regarding this are made.

Introduction

Educational practitioners have the responsibility to ensure that they provide a fully inclusive and meaningful education that caters for each and every child's individual needs (The Scottish Government, 2010). Whilst this position is widely supported, there is still considerable debate as to how this can be achieved in practice. In particular, it raises issues for teachers about the identification of potentially diverse and complex needs and how best to respond to these, so that all children may be supported to achieve their full potential.

Through its laws, policies and curriculum, Scotland has embraced a very broad view of inclusion. Inclusion in Scotland is not solely about children with specific needs, but is the right of all learners to an education of the highest quality (HMIE, 2002). These entitlements are further set out in The Education (Additional Support for Learning) (Scotland) Act 2004, which recognises that all children may need additional support at some point in their education and requires educational authorities to provide this.

Recognising the diversity of learners, the Scottish Government encourages everyone involved in educating children and young people to respond flexibly to eliminate barriers to participation,

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learning and achievement and promote equality. These principles were also enshrined in Curriculum for Excellence from the outset. Developed as a curriculum for all learners, the foreword to Curriculum for Excellence states that "Our aspiration is to enable all children and young people to develop their capacities as successful learners, confident individuals, responsible citizens and effective contributors in society" (The Scottish Executive, 2004a, p.3). More recently, these principles have been included and further developed in "Getting it right for every child" (GIRFEC), Scotland's national approach to improving outcomes for all children with needs. GIRFEC puts the needs and wishes of the child and their family at the centre of all decision-making. Acknowledging that children's needs are often complex, it advocates the use of the My World Triangle to gain a holistic view of the child's strengths and needs, and requires services to work together to prepare and implement an integrated support plan for each child (The Scottish Government, 2012).

This commitment to inclusion has considerable implications for educational practitioners. In order to provide the best education possible for all children in their care, they need to possess up to date and comprehensive knowledge and a thorough understanding of a much wider range of potentially complex needs. It also requires them to view each child as a whole and know how to access appropriate resources and effective support strategies in order to respond to their needs individually, whilst working collaboratively with other agencies involved.

The benefits of inclusion have been well documented, with regard to the child with additional support needs, typically developing peers, and the school ethos in general. Berg (2004) reports that inclusion exposes children with specialist needs to an enriched learning environment which affords greater stimulation and creates a climate of higher academic expectation. This encourages children to take more responsibility for their learning, resulting in enhanced self-esteem. Wiele (2011) further argues that mainstream classrooms are better placed to support social interaction and the learning of appropriate behaviour, since opportunities to learn and practise new skills are natural and not staged. Mainstream classrooms also provide children more opportunities to learn from their peers (Barrett & Randall, 2004; Kalyva & Avramidis, 2005) as typically developing classmates can act as positive role models, assisting with learning key skills and acceptable behaviours (McCarty, 2006). In addition, there are social benefits, as inclusion provides opportunities to share experiences with a wider range of children and to foster friendships with them. Cigman (2006) argues that typically developing classmates benefit too: socialising and working with children with specialist needs helps them to develop a greater understanding of others and to respect and appreciate different skills and attributes, ultimately preparing them for life in a diverse society. As such, inclusion in education may be "a vital building block of a more inclusive society" (Batten, 2005, p.94).

However, inclusion can also have some disadvantages. Berg (2004) notes that there can be an over-emphasis on socialisation, and not enough on academic quality. Quality of provision may also be lower in mainstream classrooms as staff may lack necessary specialist knowledge and staff:pupil ratios are higher than in specialist settings (Jordan and Jones, 1999). In addition, instead of fostering friendships, inclusion can, in some cases, lead to greater isolation and where children are not accepted by their peers, this can lead to lower self-esteem (Wiele, 2011). Similarly, Lee, Yoo and Bak (2003) noted that classmates tended to act as "helpers" rather than being true friends.

Autism

Autism isn't something a person has, or a 'shell' that a person is trapped inside. It is pervasive, it colours every experience, every sensation, perception, thought, emotion, and encounter, every

aspect of existence. It is not possible to separate the autism from the person (The Public Health Institute for Scotland, 2001, p.8).

This insightful description of autism makes it clear that not only is autism an intrinsic part of the individual, it also makes them the person that they are.

Since first identified by Kanner in 1943, knowledge and understanding of autism has grown and it is now recognised as a lifelong, neurodevelopmental disorder that can impair a child's ability to communicate, interact or relate to others and the world around them (Batten, 2005; Willis, 2006). Typically, a child's impairments are noticeable from early infancy and will progress throughout the child's development (American Psychiatric Association, 2000). Autism Spectrum Disorder (ASD) is the 'umbrella term' given to a range of disorders. These disorders vary from mild (Asperger's syndrome (AS)) to severe (Rett's syndrome), where the child may develop very limited or no language and find it extremely difficult to communicate with others. In addition, as a 'spectrum disorder', although there is a range of impairments and behaviours which have been associated with autism, there is no conclusive list as it affects everyone differently (The Scottish Government, 2011). As a result, there is no 'typical' case: each child is unique and will present a variety of behaviours to a lesser or greater degree, ranging from mild to severe (de Boer, 2009; Wall, 2010).

Therefore, with regard to the particular complexities of autism, teachers need to have considerable knowledge of the differing forms it can take, whilst remembering that each child will present differently, so that a truly individual response in terms of support strategies will be necessary.

Triad of Impairments

First outlined by Wing and Gould in 1979, 'the triad of impairments' has made a significant contribution to a greater understanding of autism and has also proved influential as a diagnostic tool (Woodward & Hogenboom, 2000). It identifies three core deficits as the defining features of all Autistic Spectrum Disorders: social interaction, social communication and social imagination. Crucially, elements of all three features must be present for a diagnosis to be made (Wall, 2010). Differences in social interaction are characterised by avoidance of eye contact, lack of desire to interact with others and difficulties making and sustaining friendships, paucity of play including difficulties with sharing and turn taking, inability to understand or interpret other people's thoughts, feelings and perspectives and difficulties understanding the 'rules' governing social situations (Pierangelo & Giuliani, 2008; Wall, 2010). Differences within social communication include delayed or lack of speech, unusual speech patterns such as echolalia, odd pitch or intonation, lack of desire to take part in conversations, inability to interpret facial expressions or gestures, literal interpretation of language, and over-riding interest in a narrow range of preferred topics (Pittman, 2007; Plimley & Bowen, 2006). Impairments in social imagination are typified by lack of imaginative or pretend play, rigid and repetitive behaviours, preoccupation with specific interests and preference for sameness and routines, accompanied by difficulties coping with changes to these (Moor, 2002; Wall, 2010). However, the triad of impairments fails to provide the full picture. As it focuses only on the deficits associated with the condition, it does not acknowledge the particular strengths individuals with autism have such as honesty, reliability, eye for detail, analytical thinking skills and, because they perceive things differently, original thinking (Winter and Lawrence, 2011).

Including Children with Autism; the Challenges

Because of their impairments, children on the Autistic spectrum may face a range of challenges in mainstream classrooms and the school environment in general. Difficulties understanding and

interpreting language and, in particular, metaphorical speech can lead to problems understanding instructions and answering questions, especially with regard to 'higher order' questions, where inference is required (Pittman, 2007; Plimley & Bowen, 2006). Children with autism often experience organisational difficulties too, both when attending to their own needs, e.g. getting ready for Gym, interval or lunch, and when selecting the resources and materials they require for tasks.

Teachers are encouraged to vary teaching methods and resources used to make lessons engaging. However, as children with autism need sameness and predictability (Moor, 2002), introducing new, unfamiliar resources can cause distraction or distress (Mesibov, Shea & Schopler, 2005). Sensory overload can also be an issue. Children with autism can be particularly sensitive to sensory stimuli, and can find it difficult to 'tune out' or discriminate between all the sensory information in the environment (The National Autistic Society, n.d). This is especially relevant in busy classrooms, where focus can be adversely affected. In other areas of school life, this may be even more pronounced; dinner halls and playgrounds can be very noisy, bustling and appear very disorganised, leading to increased anxiety levels and potential behavioural issues. Finally, the school environment is inherently sociable, but children on the Autistic spectrum may lack the desire to interact with others, the language to do this or may not understand the reciprocal nature of interactions and the 'rules' governing social situations (Pierangelo & Giuliani, 2008). All of these deficits make social situations challenging and forming friendships difficult (The Scottish Government, 2009a).

Furthermore, Curriculum for Excellence may also, in some circumstances, create additional challenges for children with autism. Curriculum for Excellence has been associated with the wider use of innovative pedagogical practices, such as active learning and collaborative group work. Collaborative working is a highly social method of learning, which involves working together in groups, brainstorming and discussing ideas, undertaking specific roles and tasks, supporting other group members in their learning and assessing both their own contribution and providing feedback to others (The Scottish Government, 2009b). This can be particularly challenging, as children with autism may not only prefer to work individually on tasks but may also lack some of the skills necessary for working effectively in groups, such as the ability to negotiate and to perceive others' points of views (Plimley & Bowen, 2006).

Active learning is a powerful way of giving children more ownership of their learning and making it more meaningful (The Scottish Government, 2007). To contextualise learning and to provide real life experiences, it also advocates excursions and inviting specialists into school, but these may be inherently stressful for children with autism, as they form a break from routine (Moor, 2002), and these pupils may not be able to make the link between learning in the classroom and in 'the real world'. Similarly, the development of the integrated curriculum stresses the importance of 'joining up learning' by making links between knowledge and skills learned in different curriculum areas (The Scottish Government, 2008). However, rigidity of thought can make it difficult to make these links and apply learning in other contexts. Finally, the pedagogy of learning through play, used particularly in the earlier stages, is highly social, involving sharing resources, turn taking and interacting and negotiating with other children, which can be challenging (Plimley and Bowen, 2006).

Inclusion of Children with Autism in Scotland; the Statistics

For educational practitioners, being able to provide effective and tailored support to these children is all the more critical at this time as the numbers of children with autism in mainstream settings are increasing.

In 2004, the Audit of Services for People with Autistic Spectrum Disorders Statistical Report recorded that 3,412 children and young people in Scotland were diagnosed with ASD, of which 1,782 or 52% were aged 5-10. It furthermore reported that 64% of primary school aged children with ASD attended mainstream schools (The Scottish Executive, 2004b). However, the Pupil Census Supplementary Data for 2014 reveals that 4,400 children in Scotland were receiving extra support in mainstream primary schools due to their diagnosis of ASD (The Scottish Government, 2014). Although this represents a considerable rise in itself, it does not include statistics for children who were not in receipt of additional support, suggesting the actual figures could be even higher.

Supporting Children with Autism in Mainstream Classrooms

As knowledge of autism has developed, however, an increasing range of strategies and interventions have been developed which aim to provide assistance with some of the specific difficulties children with autism experience. These often appear compelling and appealing to parents and practitioners alike, and promising claims have been made about their effectiveness. Surprisingly though, relatively little scientific research has been undertaken to examine whether sound evidence exists to support their use, and where such research has been undertaken, the results have often been mixed or inconclusive. However, in order to provide appropriate support and help these children achieve their full potential, it is imperative that practitioners have sound evidence about which strategies are effective, for whom and in what situations. This is essential, as due to the very complex and individual challenges children with autism face and in keeping with GIRFEC, a "one size fits all" solution will not suffice. For my study, I have chosen 3 strategies which have been prominent in the literature to focus on: Social Stories™, LEGO® Play and Circle of Friends®.

Social Stories™

Developed by Carol Gray (Gray & Garand, 1993), a Social Story™ is a brief story which describes a situation, skill or behaviour that a child finds challenging, and explains where and when it takes place, who is involved and what occurs and why, as well as providing the child with an appropriate response to it. Written to suit the needs of an individual child and using language well within their comprehension level, they are read prior to the target situation occurring, being read independently by the child or to them. As such, Gray believes they are most useful for children with high-functioning autism (HFA) (Gray & Garand, 1993). Gray views the format, style and wording of Social Stories™ as crucial and has prepared detailed guidelines regarding this. Initially, she stated they should contain 3 types of sentences: descriptive, giving factual information about the situation; perspective, which describe the reactions and feelings of others; and directive, which specify how the child should respond in the situation. Gray has since revised these guidelines, including using illustrations (Gray, 1998) and introducing cooperative and affirmative sentences (Gray, 2004). Since their inception too, other modes of presentation have been developed, including using videos and photographs (Thiemann & Goldstein, 2001) and computers (Reynhout & Carter, 2006).

LEGO® Play[1]

LeGoff, an American psychologist, has developed a highly structured and comprehensive intervention, based around the LEGO® construction system, after he observed two children with autism in his waiting room participating in spontaneous play using LEGO® sets. Part of its appeal

[1] Originally called LEGO® Therapy by LeGoff, successive writers have also used the terms LEGO® Play and LEGO® Games to describe interventions using LEGO® resources. For consistency, the term LEGO® Play will be used throughout this study.

is that it is inherently rewarding, since it capitalises on children's natural interest in this resource to promote learning and influence behaviour. In its original format, this intervention incorporated a mix of weekly individual therapy and small group LEGO® Play sessions. Within these sessions, the group members were required to collaborate to complete construction tasks, with each child in turn undertaking a specific role, i.e. the "engineer", who describes the pieces required and how they fit together, the "supplier", who locates the pieces necessary and the "builder", who then puts the pieces together. Developing a consistent set of rules for the groups to follow allowed the adult practitioner to act as facilitator, mediating to help the group to solve any problems (LeGoff & Sherman, 2006).

Circle of Friends®
This strategy originated in North America, and although initially aimed at promoting the social inclusion of children with a range of disabilities into mainstream schools, it has also been used to support children with autism. The approach aims to provide a practical and emotional support network, help to address problem behaviours and assist the focus child to build relationships with their peers (Whitaker, Barratt, Joy, Potter and Thomas, 1998). The steps involved in setting up a circle include gaining permission from the focus child and their parents, then holding a whole class meeting (without the focus child) to talk about the child's strengths and the difficulties. The meeting allows the children to share their feelings, as well as gain a better understanding of the focus child, and to volunteer to join the Circle of Friends®. The Circle of Friends®, comprising the focus child, 6-8 peers and an adult facilitator, then meets on a weekly basis to determine which issues or behaviours to address, to set targets, agree strategies to achieve these, and to monitor and review progress for them (Taylor, 1997).

I chose these strategies to focus on as they are all very different in their approach and methods, and each primarily, but not exclusively, seeks to address difficulties resulting from different aspects of the triad of impairments. In this way, Social Stories™ primarily seek to mediate difficulties in social imagination, such as dealing with changes to routine, but have also been used to address differences in social interaction, e.g. learning acceptable behavioural responses in a given situation. LeGoff has used LEGO® Play to focus on social interaction, in terms of collaborative problem solving, turn taking and sharing, as well as social communication, including verbal and non-verbal communication and joint attention. The Circle of Friends® approach seeks to develop social interaction by supporting the social skills necessary to build relationships with others and by providing a social support network, tackle problem behaviours and mediate feelings of isolation.

I shall examine the most current evidence for each of these strategies to determine how effective they are, consider their suitability for use by teachers in mainstream classrooms and, where possible, suggest how they may be implemented.

Methodology
In order to identify possible research studies electronic databases were initially searched. This resulted in the identification of a range of both empirical studies and analyses, and the reference lists of these were further reviewed to identify additional articles which might be relevant. Further searches to locate titles which had already been identified but not located were undertaken using the general search engines Google and Google Scholar.

A goal was set at finding four pieces of research per strategy, as the aim was to make this an in-depth study, rather than a broad analysis. Criteria used to inform this search were that the studies should have followed the accepted protocols for the strategy, involve primary school aged or preschool children and that the research should be as recent as possible, i.e. have taken

place within the last five years. Only articles written in English were considered for inclusion. Other considerations included that, ideally the research would have taken place within the school environment and that the results would have been subjected to statistical analysis to improve their reliability and validity. However, it was also realised that some criteria might have to be adapted for each strategy.

Social Stories™

Search terms: Social Story™, Social Stories™, autism, ASD, AS, Asperger's syndrome, social skills. Initial searches located only one study which met the stated criteria, so the search was widened first to include studies up to 10 years old and then to include research undertaken outwith the school environment. This allowed a greater number of studies to be considered, from which four were finally selected. These studies were Schneider and Goldstein (2010), Sansosti and Powell-Smith (2006), Quirmbach, Lincoln, Feinberg-Gizzo, Ingersoll and Andrews (2008) and Leaf, Oppenheim-Leaf, Call, Sheldon and Sherman (2012).

Of these, Schneider and Goldstein (2010) was chosen because it is recent, the longer duration of the research, and because it took place in the educational environment. Although the oldest paper included, Sansosti and Powell-Smith's study (2006) took place in school and included longer-term data. Despite including children out with the target age range, Quirmbach, Lincoln, Feinberg-Gizzo, Ingersoll and Andrews (2008) was included because of its unusually large sample size. Finally, Leaf, Oppenheimer-Leaf, Call, Sheldon and Sherman (2012) was included as it provided the most up-to-date research and data.

LEGO® Play

Search terms: LEGO® Play, LEGO® Therapy, LEGO®, autism, ASD, AS, Asperger's syndrome, social skills, play based intervention.

Initially, two studies were identified which met most of the stated criteria. The search was first widened to the last eight years, then 10 years and eventually four studies were selected for inclusion, these were Legoff and Sherman (2006), Andras (2002), Owens, Granader, Humphrey, and Baron-Cohen (2008) and Pang 2010.

LeGoff and Sherman (2006) was included as it was a follow up to the seminal study, tracking maintenance of perceived gains over three years. As the most recent, Andras (2012) provided the most current evidence and data, although this was not subjected to rigorous statistical analysis. Owens et al (2008) was selected due to its relatively large sample size, its longer duration and the fact it provided a comparison with another commonly used strategy, SULP. Finally, although Pang's 2010 study focused on one child and therefore did not lend itself to statistical analysis, it provided a useful insight into how the strategy might be adapted for use in preschool.

Circle of Friends®

Search terms: Circle of Friends®, peer group support, autism, ASD, AS, Asperger's syndrome, social skills, inclusion.

Identifying studies researching this strategy proved much more difficult, and the search had to be widened to include the last 10 years. This resulted in only two studies which met the majority of the criteria. The search was therefore further widened to include unpublished works and theses, which identified one more study. No further studies could be located so the decision was made to use these three: Kalyva and Avramidis (2005), Frederickson, Warren and Turner (2005) and James (2011).

Kalyva and Avramidis (2005) demonstrated how this strategy might be utilised in a preschool setting, and Frederickson, Warren and Turner (2005), although only including one child with ASD in their sample, reported evidence regarding maintenance of target behaviour. Finally, despite being unpublished and therefore not peer reviewed, closer reading of James's (2011) thesis, suggested she had undertaken a rigorous and very relevant study.

Results

Social Stories™

Two of the research projects took place in educational establishments, whilst the other two were undertaken in either research rooms and/or in the children's homes. Three studies had very small samples, whilst one was unusually large, involving 42 children. The ages of the participants ranged from 5-14, and all had a diagnosis of ASD or AS. Sansosti and Powell-Smith (2006) and Quirmbach et al (2008) assessed the effectiveness of Social Stories™ only, whilst Leaf et al (2012) compared Social Stories™ with the teaching interaction procedure and Schneider and Goldstein (2010) included a visual schedule in the second phase. Three studies used individualised illustrated Social Stories™ presented in book format, whilst Quirmbach et al (2008) compared the effectiveness of two different types of Social Story™ - standard and directive (containing only directive sentences). These were neither individualised nor illustrated. Three studies sought to teach one skill to each child using a Social Story™, whilst Leaf et al (2012) aimed to teach six skills. Intervention durations varied greatly from two days up to a maximum of 70 days, with papers Sansosti and Powell-Smith (2006) and Quirmbach et al (2008) collecting data after the intervention to test for maintenance. All four studies used observation schedules to gather data.

Table 1. Summary of Social Stories™ Studies

Paper	Key Features of Study	Key Findings
Schneider and Goldstein (2010)	Educational settings. Used individualised illustrated Social Stories™ in book format to teach on task behaviour. Read to child by author once a day prior to situation. Strict success criteria employed.	Modest improvements in target behaviour but not consistent and amount of improvement varied between children.
Sansosti and Powell-Smith (2006)	Setting: home and school. Used individualised illustrated Social Stories™ in book format to teach social skills. Read at home twice a day.	2 children showed almost immediate improvements in target behaviour, demonstrating levels similar to typically developing peers. No consistent improvement for child 3. Not known whether Social Story™ read at home.
Quirmbach, Lincoln, Feinberg-Gizzo, Ingersoll and Andrews (2008)	Clinical setting. Study compared standard and directive Social Stories™, both were generic and without pictures. Comprehension not checked. Used to teach game playing social skills.	Both Social Story™ types equally effective in teaching target behaviours. 1/3 of children showed no improvement. These children had lower verbal comprehension scores.
Leaf, Oppenheim-Leaf, Call, Sheldon and Sherman (2012).	Setting: university and home. Study compared Social Stories™ with teaching interaction procedure. 18 social skills taught in total. Used individualised illustrated Social Stories™ in book format, read to child after situation. Strict success criteria employed.	Although skill specific steps improved significantly for Social Stories™, children demonstrated considerable variability and only 4 skills mastered. Some generalisation of behaviours recorded.

All four papers recorded positive results, reporting modest to significant improvements in the target behaviours, with Sansosti and Powell-Smith (2006) stating that these improvements were almost immediate. However, reported improvements were neither stable nor consistent; all studies reported that while the target behaviour of some children improved significantly, their responses still varied greatly over trials/sessions, and other children showed only modest improvements. Sansosti and Powell-Smith (2006) and Quirmbach et al (2008) presented data which supported the maintenance of the target behaviours. Significantly, Quirmbach et al (2008) showed no difference in results between the two types of Social Stories™ utilised.

LEGO® Play

Two of the research projects took place in educational establishments, whilst the other two took place in the authors' clinics. The children involved were aged 4-11 and therefore all in the target

range. Andras (2002) and Pang (2010) used very small samples, whilst Legoff and Sherman (2006), and Owens et al (2008) had large samples. Diagnoses of the children included ASD, AS and HFA. The studies were short to long-term, ranging from 12 weeks to 3 years duration. The aims of all studies were generally similar, i.e. to improve the frequency or duration of self initiated interactions. Three studies also tested for a reduction in maladaptive behaviours. All the studies used observation schedules to gather data, whilst Legoff and Sherman (2006) and Owens et al (2008) also included interviews with parents. In addition, Legoff and Sherman (2006) used data from clinical files and Owens et al (2008) used questionnaires to assess parents' satisfaction and the children's enjoyment.

Table 2. Summary of LEGO® Play Studies

Paper	Key Features of Study	Key Findings
Legoff and Sherman (2006)	Clinical setting. Retrospective study of 60 children in receipt of weekly individual therapy and group sessions for at least 3 years. Target behaviours: increased social competence, reduced maladaptive behaviours.	Significant improvements in target behaviours. Children's diagnoses (ASD/AS) non-influential but children with relatively intact language improved most.
Andras (2002)	School setting, involving school staff. 10 weekly LEGO® Play sessions. No individual therapy. Target behaviour: increased social interactions in playground.	Significant gains in target behaviour. Behaviour maintained after intervention and further gains recorded. Some generalisation beyond playground noted. Basic data analysis employed.
Owens, Granader, Humphrey, and Baron-Cohen (2008)	Clinical setting. Study compared LEGO® Play with SULP. 18 weekly LEGO® Play/SULP sessions. No individual therapy. Target behaviours: increased social interactions in playground, decreased maladaptive behaviours.	LEGO® Play participants demonstrated substantial gains in both target behaviours. LEGO® Play participants gave higher enjoyment ratings for intervention.
Pang (2010).	Preschool setting, involving preschool staff. Single child study. Simple LEGO® Play sessions with typically developing peers to increase social interaction and reduce behavioural problems. No individual therapy.	Improvements recorded across all target behaviours. No supportive data included in results.

All four papers recorded highly positive results, reporting significant gains in the target behaviours. Importantly, all of the studies provided some evidence of generalisation of the target behaviours and three of the studies had strong evidence for this as the data was gathered in the playground. Furthermore, Legoff and Sherman (2006) demonstrated that improvements in behaviours were long-term with data being gathered after 3 years, although in this case the intervention was still on-going, whilst Andras (2002) and Pang (2010) were able to demonstrate some evidence of short-term maintenance of these behaviours after the interventions had

ended. Finally, Owens et al (2008) also provided data of the participants' enjoyment of the intervention, whilst Pang (2010), although less rigorous in its methods, did suggest that LEGO® Play might also be a suitable intervention for preschool children.

Circle of Friends® (CoF)

All three research projects were undertaken in educational establishments and the children involved were aged 3-11. All sample sizes were very small; both Kalyva and Avramidis (2005) and James (2011) comprised five children, and although Frederickson et al (2005) did include 14 children, only one child had a diagnosis of ASD. In the other studies, the participants were either AS or ASD diagnosed. The duration of the interventions was 6-12 weeks, with Kalyva and Avramidis (2005) and Frederickson et al (2005) collecting further data later to test for maintenance. Frederickson et al (2005) and James (2011) used questionnaires to gather data, whilst Kalyva and Avramidis (2005) used observation schedules. The studies used the Circle of Friends® approach to address different concepts and behaviours. Kalyva and Avramidis (2005) focused on improving the children's communication, with particular regard to initiating contact with peers and responding to their initiations, whilst Frederickson et al (2005) focused on measuring increases in social inclusion. James (2011) had four stated aims, and as well as measuring social inclusion, also addressed whether CoF impacted on the focus children's levels of happiness at school.

Table 3. Summary of Circle of Friends® Studies

Paper	Key Features of Study	Key Findings
Kalyva and Avramidis (2005)	Preschool setting, involving preschool staff. 12 weekly CoF sessions, involving activities, e.g. games and singing. No whole class meeting, members were not volunteers. Sessions did not include target setting. Target behaviour: increased social interaction.	Significant improvements in target behaviour. Gains maintained 2 months after intervention.
Frederickson, Warren and Turner (2005)	School setting. Only 1 ASD child in sample. Whole class meeting, then 6 CoF meetings. Target behaviour: improved social inclusion.	Significant gains followed whole class meeting. Only scores for child with ASD rose further during weekly meetings. Whole class meeting had included explanation of ASD. Scores for other children dropped slightly during weekly meetings and no significant maintenance recorded after intervention.
James (2011)	School setting, involving school staff. Whole class meeting, then 8 CoF meetings. Target behaviours: improved social inclusion.	Significant gains following whole class meeting. These gains gradually regressed towards baseline during weekly meetings. Majority of focus children reported feeling happier at school.

All three papers reported some positive results. Kalyva and Avramidis (2005) reported a significantly higher number of successful initiations and responses to initiations amongst the target children compared to the control group, and that these gains were relatively well maintained. Frederickson et al (2005) and James (2011) reported that acceptance of the focus children increased and rejection decreased following the whole class meeting. However, both studies reported no further improvements during the weekly CoF meetings, the one exception to this being the ASD child in Frederickson et al (2005). In addition, these initial gains were not maintained, gradually reducing over time. James (2011) also reported positive changes in the focus children's happiness ratings.

Discussion and Analysis

Social Stories™

Although all papers reported some positive results, gains were not consistent and there was a high degree of variability both between children and even between trials. Analysis of the design of these Social Stories™ against Gray's guidelines may prove useful to identify possible explanations for this.

Quirmbach et al (2008) used generic Social Stories™ and did not include illustrations. Both of these points are important as, from their inception, Gray considered the highly individualised nature of the stories to be critical to their success (Gray & Garand, 1993). Although originally not recommended as they might prove distracting, illustrations were included in later guidelines (Gray, 1998). In this study, one third of children made no improvement, which the authors attributed to their very low verbal comprehension scores. This might be relevant as Gray believed Social Stories™ were most likely to benefit children "in the trainable mentally impaired range or higher who possess basic language skills" (Gray & Garand, 1993, p.2). However, it is also possible that these scores were due, at least in part, to these deviations, and the authors themselves reflected that illustrations might have been helpful. Finally, in this study the authors failed to check comprehension, as advocated by Gray (1993). Issues with these children's understanding of the story might have been discovered earlier had this been undertaken.

The timing of reading the stories should also be investigated, as Gray advocated that, optimally, they should be read just prior to the situation taking place (Gray, 1998). However, in Leaf et al (2012) it was read after the situation, which might explain to some extent the poorer results for Social Stories™. In addition, in Sansosti and Powell-Smith (2006) they were read at home and therefore not directly linked to the situation. This alone may have affected the outcome, but it also resulted in less experimental control, so it is possible, as the authors stated, that the third child did not actually read the story, thus accounting for his results.

The success criteria employed may also have played a critical role. Two studies employed very strict success criteria and, as a result, only four skills were mastered in Leaf et al (2012). Success criteria should be realistic, using the performance level which would be expected for typically developing peers (Sansosti & Powell-Smith, 2006). Crucially, only Sansosti and Powell-Smith (2006) used peer comparison, and found very similar levels of performance.

Quirmbach et al (2008) compared standard and directive stories, reporting no difference in the outcome. This led the authors to suggest that perhaps directive sentences are the "active ingredient" (Quirmbach, *et al.*, 2008, p.315) as they were common to both types of story. Therein lies the problem, however. Despite Gray's own guidelines and several reviews analysing the features of Social Stories™ (Reynhout & Carter, 2006), there is still no precise formula for writing them. Gray herself views writing them as "an art, not a science" (Gray, 1993, p.5).

Some positive points emerge from these studies, however. Sansosti and Powell-Smith (2006) noted substantial gains for two children and that these gains were almost immediate. Similar findings have been reported elsewhere (Swaggart, *et al.*, 1995). In these studies, Social Stories™ were also used to address a range of skills and behaviours, including learning routines and prosocial behaviours. Other studies have used Social Stories™ to address challenging behaviour (Swaggart, *et al.*, 1995), whilst Gray herself believed their application to be wide ranging (Gray, 1993). In addition, the children in these studies ranged from 5-14 years of age, and diagnoses included both ASD and AS, attesting to the versatility of this strategy. Some evidence of both generalisation of learned skills and behaviours and maintenance of gains after the end of the interventions was also reported. Due to the lifelong difficulties associated with ASD, evidence of generalisation and/or maintenance is critical when evaluating the effectiveness of support strategies (Sansosti, Powell-Smith & Kincaid, 2004).

The results from these studies are promising. However, they also underline the fact that, despite the considerable empirical research carried out into Social Stories™ to date, there is still insufficient evidence regarding which features are effective, for whom and in which situations. It is hoped that addressing these questions might achieve more consistent results.

Social Stories™ represent a simple strategy, which lends itself well to use in mainstream classrooms. Whilst some initial training is necessary to learn how to write them, they are inexpensive and relatively quick and easy to create, requiring only basic word processing skills. Social Stories™ are also portable, allowing the children to self manage, reading them when required, there by fostering ownership and independence, in line with the principles of Curriculum for Excellence (The Scottish Government, 2008). The strategy is also flexible, both in terms of the children and the range of situations and target behaviour it can be used for. This is particularly important if they can be used to overcome difficulties arising from the triad of impairment, which affect children in mainstream classrooms, such as managing routines, coping with change and knowing how to respond appropriately in social situations.

LEGO® Play

The most encouraging results were associated with LEGO® Play, with all four studies reporting very positive results. Significantly, three of the studies did not include individual therapy, which LeGoff himself had considered to be an essential component (LeGoff, 2004). Despite this, the results from these studies were overwhelmingly positive, although it should be noted that Andras (2002) undertook only basic analysis of results and Pang (2010)'s results were not evidenced. These studies suggest LEGO® Play can be used for a range of children. The focus children were aged 4-11 and diagnoses included HFA, ASD and AS. Overall, LeGoff reported no difference in scores for ASD or AS children but he did suggest that, with regard to gains in social competence, children with relatively intact language skills may benefit most. The presence of both generalisation and maintenance provide further support for the robustness of the results.

The main target behaviours addressed in these studies were increased social interaction and reduced maladaptive behaviours. Both of these are important in terms of achieving inclusion for these children: controlling inappropriate impulses and repetitive behaviours is desirable as they may impact on the child's learning and be distracting to others, whilst the ability to learn and use social skills is essential in order to form meaningful social relationships with their peers (Strath, 2010).

LeGoff argues that LEGO® Play is a particularly effective intervention for teaching social skills to children with as it intrinsically rewarding. Since it capitalises on the children's natural interest in LEGO®, it is inherently motivating and no external rewards are required (LeGoff, 2004). This is

important since motivating children with autism can be problematic, as they may not respond to traditional motivators such as praise (The Scottish Government, 2009a). That LEGO® Play can be enjoyable is borne out by the positive ratings of the intervention in Owens et al (2008) with 11/16 of the participants rating it 10/10. While the premise behind the intervention is relatively simple, it is unlikely that all children will find LEGO® enjoyable so, as Owens *et al.* (2008) and Pang (2010) ask, could other construction sets or collaborative play approaches achieve similar results?

Whilst these studies provide supportive evidence for the strategy's efficacy, it should be noted that, as yet, little research has been undertaken into LEGO® Play, so the evidence available is limited. Furthermore, two of the major studies were conducted by LeGoff himself, so there is an urgent need for empirical research from other sources. It is hoped that this would strengthen the evidence base for LEGO® Play, which is, at this stage, promising.

LEGO® Play requires some initial training to be able to facilitate the LEGO® Play sessions and some investment of time when running them, however, the play materials required are readily available and relatively inexpensive. Although the intervention was developed in a clinical setting, two of these studies demonstrated that it can be used in an educational setting, and this will certainly be easier if it can be proven that individual therapy is not a crucial element. If this is the case, it is possible that LEGO® Play could make a notable contribution in mainstream primary schools to the teaching of social skills, such as joint attention, verbal interaction and collaborative working. Learning these in naturalistic settings may also make these skills more likely to be generalised, both to formal teaching and informal social situations.

Circle of Friends®

Although all three studies reported some positive results, overall they are disappointing. Kalyva and Avramidis (2005) recorded the most favourable results, which were largely maintained two months later. However, this study deviated significantly from the format outlined by Taylor (1996), as there was no initial class meeting and circle members were selected by the nursery teacher. The format of the meetings also differed as they did not address the focus child's behaviour nor include target setting, instead comprising activities, such as games and singing. Although these adaptations may have been made to suit the age of the participants, they cannot be considered true CoF meetings, thus undermining the validity of the results.

The other two studies recorded significant improvements in the social inclusion of the focus children following the whole class meeting. However, not only were no further gains reported during the weekly CoF meetings, these initial gains gradually regressed. The only child whose acceptance and rejection scores continued to improve during the weekly meetings was the one child diagnosed with ASD in Frederickson et al (2005). The authors hypothesised that, because the nature of the child's difficulties had been explained at the whole class meeting, this had created greater empathy towards him and more realistic expectations regarding potential behaviour change. However, James (2011) also included this, and not only did the initial gains fall during the weekly meetings, they regressed close to baseline levels. The reasons for this were unclear. Nevertheless, the initial gains resulting from the whole class meeting should be viewed positively. The question which must now be addressed is how these gains can be maintained in the longer term.

Significantly too, one study reported that four of the five focus children felt happier in school following the intervention. This finding alone is important, since the intervention was set up to support them, so their perceptions are crucial. Listening, and responding, to pupil voice is vital, and is an integral part of the GIRFEC approach (The Scottish Government, 2012). In addition, as

argued earlier, social isolation can have a detrimental impact on emotional wellbeing and self-esteem (Wiele, 2011), so that if an intervention of this nature can prevent this, then its impact should not be underestimated.

There is a relative lack of research regarding the use of CoF for children with autism, as borne out by the difficulty encountered in identifying studies for this project. Furthermore, the results of these studies are mixed to say the least, with Frederickson et al (2005) concluding there was currently insufficient evidence to support the weekly CoF meetings. Whilst this author would not go so far, the evidence at present is inconclusive and there is an urgent need for more research in this area.

These studies demonstrate that this strategy can be implemented in mainstream classrooms. However, organising and running a CoF intervention represents a considerable investment of time and effort on both the part of the facilitator and the circle members. Based on the results of these studies alone, the use of CoF in mainstream classrooms cannot be recommended in its present format at this time.

Conclusion

This study has sought to contribute to the existing evidence regarding the use of Social Stories™, LEGO® Play and Circle of Friends® to support children with autism by undertaking a review and analysis of recent research. Whilst some positive results were found for all three interventions, the results are inconclusive. In the case of Social Stories™, it is concluded that, while some children make very significant gains, the results are often inconsistent and highly variable. The reasons for this are, as yet, unclear. Nevertheless, Social Stories™ remains a promising intervention for teaching routines and a range of social behaviours, and can be easily implemented in educational settings. The results for LEGO® Play are the most positive, although it was felt that the evidence base is too limited at this time. However, if further research supports the current evidence and the strategy can be demonstrated to be effective without individual therapy, it could certainly be used in mainstream schools, for example, to develop social competence. However, the results relating to Circle of Friends® are disappointing: although gains in social inclusion followed the whole class meeting, these were not sustained during the weekly meetings. As a result, despite the fact the strategy is suitable for use in educational settings, this can not be recommended at this time.

Whilst the methodology of this project is appropriate, it is limited by the lack of empirical research studies available, particularly for LEGO® Play and Circle of Friends®. The studies were therefore chosen from a limited body of research and the conclusions are dependent on the reliability of these sources. In addition, as this is a fairly small-scale study, the findings should therefore be treated with caution.

As noted earlier, there is a need for further rigorous empirical research into these strategies. With regard to Social Stories™, the aim should be to achieve greater consistency in the results. Research studies should therefore try to establish which children respond best to Social Stories™ in terms of their characteristics, as well as trying to determine which skills and behaviours can be taught most effectively using them. Finally, the features and various formats of Social Stories™ should be scrutinised to gain a better understanding of their value and impact. The evidence base for LEGO® Play should be strengthened by undertaking more studies in educational settings, and without individual therapy, in order to ascertain its suitability for use in mainstream schools. The use of other construction materials and collaborative problem solving games should also be researched to establish whether they can achieve similar results. In the case of Circle of

Friends®, research should focus on the format and content of the weekly meetings to identify ways of maintaining the initial gains in the longer term.

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