The value of LEGO® Therapy in promoting social interaction in primary-aged children with autism

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Editorial comment
This paper describes a small-scale study that looked at the wider effect of ten weekly sessions of LEGO® therapy on the social interaction skills of eight, primary-aged children on the autism spectrum. Their behaviour was observed in the playground before for a period before the sessions began, then immediately after the ten weeks of LEGO® therapy and then again ten weeks after the therapy stopped. Findings show that there was more social interaction between the children after the sessions and that this effect was maintained when the therapy stopped.

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Introduction

Moor (2002) writes:

> *'Play and social development go hand in hand – one is a vehicle for the other. Underpinning play is interaction.'* (Moor, 2002, p 17)

However, children with autism often find social play difficult (Attwood, 1998; Hauck, Fine, Waterhouse and Feinstein, 1995). Rogers (2000) views improved social functioning as one of most important intervention goals for children with autism and evidence suggests that social competence is a key predictor of life outcomes (National Research Council, 2001, cited Owens et. al., 2008). Observations of children with autism indicate that they tend to engage in solitary, repetitive play in their free time, rather than interacting with others (Wolfberg 1999, cited Phillips & Beavan, 2007). In addition, LeGoff, Krauss & Levin Allen (2010) identified an absence or difficulty in engaging in adaptively relevant play, which is required to play effectively with others.

Origins of LEGO® Therapy

The definition of the Danish word Lego is to play well (Whitworth, 2009). LEGO® Therapy is a social development programme for children of school age on the autism spectrum, which is based on collaborative LEGO® play.

LeGoff, a psychologist in the USA, came up with the idea for LEGO® Therapy, having noticed that two children in his waiting room, attending individual therapy sessions were playing animatedly together using their LEGO® sets. Neither child had previously shown any motivation to interact and it seemed likely that their common interest in LEGO® had given them the enthusiasm to engage socially. With the agreement of their parents, LeGoff started weekly LEGO® Therapy sessions alongside their individual sessions (Owens & LeGoff, 2007). He discovered that by allocating specific joint and interactive jobs within the LEGO® building and by making the children take turns to carry out each role, the resulting interaction promoted the development of key skills which were typically hard for those with autism to acquire, including joint attention, sharing, collaboration, verbal and non-verbal communication and conflict resolution. By providing a structured set of rules and giving pupils responsibility for problem-solving, using the rules as guidance, the adult was able to take the role of facilitator, highlighting the presence of any problems and encouraging pupils to come up with solutions. These experiences resulted in a greater understanding of others' points of view.

LEGO® Therapy uses play to develop social competency by creating opportunities to interact. Pupils work

together to build LEGO® models in pairs or teams of three. It is argued that as a result, participants experience a greater motivation to initiate social contact and engage in sustained interactions with others (LeGoff, 2004).

The study

The study took place over one academic year as an integral part of my job working as a Specialist Teacher for a local authority, advising mainstream school staff on working with children with autism. In my role, I recognise the need to support pupils to improve their social interactions with their peers. However, the programmes that are commonly used in schools seem to teach social skills out of context and pupils have difficulty generalizing their learning into a real life, social setting. Even where social initiations are made, my experience indicates that pupils remain ineffective at generating a chain of two-way interactions and generally continue to appear aloof or passive to their peers. LEGO® Therapy creates naturally occurring opportunities to develop social understanding in a real play setting, and so it seemed appropriate to try this out in my work.

Why LEGO® Therapy?

Traditionally, social skills programmes focus on areas of impairment (Hurley-Geffner, 1995 in Potter & Whittaker 2001), rather than considering what may be possible for pupils with autism and facilitating the development of these skills. Pupils can gain a negative perception of having to participate because they are not good at socialising (Gomez de la Cuesta, 2010) and may view initiatives as uninteresting or irrelevant.

Previous studies on LEGO® Therapy

LeGoff published an initial outcome study in 2004. Following 12 weeks of LEGO® Therapy, he observed clinically significant improvements for a group of children with autism in the frequency of their self-initiated interactions and also the duration of their interactions in unstructured situations. He also identified a reduction in rigidity and aloofness. Those children who carried on for a further 12 weeks made additional gains in these areas. LeGoff and Sherman (2006) carried out a retrospective study on the long term outcomes of LEGO® Therapy as compared to comparable non-LEGO® interventions. The pupils taking part in LEGO® Therapy made greater gains in social competency and showed a greater ability to adapt to social situations. Progress was maintained over the three year period, supporting the idea that LEGO® Therapy leads to meaningful and long-term generalisation.

Owens and LeGoff (2007) produced a LEGO® Therapy Manual which was used to create consistency for use in a randomized controlled trial. Owens, Granader, Humphrey & Baron-Cohen in 2008, compared LEGO® Therapy with the Social Use of Language Programme (SULP) (Rinaldi, **[MARK QUERY EDITOR TO PROVIDE DATE HERE PLEASE]**). Results showed greater decreases in rigidity for children in the LEGO® Therapy group. The LEGO® Therapy group showed small but statistically significant increases in the duration of their social interactions. There was also an improvement in the number of initiations observed. Copyright issues have stalled the publication of a LEGO® Therapy Manual, resulting in a positive, but limited, bank of research which has been carried out by the core team. Research has been carried out in a clinical setting which makes recommendations for further research in schools (LeGoff & Sherman 2006; Owens et al, 2008).

Aims of the study

- to evaluate whether a series of ten, weekly, school-based LEGO® Therapy sessions, delivered to primary-aged pupils with autism in mainstream schools leads to an increase in the frequency of their social interactions in the school playground
- to determine whether LEGO® Therapy has an impact on the style of interaction observed, using the categories of verbal communication, proximity, touch, copying and taking part in organised, collaborative games, such as football or 'What's the Time, Mr Wolf?'
- to ascertain whether any measured gains were still in evidence following a further ten-week period of no intervention

Method

The current study used a waiting list control design to evaluate gains in social interaction. Each pupil was observed in the playground for ten minutes on six occasions during the academic year: at the start and end of an initial ten week control period with no intervention, at the start and end of a further ten weeks of LEGO® Therapy and at the start and end of a further ten weeks with no intervention to assess maintenance over time.

The sample

There were eight pupils aged between eight and eleven, based in three different mainstream primary schools (see *Table 1*). Each child included in the research had a diagnosis of an autistic spectrum condition, although the schools also included other pupils with difficulties in social communication and flexibility as participants in the LEGO® Therapy sessions. There were seven boys and one girl featured in the sample. It would have been useful to include more girls, but the profile reflected the ratio of girls to boys on caseload.

The importance of the adult's role in LEGO® Therapy in highlighting problems to the children, rather than giving solutions, was reinforced through training and support (Owens et al, 2008). Peer mediated corrective feedback was encouraged by directing pupils to remind each other of the rules in a positive manner. As the sessions progress, more of the adult's effort should go towards promoting the social and communication skills, rather than developing actual LEGO® building skills (LeGoff et al, 2010). Each school was given training on LEGO® Therapy and I was available for advice and help throughout the ten week period either by phone, e-mail or in person. To check validity and consistency, school staff completed Fidelity Checklists for each session to check that their practice conformed to the LEGO® Therapy guidelines. To assess that these were completed objectively, I randomly attended sessions and completed my own checklist alongside school staff for subsequent comparison. It was encouraging to see that the adults were able to act as facilitators, promoting the participants' own abilities to problem-solve collaboratively. Pupils were observed to make reference to the rules in sorting out any issues and as the sessions progressed, there were fewer incidences of pupils attempting to dominate and a greater emphasis on giving verbal explanations to their peers, rather than grabbing equipment when something had gone wrong with the building. Pupils were also more accepting of the need for turn taking.

Table 1: Research sample

	School A	School B	School C
Age 8	2		
Age 9	2	1	
Age 10		1	
Age 11			2

The format of the sessions

During the ten-week intervention period, a 45-minute session was delivered each week by school staff. This included a five minute introduction, allowing the opportunity to greet group members and reinforce the LEGO® rules or set goals. This was followed by 20 minutes of LEGO® set building, 15 minutes of free building and five minutes of tidy up time. During the set building, small LEGO® kits with pictorial instructions were provided and participants worked in pairs or threes, taking it in turns to perform set roles:

1. The Engineer used the plans to describe the bricks and the construction needed
2. The Supplier found the correct bricks
3. The Builder put the bricks together following the Engineer's verbal instructions and the plans.

During the free building, pupils agreed on a LEGO® project and built collaboratively, without visual instruction sheets. This part of the session tended to replicate a real life play situation more closely, with more verbal negotiation and as the weeks progressed, was often where chat which was not related to LEGO® occurred. It was during the freestyle section of a LEGO® Therapy session that I observed one pupil laughing with a peer. In four years of close work with the school, this type of mutual enjoyment had never been observed for this particular pupil. For each session, the rules and a visual timetable were clearly displayed.

Results

Observation 1 was carried out at the start of the control period; observation 2 was ten weeks later at the end of the control period. Observation 3 took place at the start of the intervention. Observation 4 was ten weeks later, at the end of the intervention. Observation 5 took place at the start of a ten-week period of non-intervention. Observation 6 was carried out at the end of these ten weeks.

Figure 1 illustrates the average number of social interactions observed by the pupils during playground observation. The baseline figure at observation 1 showed an average of three self-initiated interactions during a ten-minute observation. Following ten weeks of LEGO® Therapy at observation 4, the figure rose to an average of five interactions during ten minutes on the playground.

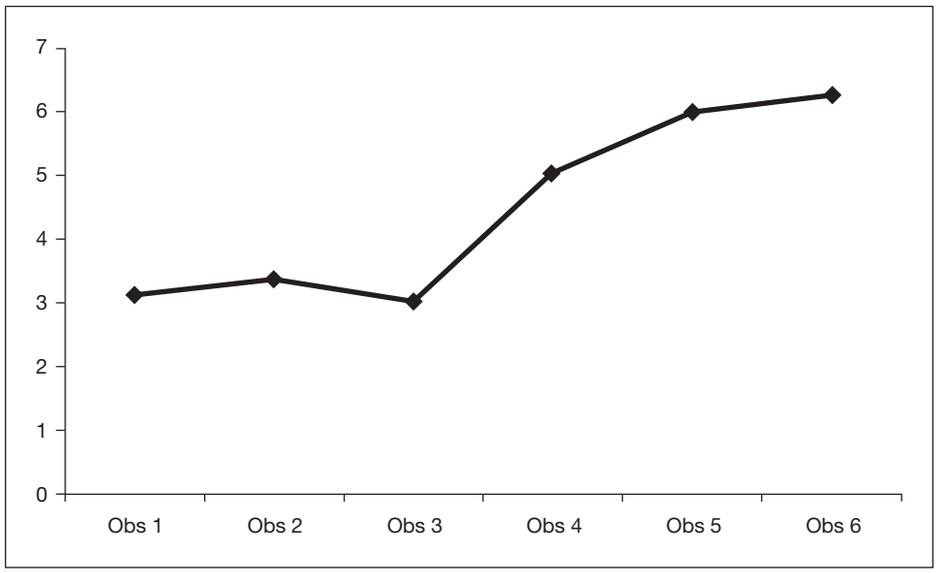

Figure 1: Average frequency of interaction in the playground between the children pre and post intervention

Types of interaction observed in the playground

Prior to LEGO® Therapy, the pupils were observed to engage in four types of interaction (ie verbal, proximity, touch and copying), and only started to join in with organised games following the intervention. The greatest gains were made in the area of verbal interaction, which increased from being observed an average of 0.75 times per ten-minute observation prior to LEGO® Therapy, to an average of 3.4 times following the intervention at observation 4 (see *Figure 2*).

In terms of touching peers, the frequency decreased between observations 3 and 4, from an average of one touch per ten-minute observation to an average of 0.25 times after LEGO® Therapy (see *Figure 3*). It may be that they were now talking to each other rather than communicating by touch.

A common observation in the early stages of the study was for pupils to copy the actions of their peers in the playground. Initially, it was very common to see parallel play, with pupils following a play sequence or running a

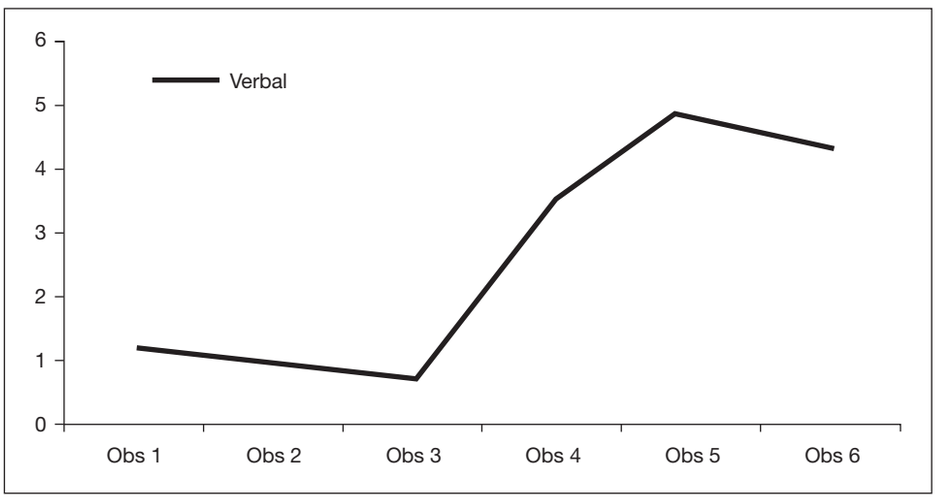

Figure 2: Average number of verbal interactions in the playground pre and post intervention

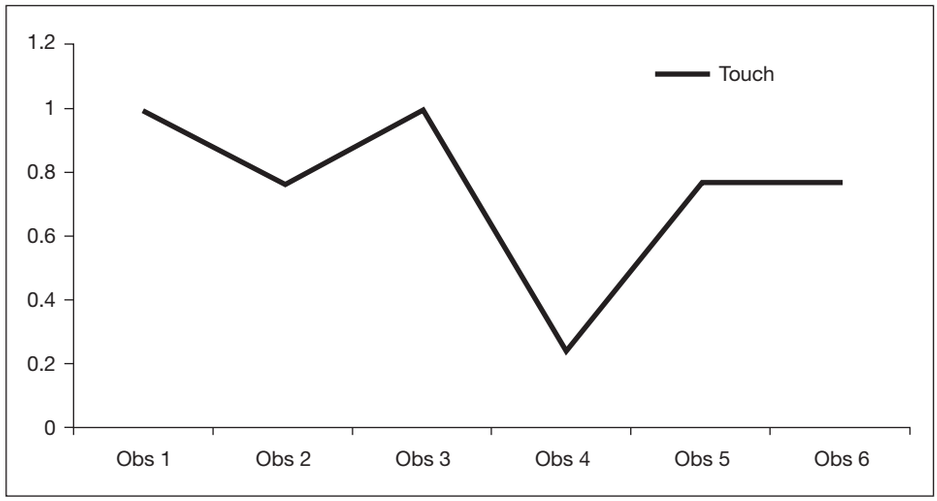

Figure 3: Average number of times the children touched each other in the playground pre and post intervention

few paces behind others, without giving any verbal indication that they were attempting to engage. Very often, the other pupils were so engrossed in their own play, that they did not even notice the focus child's actions. During the study, there was a significant decrease in the amount of copying used in social interaction (see *Figure 4*). Prior to the intervention at observation 1, copying represented 25 per cent of all interactions, but at observation 4, following LEGO® Therapy, the proportion of copying had reduced to 15 per cent of all interactions.

No organised games were seen at observations 1, 2 and 3 (see *Figure 5*). By observation 4, following LEGO® Therapy, the first pupil was observed playing football. This increased again at observation 5 and 6. Although only scoring one interaction, participation in organised games tended to last for the whole observation period.

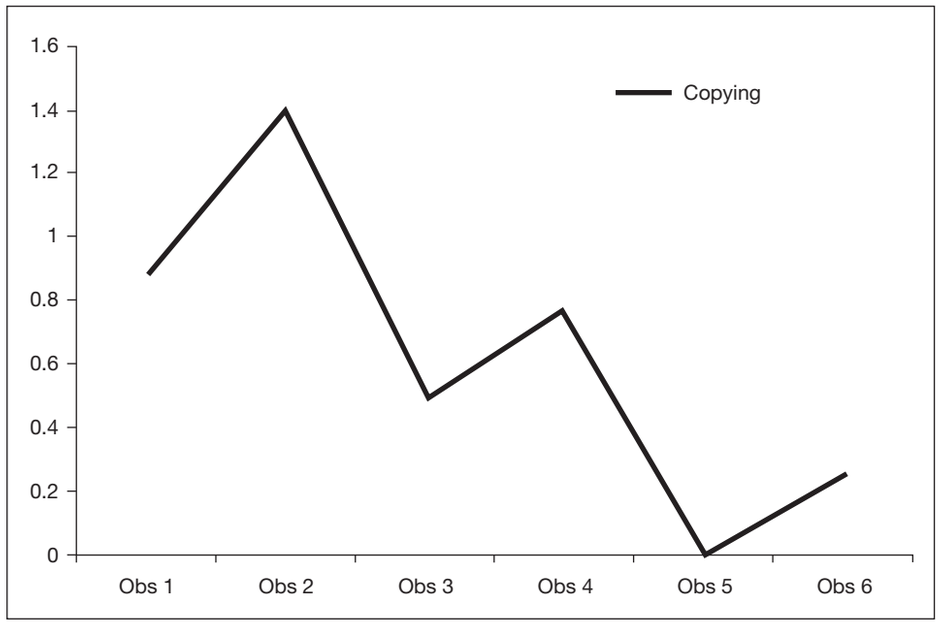

Figure 4: Average number of times the children copied each other in the playground pre and post intervention

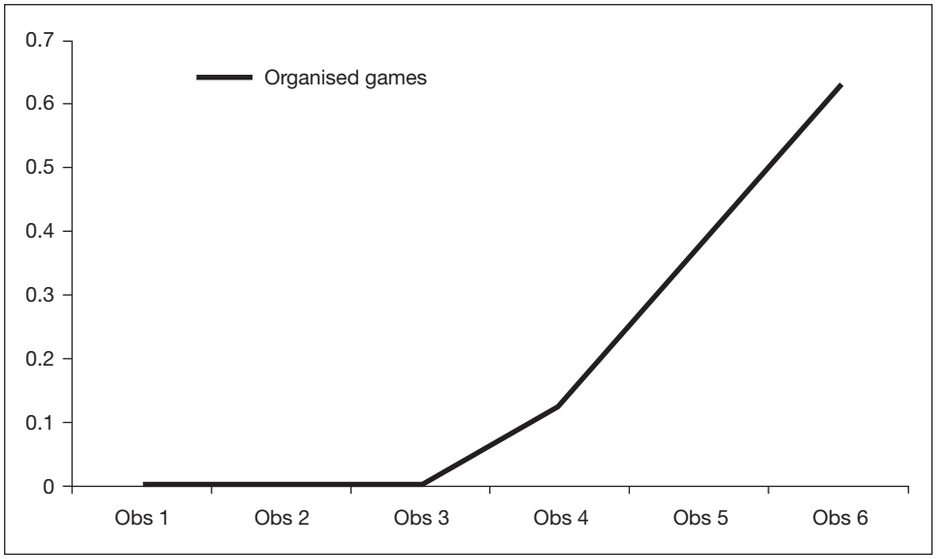

Figure 5: Average number of times the children engaged in organised games in the playground, pre and post intervention

A measurement of the duration of interactions would have been a more useful indicator than merely recording the frequency, with hindsight.

Compared to the published data on LEGO® Therapy, this is the first study to include a period of no intervention to assess generalisation into other activities. The data demonstrated social gains over the period of intervention, but to evaluate its meaningful impact, it was important to consider whether these gains were maintained in the absence of the intervention. Surprisingly, gains in social development appeared to during the final ten week period of no intervention.

The significance of the changes observed, in terms of the variety of playground interactions, appeared to relate to the pupils' abilities to find common ground with their peers. In the early observations, participants tended to engage more in strategies, which relied on peers interpreting their intentions (eg proximity, copying and touch), with the likely outcome of parallel, rather than interactive play. LEGO® Therapy seemed to have widened the range of activities in which participants were willing to participate and 'to go with the flow'.

Bogdashina (2005) identifies spoken language as the clearest means of communication, yet individuals with autism tend to adopt other forms of communication as their primary means, particularly in an uncomfortable situation such as the playground. The results of the current study showed that verbal interaction progressed significantly during the course of the research which is an important finding. Once the participants were able to indicate an interest and carry out more collaborative play, the other pupils started to initiate more contact with them. This knock-on effect developed over time and may also support the idea of the social momentum continuing to pick up even after the intervention had finished.

In my view, the significance of the observation of participants engaging in collaborative organized games should not be underestimated. Through my advisory work, it can often seem as though the boys' lack of interest and flexibility towards joining in with the football games which preoccupy the majority of their peers, represents one of the greatest social disadvantages posed in a mainstream playground. These activities involve turn-taking and joint attention, and using a common language, which had appeared hard for them initially.

The use of social rules in LEGO® Therapy provides a structure, which makes the activity more understandable to children with autism. The same rules are relevant to both the playground and group work situations. It is worth noting that one school reported marked differences in the way their children were now able to engage in group work. Not only were the pupils more able to hold joint attention, but also their group listening

and communication skills appeared to have improved, with fewer instances of dominating the group and improved turn-taking.

A key feature of autism, as defined in DSM-IV (American Psychiatric Association, 1994) is a lack of social reciprocity. The observations in this study showed evidence of sequences of two-way interactions. Potter & Whittaker (2001) emphasise the importance of using enjoyable and meaningful activities to support communication in the educational environment, as these are more likely to promote spontaneity. LEGO® Therapy aims to promote spontaneous social interaction by motivating pupils with activities that they find enjoyable.

Limitations of the study

- The observations required an unavoidable element of observer judgement on what constitutes a social interaction.
- The duration of interactions would have been a useful measure.
- The study used different adults to deliver the intervention, which may have had an impact on the effect of the intervention.
- The school holiday resulted in inevitable gaps between each assessment period, which may have affected results.
- The small sample size limits the generalisability of the findings and it would be very useful to repeat the study with a larger sample.

At one school, the participants requested that chat time was included in the LEGO® sessions. The staff checked whether this would be appropriate and it was agreed that it was a very positive sign that the pupils involved were motivated to communicate their thoughts on issues which were unrelated to the LEGO® building process. It was decided by the pupils to extend the sessions by five minutes and pupils requested that they could take it in turns to bring a favourite item to show the group. Obviously this adds a new element to the sessions, which can make the results harder to compare, since the chat time itself may lead to social skills development. In creating a Manual on LEGO® therapy, the hope is to establish a system for treatment replication.

Concluding comments

The current study appears to support the case for the use of LEGO® Therapy in the development of social skills in pupils with autism. Following the intervention, participants engaged in social interactions more frequently. Pupils were able to form meaningful bonds with their peers, which extended into the playground and they also used a wider variety of strategies to interact with those around them. Even after the LEGO® Therapy sessions had finished, pupils continued to consolidate and develop their skills, making additional progress in each of the areas monitored, indicating that generalization had taken place over time. In my opinion, the true sign of the effectiveness of any intervention is the participant's ability to generalize the acquired skills even after the intervention has ceased. This is the first study to suggest this occurs following the use of LEGO® Therapy. For me, the defining moment of the study took place as I arrived at a school to carry out an observation of a pupil about whom the Midday Assistants had previously said, 'He's the one who's always on his own'. I observed him actively engaged in a football game, demonstrating the key skills of turn-taking, joint attention and shared accomplishment, skills from the Lego Therapy which he had appeared to generalise to the playground setting.

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