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Title:

Developing Communication Skills in Deaf Primary School Pupils: Introducing and Evaluating the *smiLE* Approach

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ABSTRACT

Background: Many profoundly deaf signers have difficulty communicating with hearing people. This paper describes *smiLE* (Strategies and Measurable Interaction in Live English; Schamroth & Threadgill, 2007a) a therapy approach used to teach deaf children skills to become successful communicators in real-life situations.

Aims: This study evaluates the effectiveness of *smiLE* in helping deaf pupils develop their ability to make successful requests in a specific communication situation and whether this generalized to another communication situation.

Method: Sixteen severely and profoundly deaf primary school pupils (7.2-11.0 years old) received an 11-week programme of therapy. Their performances in a trained and an untrained communication situation were compared pre- and post-therapy.

Results: In the trained task, the pupils' interactions improved significantly. No differences were found in the untrained task, suggesting that the learnt skills did not generalize. Anecdotal findings suggest that some carry-over into a similar situation had occurred and that trained skills were maintained.

Conclusions & Implications: The *smiLE* therapy approach is effective in providing deaf children with the communication skills and confidence to interact with English speakers in targeted situations. The lack of generalization of these skills to similar situations may be overcome by a longer therapy programme specifically promoting these skills across different situations.

Keywords: communication skills; deaf; generalization; Live English; outcome measures; speech and language therapy; efficacy

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INTRODUCTION

Within the population of deaf people are those who prefer to speak, those who use a sign language and those who communicate using a combination of speech and signing. Regardless of their communication preference, people who are deaf experience much discrimination and lack of understanding in society at large (Higgins, 1980). It is well known that profoundly deaf signers have considerable difficulty in communicating with hearing people (Bench, 1992; Gagne, Stelmachovich & Yovetich, 1991) as many have poor English skills and low levels of speech intelligibility (Beazley, 1992; Bench, 1992; Carney & Moeller, 1998) and most hearing people cannot sign. This can lead to the emergence of a 'shared handicap of communication' between deaf and hearing partners (Bouvet, 1990) causing both to be unsure and ineffective at communicating with each other (Beazley, 1992).

To be a competent communicator, a person must use a range of pragmatic skills effectively. Owens (1996) showed that hearing children acquire these skills within the first 8 years of life through conversational interactions. However, for profoundly deaf children, learning the rules of social communication is more challenging (Crocker & Edwards, 2004) and many have difficulties in acquiring pragmatic skills necessary for communicating with hearing people, particularly when using the spoken modality (Bench, 1992; Jeanes, Nienhuys & Rickards, 2000).

Common communicative difficulties identified in studies include failure to clarify misunderstandings, solve disagreements or lead conversations (Stinson, Liu, Saur & Long, 1996). The problems deaf children have in asking questions have also been

highlighted (Lederberg & Everhart, 2000; Nicholas & Geers, 2003). Deaf students may additionally have difficulties with showing they do not understand something or seeking clarification (Bench, 1992; Silvestre, Ramspott & Pareto, 2007; Wood, Wood, Griffiths & Howarth, 1986). A study by Jeanes et al. (2000) found that signing deaf children made fewer and less specific requests for clarification than oral deaf or hearing peers and neither oral nor signing deaf children responded appropriately to requests for clarification. This highlights the difficulties deaf pupils have in requesting clarification, responding to requests for clarification and at times of communication breakdown (Hindely, 2003; Jeanes et al, 2000; Silvestre et al., 2007).

In addition, deaf children are not always made aware of the lack of clarity of their own communication. Often, a hearing parent or teacher will fail to signal the ineffectiveness of a message or may themselves repair it for the child (Beazley, 1992; Brackett, 1983; Wood et al., 1986), thereby denying deaf children the chance to develop the effectiveness of their interactions (Beazley, 1992) or take responsibility for their own communication.

There may be a number of reasons why these patterns of difficulties develop. Research has frequently noted that deaf children have reduced exposure to naturalistic, meaningful conversations (Akamatsu & Musselman, 1998; Carney & Moeller, 1998). Indeed, deaf children have reduced access to all aspects of incidental learning as their hearing loss prevents easy access to spoken language around them. With the exception of the small minority from deaf families, children who sign are rarely in communication situations where they can 'overhear' competent

sign language users as hearing parents and professionals may themselves have limited signing skills and frequently fail to use signing in the communication environment unless directing it specifically at the deaf child (Greenberg, 2000). Reduced quality and quantity of interactions means fewer opportunities for these behaviours to be modelled and fewer opportunities for the deaf child to apply the behaviours in natural settings (Brackett, 1983; Carney & Moeller, 1998; Jeanes et al., 2000).

Poor communication has consequences for emotional learning and mental well-being (Crocker & Edwards, 2004; Hindley, 2000). Marschark (1993) notes that many social-emotional problems of deaf children and adults are rooted in early socialisation and intertwined with impairments in hearing and language competence. While there is nothing inherent in a hearing deficit that causes social immaturity or inadequacy, there is evidence indicating that deaf children are relatively passive and less socially mature than their hearing peers (Carney & Moeller, 1998; Lemanek, Williamson, Gresham & Jensen, 1986; Meadows, 1980; White, 1982). This can often be related to distortions of parent-child interaction, limited early communication, reduced access to incidental learning and deprivation of social experiences (Hindley, 2003). Deaf people who communicate poorly in the hearing world are more likely to be socially isolated (Bain, Scott & Steinberg, 2004; Steinberg, Sullivan & Loew, 1998), are at greater risk for psychological distress (Marschark, 1993) and have a greater overall prevalence of mental illness than the general population (Crocker & Edwards, 2004; Hindley, 2000).

Traditionally, speech and language therapy with deaf clients has focussed on improving auditory perception, speech reading, speech production, vocal characteristics and understanding and use of language (spoken and, more recently, sign languages) (Carney & Moeller, 1998; Bench, 1992). Less consideration has been given to the everyday communication experiences of deaf children. Bench (1992) points out that, despite the large literature on the limited pragmatic abilities of hearing-impaired people, little of it relates to the assessment of, or therapy for learning and use of functional communication skills. In their review of treatment efficacy in children with hearing loss, Carney and Moeller (1998) mention no studies that focus on functional communication skills or social interaction. Given the potential implications of a deaf person's inability to interact with the hearing world, the urgency to develop therapy techniques to address this need becomes apparent.

It is known that improving communication skills can increase confidence and self-regard which have been shown to be particularly important in developing the social and communicative competence in hearing-impaired children (Palmer, 1988; White, 1982). The present study describes a therapy programme to develop the functional communication skills of deaf children based on a 'Live English' approach. The term 'Live English' was first used by Pickersgill & Gregory (1998) for the English used in face-to-face communication. It has been developed by speech and language therapists (SLTs) into a functional therapy approach focusing on real life communication between a deaf and a non-signing, hearing person. A particular Live English approach called '*smiLE*' (Strategies and Measurable Interaction in Live English; Schamroth and Threadgill, 2003; Schamroth and Threadgill 2007a; Schamroth and Threadgill 2007b) is used in this study. This approach teaches

effective communication strategies through structured steps to allow successful interaction in every day situations with English speakers.

Therapy is delivered in a series of *smiLE* modules. Each module focuses on a selected communication situation that pupils may experience. A test-teach-test approach is used and each child's interactions in the communication situation are filmed pre- and post-therapy. The videos are used for both assessment and feedback to pupils, a technique held to be important in intervention (Brackett, 1983; Ducharme & Holborn, 1997; Rustin & Kuhr, 1989).

The use of filmed material for assessment allows the therapist to identify which skills pupils already have and which areas need further development. When used as a therapy tool, the target skills are first elicited from pupils through discussion and adult role-play before their videos are watched. This enables pupils to have a clear idea of the target behaviours (as described by Schamroth & Threadgill, 2003; Schamroth & Threadgill, 2007a; Schamroth and Threadgill 2007b; and Threadgill & Allwright, 2006). The video then enables pupils to gain visual feedback regarding their own communication and gives opportunities for self-evaluation. By comparing their initial and final performances, pupils see their achievements and can assess their own progress. Since many deaf children struggle with literacy (Carney & Moeller, 1998; Marschark, 1993), the *smiLE* approach uses symbols and simple written language to access the targeted skills (Schamroth & Threadgill, 2007b; Threadgill & Allwright, 2006).

SmiLE therapy draws on techniques recommended and/or used in the literature. It includes explicit teaching of basic skills (e.g. eye contact, facial expression), communicative functions (e.g. greetings and interruptions) and socially appropriate phrases as advocated by Beazley (1992) and Rustin & Kuhr (1989). As used in programmes developed by Tye-Murray (1992), pupils are made aware of language or vocabulary they may encounter during interactions and target skills are modelled (see Ducharme & Holborn's (1997) study for use of this method). Opportunities are given for role-play and skills are practised in real situations as suggested by Brackett (1983), Rustin & Kuhr (1989) and Beazley (1992) and used by Jeanes et al. (2000) in their study on the pragmatic skills of profoundly deaf children. Giving opportunities to interact with hearing people in a controlled environment can foster confidence and teach children to take responsibility for their own communication (Palmer, 1988). Bench (1992) recommends that, pupils practise active listening skills which involve seeking clarification. Where appropriate, pupils also learn alternative ways to communicate, as seen in Gagne et al.'s (1991) study. They are taught about the need to adapt their message for different listeners (Brackett, 1983) and that simply informing a stranger about one's hearing loss can have a positive impact on the communication (Bain et al., 2004).

SmiLE therapy is offered within a group context. This provides a ready-made social situation and opportunities to practise and extend communication skills into a social setting. Beazley (1992) suggests that a co-leader for such groups is beneficial. In *smiLE* therapy, teachers work alongside SLTs in planning and presenting sessions, allowing for carry-over into the classroom.

Pupils' communication skills are assessed using carefully designed criterion-referenced measures whereby relevant interaction behaviours needed for a specified skill are broken down into a step-by-step checklist (described by Schamroth & Threadgill, 2003; Schamroth & Threadgill, 2007a; Schamroth & Threadgill, 2007b; Threadgill & Allwright, 2006). By carefully analysing the video footage, the therapist is able to establish a baseline and provide later outcome measures which indicate change and demonstrate the effectiveness of the intervention, the importance of which is highlighted by Bray, Ross & Todd (2006) and Bunning, 2004. Evaluation, however, should also assess the generalization of trained skills to other situations, an area known to present problems to deaf children (Bench, 1992; Kreimeyer & Anita, 1988; McGinnis, 1983). The generalization of communication skills learnt in *smiLE* therapy was also examined in this research.

Aims of the study

This study considered the impact of *smiLE* therapy in deaf primary school pupils. It measured the changes in the children's communication skills after *smiLE* therapy and investigated whether deaf pupils spontaneously generalize the specific skills learnt in therapy to another communication situation.

METHOD

Participants

A non-random sample of 16 deaf primary school children aged between 7.2 and 11.0 years old (mean: 9.3 years; SD: 14.2 months; 7 girls and 9 boys) participated. All were severely or profoundly deaf, had normal cognitive functioning and attended a specialist primary school for deaf children where a Total Communication (TC) philosophy was followed. TC uses a combination of speaking, signing, finger spelling, natural gestures, lip reading and other clues to facilitate communication (NDCS, 2008). Seven participants were from deaf families where British Sign Language (BSL) was used; the others were from hearing families where English was the dominant home language. All participants in the study used signing (BSL or Sign Supported English) within the school environment and all relied on signing to support their communication. Parental permission was obtained for pupils to participate in the study.

Entry criteria for the study were that pupils were in Key stage 2 (Years 3-6), ate school dinners at lunch time (the study involved making requests for their meals) and had not previously received *smiLE* therapy. Participants were put into four small groups of four to six pupils each .

Procedure

a) Communication situations

Pupils were filmed in two situations that could occur within the school setting and which required them to interact with hearing, non-signers. Filming took place at the beginning (pre-therapy) and end of term (post therapy).

Situation 1: Pupils were required to request a plaster from the school secretary. They were shown a photograph of the secretary and a plaster, but were not given the BSL sign or English word for it. The secretary was required to misunderstand the pupil's request and offer an incorrect item unless the child's communication was perfectly clear. Paper and pen were present for pupils to use, but were placed to the side of the desk and attention was not specifically drawn to their availability. Pupils were aware that they were being filmed.

Situation 2: Pupils made requests for their choice of food in the dining hall. They were offered their usual food options on the day of filming and kitchen staff followed their usual routine. The camera was unmanned in the dining hall and pupils were not warned that they would be observed.

Situation 1 received *smiLE* therapy, Situation 2 did not.

b) Assessment

As no standardised assessments on pragmatic communication skills exist for deaf children, a specially designed criterion referenced measure was used to assess the children's pragmatic and functional communication skills in this study. The carefully designed criterion referenced measures are an important feature of the *smiLE* approach.

Pupils' communication was assessed on their achievement of a set of criteria using an observational checklist. The criteria were matched as closely as possible across the situations. In each situation, three aspects of the interaction were analysed: 1)

entering; 2) requesting and 3) leaving. Pupils received a 'yes' if criteria were met or 'no' if not. The criteria are shown in Tables 1 and 2.

INSERT TABLE 1 AND 2 HERE

c) Clarity of communication

The clarity of pupils' communication in Situation 1 was assessed. This analysis considered whether or not they used an accurate English utterance, and whether intelligible speech and/or an effective alternative communication method (e.g. writing, drawing) was used. The adjudicators judged whether the children's request utterances were a) intelligible (such that they would be understood by a person unfamiliar with the speech of a deaf person) and b) grammatically accurate. Their initial and final interactions were compared.

d) Scorer Reliability

The first author scored all videos. To check reliability, data was scored by two other adjudicators. Videos were presented in a random order and the other adjudicators were blind as to the time the video had been taken and whether the task was treated or untreated. The first adjudicator was a SLT who could sign and was with familiar *smiLE*, but did not know the children. The second was a hearing teacher with no knowledge of sign language or *smiLE* and who had never worked with deaf children.

e) Therapy Sessions

Pupils received an 11-week block of *smiLE* therapy targeting communication skills required for Situation 1. Therapy consisted of two 25 minute sessions per week given to each group of 4-6 children. Two Specialist SLTs and four Specialist Teachers of the Deaf were involved in the therapy sessions with the four groups of children. One session a week was led by a Specialist SLT and run jointly with the teacher. The other session recapped on skills learnt in previous session/s and was planned by the therapist but run by the teacher alone. Identical therapy was provided for each group.

Sessions used a structured format and followed a logical progression. They began with discussion of the differences between BSL and spoken English to raise awareness of the different languages that may be used by deaf and hearing people. Most sessions focussed on the communication skills and spoken phrases required for entering, making a request and leaving. One technique involved eliciting the specific communication skills from pupils through discussion and adult role-play. Filmed interactions were viewed by the group to see if those behaviours were present. Pupils also had sessions on the use of alternative communication strategies (e.g. drawing, writing, acting) to prepare them if their speech was not understood. Pupils practised their entering, requesting and leaving through role-play.

Pupils' interactions were viewed using a classroom interactive whiteboard and projector. A variety of paper and interactive, electronic therapy materials were developed to assist learning. Symbols (from the 'Writing with Symbols 2000' software package) were used to support understanding and reduce the literacy load.

These facilitated the learning of relevant communication skills and English phrases and were used when analysing the students' own filmed interactions.

RESULTS

The reliability of the data was assessed by correlating the scores of the 3 adjudicators for the pre- and post-therapy data for each situation using the Pearson Product Moment Correlation. The 12 resulting correlations ranged from 0.743 to 0.952 and in each case were significant at $p < 0.001$. Further statistical analyses were based on the means of the three adjudicators' scores.

A three-factor within subjects ANOVA was used to analyse the data. The factors were the two situations (treated/office and untreated/dining hall), the time of assessment (before and after treatment) and the subtests of the assessment (entering/requesting/leaving). As the numbers of items in the subtests were unequal, scores were converted to percentages for the analysis. Significant main effects of each variable were found. Scores after treatment were significantly higher than those before ($F(1, 15) = 23.51, p < 0.001$) and scores for the office situation were significantly higher than those for the dining hall ($F(1, 15) = 13.59, p < 0.01$). These effects were qualified by a significant interaction between the variables ($F(1, 15) = 21.87, p < 0.001$). As expected this showed that the treated situation had improved more than the untreated. Mean scores are shown in table 3. An analysis of simple main effects found that there was no difference in the scores prior to treatment but

that scores for the office situation were significantly higher after treatment ($F(1, 15) = 54.20, p < 0.001$).

INSERT TABLE 3 HERE

The subtests of the assessment also differed significantly ($F(2, 30) = 3.95, p < 0.05$). This was due to lower scores on the entering section. The interaction between situations and subtests was also significant ($F(2, 30) = 24.07, p < 0.001$). This interaction combines the subtest scores for the pre- and post-therapy assessments. An analysis of simple main effects showed that the office situation had significantly higher scores for entering ($F(1, 15) = 13.80, p < 0.01$) and for leaving ($F(1, 15) = 14.55, p < 0.01$) but that scores for requesting were marginally higher in the dining hall situation.

When comparing the percentage scores of the a) entering, b) request and c) leaving subsections, of the initial versus final dining hall and office interactions (see Table 4), the pupils' initial dining hall (untreated situation) request (75.29%) was better than their initial office (treated situation) request (50.00%). The pupils' initial entering and leaving were, however, better in the office situation. In the final situation, all subsections were noticeably better in the office situation (treated situation) but almost unchanged in the dining hall situation, giving further indication of the improvements made following the *smiLE* therapy sessions regarding interaction in the office situation.

INSERT TABLE 4 HERE

Clarity of communication

Before therapy, 3 pupils used intelligible and grammatically accurate English utterances to make their request in the office (e.g. *'Plaster please.'* or *'Can I have a plaster please?'*). Five children used intelligible speech, although their communication was not always grammatically correct. Five children used other methods (e.g. gesturing/acting) to communicate their initial request or to support their (potentially unintelligible) spoken request. None used drawing or writing. The remaining three children used BSL when communicating with the hearing person.

Following therapy, English utterances were much improved; they were more complete and all pupils attempted to produce some spoken English. Eleven used a grammatically accurate English utterance for their post-therapy request and nine of these were intelligible. Seven children used other methods effectively; two wrote and one used drawing, while the others opted to use gesture or mime to support their speech. In total, 12 children communicated effectively in their communication attempt after therapy.

INSERT TABLE 5 HERE

DISCUSSION

In this study, deaf primary school pupils were filmed making a request to a hearing adult in two school situations: the office and the dining hall. Performance in the office

improved significantly after a block of *smiLE* therapy; performance in the dining hall remained unchanged. In the office, the children's entering, requesting and leaving behaviours all improved after therapy, as did the specific skills trained (e.g. eye contact, use of 'please', ability to re-request after being misunderstood, etc).

The dining hall situation had an ambiguous role in this study. From an experimental point of view, it acted as a control and its failure to improve indicates that changes in the office situation were likely to be due to the therapy. From a clinical perspective, however, the lack of generalization from the treated to the untreated task is disappointing particularly as the latter was selected to utilise many of the skills trained in therapy.

This failure to generalize raises a number of questions. Despite the similarity of the tasks, confounding variables may have affected the outcome. Was the dining hall task more difficult? This seems unlikely as it was a more familiar situation to the pupils who had already developed strategies to get the food they wanted. This was confirmed by their good scores for the requesting part of the task. The request was less demanding as pupils could point to the food they wanted without having to make a verbal or written request. Given that they did not experience any communication breakdown in the dining hall, pupils may have had little incentive to change. The situation was more public, less easily controlled and more distracting. It also differed from the office situation in that the unmanned camera was less likely to cue different behaviour. As a result, the dining room task may not have been as closely matched to the office task as had been intended.

Conversely, the office task was, in some ways, more demanding. It was less familiar, required more language and greater clarity from the child and aspects were manipulated to increase the difficulty (e.g. by asking for an item that was out of sight and the introduction of misunderstanding). The passivity typical in deaf children (Lemanek et al., 1986; Meadows, 1980) was evident when many accepted the wrong item in their initial attempts. Following therapy, the children had developed their ability to re-request, to use clarification strategies when misunderstood and to politely refuse an incorrect item. This led to a significant improvement: only 2 pupils (who were the 2 youngest participants) failed to get the plaster after therapy. This indicates that the therapy taught the pupils the skills for successful communication in this situation. Further evidence of this was that many of them could use a grammatically accurate English utterance and intelligible speech to request the item after therapy. This shows that the therapy was successful in teaching children ways to apply their linguistic knowledge and speech skills in a functional communication situation.

This speculation about the relative difficulty of the two tasks reveals a weakness in the experimental design of the present study. Ideally the treated task should have been counterbalanced across subjects thus removing possible task associated confounding variables. Conducting the research in a school situation made this inconvenient in the present study but its introduction is recommended in future research as is the use of a control group.

The lack of generalization suggests that future work, either in research or in clinical use of the therapy, should carefully consider the nature of the tasks to which generalization might occur and the changes within therapy delivery that would encourage it. In the current study, more practice of the same communication skills in a variety of communication settings may have enhanced the carry-over of previously learnt skills.

Anecdotally, it was noted that pupils became more aware of their communication and some reported that they felt more confident to communicate with a hearing adult using the skills they had learnt. For example, when watching the pre- and post-therapy videos of his office request, one pupil commented that in the first video he 'didn't know how to ask'. He went on to sign that he then 'learnt how and practised with the therapist' and that he felt more confident because he knew what to do the second time he went into the office.

While their communication improved significantly during this study, it was apparent that many participants had difficulty monitoring whether their speech had been understood, an issue highlighted by Beazley (1992) and Brackett (1983). Initially, pupils were largely unaware that the hearing adult had misunderstood them and failed to enhance the clarity of their communication. Pupils had to be taught to recognize when their speech had been unclear and when and how to use alternative communication methods.

Deaf children often have difficulty with vocabulary and spelling (Marschark, 1993). In the present study, pupils had to be specifically taught the writing and drawing skills to describe a plaster. As Brackett (1983) suggests, it is often assumed that deaf children will learn incidentally through experience or by watching deaf adult role models. The present study suggests that many skills need to be explicitly taught.

In subsequent *smiLE* therapy after this study was completed, eight of the pupils were placed in a similar office-type situation (but with different demands and a different hearing adult). While not part of the study, it was noted that pupils had maintained (and sometimes improved) the skills they had learned from the therapy. This suggests that generalization does take place, though only to a very similar task. To ensure that generalization occurs, it may be beneficial to include a combination of maintenance and generalization programming techniques as part of the *smiLE* therapy approach (as used by Ducharme & Holborn, 1997, Lemanek et al., 1986 and Rasing, Coninx, Cduker & van den Hurk, 1994). This could involve discussion with pupils of how skills can be used in different settings and provision of opportunities to practice in a wider range of communication situations. Allowing pupils to practise taught communication strategies in different environments may increase their awareness of how to apply communication techniques in a range of situations as suggested by Brackett (1983) and McGinnis (1983). There are also implications for ways in which teachers, school staff and parents can help to reinforce communication skills in everyday communication situations. Finally, it may also be useful to incorporate role reversal where pupils are able to learn about the perspective and needs of listeners and speakers. This may allow pupils to learn about cause-and-effect aspects of communication and the difference between the

speaker's intended message and listener's perception, as suggested by Palmer (1988).

CONCLUSION

The *smiLE* approach (Schamroth & Threadgill, 2007a) was used in this study to help primary school children (7.2-11.0 years old) develop their communication skills and was found to be effective within a targeted situation. A significant difference was seen in the overall interactions of the pupils after therapy and much improvement was seen within their entering, request and leaving behaviours. No improvement was seen in the control situation. This suggests that children had not generalized the learnt communication skills. Anecdotal evidence suggests, however, that some generalization into another, more similar situation had occurred and that the learnt communication skills were maintained over a period of time. In view of these findings, generalization may be improved by providing a longer therapy programme that includes specific generalization techniques and which specifically promotes the use of the learnt skills across different situations.

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TABLES AND FIGURES

Table 1: Scoring Criteria for Pupils' Interaction in Situation 1 (the Office)

Entering:	
1) Does the pupil approach / wait appropriately?	Yes / No
2) Does the pupil make appropriate initial eye contact?	Yes / No
3) Does the pupil smile / use a pleasant facial expression?	Yes / No
4) Does the pupil use an appropriate greeting (e.g. hello, wave)?	Yes / No
5) Does the pupil stand appropriately and at an appropriate distance?	Yes / No
Request:	
1) Did the pupil make their request using an effective method that could be understood by a non-signer?	Yes / No
2) Did the child use 'Please'?	Yes / No
3) Did child re-request after being misunderstood? (in English or other method)	Yes / No
4) Did the child refuse the incorrect item?	Yes / No
5) Did child re-request after being offered the wrong item? (in English or other method)	Yes / No
6) Did the child use clarification strategies in their re-request	Yes / No

(at any stage)? (e.g. point, write, helpful repetition, check, clarify etc)	
7) Did the child get what they wanted? (i.e. the plaster)	Yes / No
Leaving:	
1) Does the pupil make appropriate eye contact?	Yes / No
2) Does the pupil smile / use a pleasant facial expression?	Yes / No
3) Does the pupil use an audible and recognisable 'Thank you'?	Yes / No
4) Does the pupils leave appropriately (e.g. 'bye', walking out, close door etc)	Yes / No

Table 2: Scoring Criteria for Pupils' Interaction in Situation 2 (the Dining Hall)

Entering:	
1) Does the pupil approach / wait appropriately?	Yes / No
2) Does the pupil make appropriate initial eye contact?	Yes / No
3) Does the pupil smile / use a pleasant facial expression?	Yes / No
4) Does the pupil use an appropriate greeting?	Yes / No
5) Does the pupil stand appropriately and at an appropriate distance?	Yes / No
Request:	
1) Was the request made appropriately for a non-signer (i.e. using English or a clear strategy)?	Yes / No
2) Did the child use 'Please'?	Yes / No
3) Were appropriate facial expressions used during the interaction?	Yes / No
4) Did the child refuse items they did not want?	Yes / No
5) Was this done politely?	Yes / No
6) Did the child use clarification strategies in their request (at any stage)? (e.g. repeat, point, write, check, clarify etc)	Yes / No
7) Did the child get what they wanted?	Yes / No
Leaving:	
1) Does the pupil make appropriate eye contact?	Yes / No

2) Does the pupil smile / use a pleasant facial expression?	Yes / No
3) Does the pupil use an audible and recognisable 'Thank you'?	Yes / No
4) Does the pupils leave appropriately (e.g. 'bye', walking away etc)	Yes / No

Table 3: Mean percentage scores for treated and untreated situations.

Situation		Time	
		Pre	Post
Office	Mean	60.07	93.02
	Std. dev.	25.35	9.15
Dining Hall	Mean	62.70	60.40
	Std. Dev.	14.35	17.91

Table 4: Initial vs Final Office (treated) and Dining Hall (untreated) Entering, Request and Leaving Skills

	Entering	Request	Leaving
Office – initial	58.33%	50.00%	71.88%
Dining Hall – initial	52.92%	75.29%	59.89%
Office – final	95.42%	88.00%	95.83%
Dining Hall – final	48.33%	78.57%	54.17%

Table 5: Effectiveness of Communication: Use of grammatical English, intelligible speech and alternative communication methods

	Number of pupils using accurate English grammar	Total pupils using intelligible speech (grammatical or ungrammatical)	Number of pupils using other understandable methods to communicate	Number of pupils whose request may have been successful first time
Pre-therapy Situation 1 Request	3 (18.75%)	5 (31.25%)	5 (31.25%)	8 (50%)
Post-therapy Situation 1 Request	11 (68.75%)	9 (56.25%)	7 (43.75%)	12 (75%)