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Does Mixed-Up Marty help children to Improve their speech?

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UNIVERSITY of LIMERICK
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DEPARTMENT OF
CLINICAL THERAPIES



Does Mixed-Up Marty Help Children to Improve Their Speech?

Effects of a Novel Home Programme on Children with Speech Sound Disorders

**A Research Project submitted to the Department of Clinical Therapies, University of Limerick,
as part of the requirement for the Master of Science in Speech & Language Therapy**

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Abstract

Objective: Children with speech sound disorders make up a large portion of speech and language therapy waiting lists. As a consequence, it is necessary to investigate alternative methods of service delivery. This study explores the effect of a novel parent-implemented, no training needed home programme (HP) using an input only approach.

Method: Thirteen children aged 3;3 to 5;9 with diagnoses of phonological delay or disorder took part and received the same HP. Participant's productions on the Diagnostic Evaluation of Articulation and Phonology (DEAP) phonology subtest were measured in terms of Percentage Consonants Correct (PCC). PCC was compared pre and post HP. For four children these figures were also compared with the change following a five week no treatment period, and for another three children following a five week period of structured interaction prior to the HP.

Results: The results from this study show that the HP has a statistically significant effect. However, the changes made were too small to be clinically significant.

Conclusions: Demonstrating effectiveness of intervention can be challenging as rate of change may be slow for children with speech sound disorders. A diagnostic assessment may not capture the changes made, which suggests an alternative outcome measure may be necessary. Reports from parents and informal observations by the investigators suggest that improvements were made beyond what was shown in the DEAP phonology subtest. This study demonstrates that the novel HP used may help some children with speech sound disorders.

Abbreviations: HP = Home Programme; DEAP = Diagnostic Evaluation of Articulation and Phonology; PCC = Percentage Consonants Correct; HSE = Health Service Executive; SSD = Speech Sound Disorders; SLT = Speech and Language Therapist; PD = Phonological Delay; CPD = Consistent Phonological Disorder; sSLT = Student Speech and Language Therapist; NTGp = No Treatment Group; 1-1Gp = One-to-one Group; PPGp = Pre-Post only Group; T1= Assessment Time 1 for Case 1-7; T2 All cases assessments pre HP; T3 = All cases assessments post HP

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Introduction

According to a 2005 study, an estimated 10% of children have some difficulty with their speech and/or language (Connolly et al 2005). However, there is presently a lack of speech and language therapy resources available within the Primary Continuing and Community Care directorate of the Health Service Executive (HSE) (Bradley et al 2007). In the UK, children with speech sound disorders (SSD) make up a significant proportion of many therapists caseloads. A study by Joffe and Pring (2008) noted that nearly half of their Speech and Language Therapist (SLT) respondents reported that more than 40% of their caseload is made up of children with SSD, which conforms to previous estimates by Broomfield and Dodd (2004). Difficulties with SSD which persist into primary school age may have long term negative effects on literacy, socialisation, behaviour and academic achievement (Law et al 2003). Studies, as well as anecdotal evidence, suggest that intervention for children with SSDs can be a slow and gradual process (Rvachew and Nowak 2001). Owing to the limited resources and extensive waiting lists for children with SSD (Hough 2012), alternative service delivery methods must be explored. Parent-implemented interventions are one such possibility as parents have the advantage of being with their child more often thus allowing for more frequent intervention. The present study seeks to explore the efficacy of a no-training required, home programme (HP) for children between the age of 3 and 5;11 with phonological delay (PD) and consistent phonological disorder (CPD) with an aim to improve the child's speech intelligibility as measured by their percentage of consonants correct (PCC).

Impact of Wait Time

Optimally, treatment of SSD should take place before literacy skills are acquired as children with SSD are likely to encounter literacy difficulties due to the deficient phonological awareness abilities that often co-occur with SSD (Dodd 2005, Gierut 1998). Nathan et al (2004) report that children with SSD develop normal literacy skills if their speech difficulties resolve before they receive literacy instruction (cited in Williams et al 2010). It is therefore important that these children receive timely intervention, ideally between the ages of 3 and 6, in order to minimise difficulty in literacy acquisition (Bird et al 1995; Hesketh et al 2000 as cited in Williams et al 2010).

Figures provided by the HSE in May 2012 stated that over 4,000 children have been waiting for up to two years to receive therapy (Hough 2012). Where specific numbers regarding children with SSD are not clear, it is assumed that they are included in this figure. A possible solution to the problem of extended time on waiting lists is the adoption of a consultative approach (Dodd 2005). Using a consultative approach, SLTs can provide indirect intervention for clients with PD and CPD through the provision of a parent-led HP.

Classification of Speech Sound Disorders and Therapy Approaches

Children with SSD present with different types of impairment, depending on where the breakdown is in the speech processing chain (Duggirala and Dodd 1991). Children with SSD may present with an articulation disorder, a PD, a CPD or an inconsistent phonological disorder (Dodd 2005). In the present study, focus has been given to PD and CPD. Children with PD present with phonological error patterns that occur during normal speech development, with at least some of these error patterns typical of a child of a younger chronological age (Dodd 2005). Conversely, children with CPD present with consistent use of some non-developmental error patterns (Dodd 2005). As children with PD and CPD both have identifiable patterns in their speech, the same treatment can work for both, whereas inconsistent phonological disorder and articulation difficulties require alternative approaches.

In order to improve efficacy of treatment for PD and CPD, efforts have focused on many aspects of the treatment process, including different therapy approaches (Geirut 1990; Monahan 1986; Rvachew 1994 as cited in Rvachew and Nowak 2001). For children with PD and CPD, a minimal pair approach is frequently recommended, as this method of intervention confronts homonymy (two or more sounds produced the same) in the child's phonological system (Williams et al 2010, Bauman-Waengler 2000). It is important to note that minimal pair intervention is advised for children who are stimulable for the target sounds (Weiner 1981 cited in Baker and McLeod 2004). Minimal pair intervention prompts communication breakdown by increasing the child's awareness that they must produce sounds contrastively in order to convey their intended meaning. The focus during this intervention is on the child's speech output and is targeted at word level. The goal is for the contrasts to generalise from word level to conversational speech, to improve intelligibility

and also to facilitate cognitive reorganisation of the child's phonological system (Bowen and Cupples 1999).

Treatment Dosage

Treatment dosage using a minimal pair approach varies greatly from child to child, as seen in a study by Baker and McLeod (2004) where the time taken by two case studies with similar speech profiles varied from seven weeks to five months. Optimal dosage of minimal pair intervention is difficult to quantify as current research reports anywhere from 4 ½ hours to 45 hours (Williams et al 2010). In one noteworthy study, Crosbie et al (2005) report improvements in PCC after a total duration of 8 weeks, with 30 minute sessions twice weekly (cited in Williams et al 2010). A study by Dodd et al (2008) found a mean increase in PCC of 16% following a treatment time of six hours, distributed via thirty minutes per week over one school term. Given the inherent limitations of the current service provisions, it is simply not possible for all children with SSDs to receive this amount of therapy.

Parents as Agents

A study by Joffe and Pring (2008) reports parental involvement to be a popular method of implementing therapy, along with meaningful minimal contrasts, phonological awareness and auditory discrimination tasks. Three-quarters of SLT respondents in the above study reported that they *always* or *often* involve parents in therapy. The popularity of this method would suggest that it is considered to be efficacious (Bowen 2009). Efficacy of parental involvement was seen in a previous unpublished research project as improvements were reported with a 17% mean increase in PCC after 6 weeks of a parent led intervention (Brady 2010).

Training parents of preschool children with a phonological disorder and Down syndrome to be agents of therapy showed a significant mean increase of 30% in the children's PCC (Dodd and Leahy 1989 cited in Dodd 2005). Ruscello et al (1993) found that treatment implemented solely by an SLT compared with treatment implemented using a combination of SLT and parents resulted in similar improvements. SLT directed therapy compared with parent directed therapy found that lesser gains were made by the children who were treated by their parents, but gains were nonetheless made (Lancaster et al 2010). Thus, it

can be proposed that as long as the agent of therapy is an effective agent, improvements can be made.

Parental involvement allows facilitation of enhanced intervention management (Bowen and Cupples 1999). However, the parent training required in order for parents to be effective agents of therapy is often problematic.

Training vs. No Training

Where parental training can be cost-effective, particularly in long-term cases, it requires many hours of training. In a study by Dodd and Leahy (1989), twenty-six hours of training were provided over a thirteen week period to parents, which resulted in significant improvements in participant's phonological skills (cited in Dodd 2005). Lancaster et al (2010) trained parents for two hours, plus advice sessions every six weeks over a six month period. In a previous unpublished study in this area, two hours of training were provided to parents with an additional home visit to ensure correct implementation of the programme, which had successful results (Brady 2010). Where these studies have shown that training parents can be effective in improving children's speech, it does not solve the problem of extensive waiting lists for speech and language therapy as SLT time is still taken up with training. Thus, current parent-training models are no more cost effective than SLT directed therapy. Additionally, effective training does not always produce effective agents (Dodd 2005).

SLTs using a consultative model when providing intervention to children with SSD need to ensure they are giving effective training and that the therapy will be implemented accurately and effectively. Difficulties with this approach include an inability to continually monitor and evaluate progress and efficacy of the intervention, as is best practice during typical SLT directed sessions (RCSLT 2006).

Training parents to be effective agents of therapy can be very difficult and may not produce the desired results. Parents have a different interactional style than SLTs which may result in the child not achieving the desired outcome of the task (Gardner 2006). A possible solution is to provide parents with a HP that requires little or no training, in a format which is motivating for both the child and parent and is straightforward to carry out.

Input Only Approach

Children require frequent access to high quality speech input to facilitate improvements in their production skills (Rvachew and Brosseau-Lapré 2012). Natural interaction between parents and their children, along with effective training in modelling techniques, can be sufficient to effectively change a child's linguistic behaviours (Dodd 2005, Bowen 2012). Therefore, intervention for children with SSDs, be it home or clinic-based, must incorporate parental guidance/instruction on appropriate modelling techniques (Bowen and Cupples 1999).

Pye et al (1987) suggest that the acquisition of first sounds is more dependent on input frequency than articulatory difficulty, as seen by French children acquiring /v/ earlier than English speaking children, where /v/ occurs less frequently (cited in Bowen and Cupples 1999). Thus, increasing input frequency may facilitate phonological change and allow the child opportunity to discover underlying phonological patterns (Ingram 1989 cited in Bowen and Cupples 1999).

By exploring the order of acquisition of word initial consonants in Dutch children, Van Severen et al (2012) concluded that the higher the input frequency of word initial consonants, the earlier it appears in spontaneous speech. Hodson 2011 (cited in Rvachew and Brosseau-Lapré 2012) assert that an input-based therapy approach can be beneficial as children acquire their phonological system through listening.

Auditory Bombardment (Hodson and Paden 1983 cited in Bowen 2009) helps the child to develop 'auditory images' which increases their awareness of incorrect productions (Bowen and Cupples 1999). Similarly, auditory input therapy (Lancaster and Pope 1989; Flynn and Lancaster 1996 cited in Bowen 2009) uses an input method which exposes the child to multiple repetitions of target sounds through play (Bowen 2009). However, these methods are not as regularly utilised by SLTs as other methods (Joffe and Pring 2008).

Furthermore, in a study which looked at input frequency of word initial clusters, it showed that maternal input, in particular, was a significant predictor of age at which 80% accuracy is reached in the production of word initial clusters (Ota and Green 2012). As input is an integral component of many therapy approaches, such as minimal pair intervention, cycles

phonological remediation therapy, PACT (Williams et al 2010), a HP for children with PD and CPD which is based on input only is an appropriate method of service delivery.

Aims of Investigation and Hypotheses

The development of alternative approaches to treating children with PD and CPD is an important prospect to consider as these children account for a significant portion of SLTs caseloads and waiting lists (Joffe and Pring 2008). If children with PD and CPD could be treated efficaciously via a no-training needed HP, it would provide them with a stronger platform with regard to their linguistic abilities, thus reducing the risk of literacy difficulties. Further benefits extend to the reduction of stress placed on SLTs to deal with oversized caseloads with limited resources by reducing waiting list via an inexpensive and timely approach.

There is a significant niche for SLTs to take on a more consultative approach. It is important to ensure that SLTs are equipped to take on this role by providing parents with adequate, comprehensive resources which are easily comprehended (Bowen and Cupples 1999).

This study aims to show that a HP delivered by parents can be effective at improving children's speech as measured by PCC. The novel HP uses an input only approach as it is difficult and time consuming to teach parents how to carry out therapies requiring production, such as in a minimal pair approach. The HP provides parents with a therapeutic 'script' in the format of traditional tasks such as reading stories.

The main hypotheses in this study are as follows:

Hypothesis 1: This HP will be more effective at improving children's speech than receiving no intervention as measured by improvement in PCC (n=3).

Hypothesis 2: This HP will be more effective at improving children's speech than receiving one-to-one play based parental interaction as measured by improvement in PCC (n=4).

Hypothesis 3: Children who receive the HP will make similar gains in speech accuracy (as measured by PCC) as children in a typical block of SLT directed therapy (n=13).

Methodology

Ethical Approval and Consent

Ethical approval for this research project was received in June 2012 from the University of Limerick Faculty of Education and Health Sciences Research Ethics Committee. Parents of all participants were provided with information detailing the aims and methods of the project, as well as the use of their child's data. Parents gave written consent for their child's participation in this research project and were offered an opportunity to ask questions regarding the research (see Appendix A for a copy of the information sheet, consent form and case history form).

Sourcing Participants

Participants were recruited via an email which was sent to the University of Limerick's mailing list, and recruitment posters distributed to local GP's, local crèches, supermarkets and post offices (see Appendix B for the recruitment email and poster). Potential participants were given an email address and two phone numbers to contact. Screening took place via a call-back which was carried out by the investigators.

Table 1. Inclusionary and Exclusionary Criteria for Participants

Inclusionary	Exclusionary
Aged between 3;00 and 5;11	No other diagnosis
Phonological delay or consistent phonological disorder	English as a first language
Motivation to participate (parents)	Not currently in receipt of SLT, however, if on the waiting list awaiting therapy this was acceptable

Appointments were arranged if the participants were thought to be eligible from the screening call. Of the twenty-three families that volunteered to participate, thirteen fit the inclusionary/exclusionary criteria as seen in Table 1. Children with inconsistent phonological disorders were not eligible as different therapy approaches are better suited for them, e.g. Core Vocabulary (Dodd 2005).

Assessments

Appointments were given for the Speech and Language Therapy clinic in the University of Limerick for the first assessment. The participants were assessed using the standardised test of phonology, the Diagnostic Evaluation of Articulation and Phonology (DEAP). Of the six student Speech and Language Therapists (sSLTs) who were the investigators for this research project, two were present for each assessment. One sSLT administered the Diagnostic Screen and Phonology subtests of the DEAP. Both sSLTs transcribed the responses. The second sSLT also collected the signed information sheets, consent forms and carried out a case history, answering any parental questions that arose. Parents also signed an audio release form, allowing the sSLTs to audio record the sessions. An Olympus Digital Voice Recorder VN-750 was used for the audio recording. Following the assessment session, transcriptions were compared. In the event of discrepancies between the two transcriptions, both sSLTs listened to the recording and agreed upon a transcription. A Likert scale, Parent Likert Scale 1, was filled out by each parent regarding their perceptions of their child's speech difficulty (see Appendix C for Parent Likert Scales 1 and 2).

Subsequent to the assessment, the two sSLTs agreed on the diagnosis. Parents of children who fit the inclusionary and exclusionary criteria were invited to take part in the study. All the parents who were invited agreed to take part. Those who were not eligible received general advice on facilitating children's speech development (see Appendix D for 'Modelling and Recasting' hand out), and were advised how to self-refer to local SLT services if the child's difficulty was beyond the scope of the current research project.

Participants from the first assessments (see Table 2) were assigned to one of two groups. The first group (n=3), called the no treatment group (NTGp), was used to compare the changes made after a period of no intervention and the changes made post HP as measured by PCC as outlined by Hypothesis 1. This controlled for changes made due to maturation.

The second group (n=4), called the one-to-one group (1-1Gp), was used to compare the changes made after a period of one-to-one structured interaction with a parent as outlined by Hypothesis 2. Parents were advised to spend fifteen minutes per day, six days per week for five weeks carrying out one-to-one activities with their child. Parents were provided with a parent diary (see Appendix E for HP Parent Diary) which contained ideas around possible

activities, for example a jigsaw puzzle or a bed time story. It was highlighted to the parents that these activities were to be carried out with just the parent and their child, i.e. one-to-one interaction. Parents were asked to fill out the parent diary stating what activity they did, and if they did not do an activity, the reason for this, e.g. child feeling unwell. This was to ensure compliance with the one-to-one interaction, and to control for changes made with increased one-to-one interaction compared with the changes made using the HP as measured by PCC. Initial assessments took place for the two control groups prior to the control period.

Due to low numbers from the initial sourcing of participants, a second group of participants (n=6) joined the project at a later date. They were assessed once pre and once post HP only and so were called the pre-post only group (PPGp).

Pre HP assessments took place for all thirteen participants on the day they were given the HP (see Table 2). This meant that the participants in the control groups were assessed twice prior to intervention with the HP. Additional stories and activities were sent out in the second and third week of the HP period to provide parents with more stories and activities and to keep the programme new and motivating for the child. Parents were advised to spend time particularly on the sections targeting processes their child used most. After five weeks of carrying out the HP, participants were reassessed.

Table 2. Assessment Dates and Case Number Assignment into Groups

Assessment dates	Assessment Time	NTGp	1-1Gp	PPGp
3 rd , 4 th , 7 th January	Initial	4,5,7	1,2,3,6	
4 th February	Pre HP			8,9,10,11,12,13
11 th February	Pre HP	4,5,7	1,2,3,6	
11 th March	Post HP			8,9,10,11,12,13
19 th March	Post HP	4,5,7	1,2,3,6	

Diagnosis of Clients

Diagnosis was given using Dodd's method of identification of five examples of an error pattern (Dodd 2005). Diagnosis was then classified according to the DEAP manual as consistent phonological delay or disorder (if two or more atypical errors were present).

Table 3. Information on Participants

	Case	Gender	Age Pre HP Ax (months)	Family History	Maternal Education	Diagnosis	PCC 1 (Baseline)	PCC 2 (Pre HP)	PCC 3 (Post HP)
1-1Gp	1	M	54	No	3	Mixed	56	52	62
	2	F	57	No	4	Delay	79	84	92
	3	F	54	No	4	Delay	56	62	64
	6	M	41	No	4	Delay	65	54	61
NTGp	4	M	70	No	4	Delay	82	82	78
	5	M	44	Yes	3	Mixed	66	63	67
	7	F	61	No	4	Delay	81	72	79
PPGp	8	F	45	No	4	Delay		61	71
	9	M	42	No	3	Mixed		27	35
	10	F	47	No	3	Delay		72	68
	11	M	54	No	1	Delay		72	76
	12	F	53	Yes	2	Delay		62	58
	13	M	64	No	3	Delay		76	84

Maternal Education: 1=Junior Certificate, 2=Leaving Certificate, 3=Post Leaving Certificate/FETAC, 4=3rdLevel

Materials and Measures Used

The DEAP subtests were used for diagnosing the clients and thus informing eligibility. The phonology subtests were then used to calculate and compare the change in PCC for each participant's assessments. PCC was measured using the method outlined in the DEAP manual. PCC is a measure used for scoring a child's intelligibility based on the percentage of consonants produced correctly by the child. As the sample that the PCC is calculated on is the same at all assessment times, the PCCs are comparable, thus allowing researchers to measure changes made over time (Shriberg and Austin 1997). This subtest was also used to extract the processes used by each child and the frequency of each process used. The Parent Likert Scale 1 was the same at each assessment and this was used to see if parent's perception of their child's speech difficulty changed over the research period. A second Likert scale, Parent Likert Scale 2, regarding the HP was to find out what the parents thought of the HP and their experience of administering it. A separate research project carried out a full analysis of the results obtained from the Likert scales (see Beckett 2013 and Parkes 2013).

Table 4. Materials Used at Each Assessment Time

Time 1	Time 2	Time 3
Case History	DEAP Phonology subtest	DEAP Phonology subtest
Consent forms	Parent Likert Scale 1	Parent Likert Scale 1
Audio release form		Parent Likert Scale 2
DEAP Diagnostic Screen		
DEAP Phonology subtest		
Parent Likert Scale 1		

Design of Home Programme

The HP is a book of stories and activities devised by the principal researcher and based on principles proven in the literature to be effective at remediating PD and CPD (see Appendix F for a sample story and activity from the HP). A parent diary was included in the HP to note the frequency with which the programme was carried out each day, the stories and activities carried out and any comments, in order for compliance to be ensured.

The HP was designed to be carried out for fifteen minutes per day, six days per week for five weeks via one-to-one parent-child interaction. The first section contained detailed instructions and information regarding phonological delay and disorder. Following the instructions section, *Mixed Up* stories were provided, along with activities such as nursery rhymes, sound stories, sound activities, scrapbook activities, a star chart and a parent diary. Parents were instructed to read the stories aloud to their children. The decision to include such sections in the HP is consistent with the methods found to be popularly used by SLTs, i.e. auditory discrimination, meaningful minimal contrasts, phonological awareness and parental involvement (Joffe and Pring 2008).

Table 5. Contents of the Home Programme

Contents	Consisting of	Targeting	Recommendations
'Mixed Up' Stories	Stories with confusion caused by homonymy which is ultimately resolved.	Homonymy with meaningful minimal pairs using an input approach to raise children's awareness of the differences in sounds and the importance of contrasts	Read at least one of these stories each time the programme is carried out
'Mixed Up' Story Activities	Error patterns targeted in the stories used in a minimal pair type activity with clear instructions for feedback	Minimal pair approaches targeting homonymy in child's sound system.	Carry out after reading the accompanying story
Nursery Rhymes	Popular children's nursery rhymes	Phonological awareness	To be carried out as part of the recommended 15 minutes as time permits
Sound Stories	Letterland™ sound stories- common problem sounds	Phonological awareness Increasing input	To be carried out as part of the recommended 15 minutes as time permits
Activities	Activities for error patterns which were difficult to write stories for	Cluster reduction Weak Syllable Deletion Initial Consonant Deletion	To be carried out as part of the recommended 15 minutes as time permits
Scrapbook	Choice of letters, instruction, scrapbook	Increase frequency	Stick a letter in the middle of a page in the scrapbook. Go through magazines etc. and cut out pictures beginning with that letter/sound. Talk about all of the pictures. On the opposite page, stick a letter with a sound that the child mixes up with the first letter. Cut out pictures for this sound etc.
Star Chart and Stickers	Star chart with space for stickers for six days per week for five weeks	Motivation for the child	As the child gets a sticker for each day that they carry it out.
Parent Diary	Diary with boxes for each day that the HP is filled out. <ul style="list-style-type: none"> • How long they spent • What did they do • Comment 	Fidelity with compliance	Parents were asked to fill out the diary every day and give as much detail as possible.
To be carried out for: 15 minutes per day, 6 days per week for 5 weeks Total Time = 7.5hours			

Mixed Up Stories

The *Mixed Up* stories were written specifically for the HP. Each story targeted a specific process used by children with PD and CPD, for example, velar fronting or cluster reduction. The first page introduced the main character, Marty, who was in the majority of the stories. Marty mixes up his words in the stories which cause confusion; however this is ultimately

resolved with the realisation that Marty intended to say a different word. This gives the child exposure to sound contrasts, demonstrating confusion caused by homonymy in the phonological system, with Mixed-Up Marty as a character for children to relate to. Most of the stories had an activity at the end, some of which resembled a minimal pair type game. Minimal pair intervention is effective in remediating the problems caused by homonymy by reorganising the child's phonological system by developing meaningful contrasts (Crosbie et al 2005).

Nursery Rhymes

Nursery rhymes are a beneficial phonological awareness activity that correct phonological deficits and enhance children's phonological sensitivity, which helps with literacy skills (Gillon 2005, Bryant et al 1989). Parents were encouraged to use actions with these to ensure that the children were enjoying them and were motivated.

Sound Stories

Sound Stories from Letterland™ were used to target phonological awareness and increase input frequency. As discussed, a higher frequency of input is beneficial as children acquire their phonological system through listening (Hodson 2011 cited in Rvachew and Brosseau-Lapr e 2012). Parents were encouraged to use the sound of the letter when talking about the different stories instead of referring to the letter by its letter name, e.g. /l/ instead of /el/ or /m/ instead of / m/.

Activities

Activities in this section targeted cluster reduction, weak syllable deletion and initial consonant deletion, which are error patterns found in children with PD and CPD (Dodd 2005). These error patterns were not contained in the *Mixed Up* stories as it is difficult to provide meaningful minimal pairs for these processes.

Parents were provided with a scrapbook in order to cut out letters that their child was mixing up. They were advised to stick the sounds that were being mixed up on opposite pages and, one letter at a time, cut out pictures beginning with the particular sound from a magazine. As they were doing this, they were recommended to talk about the words to

increase the frequency of exposure of the sounds for the child. As discussed, the higher the input frequency of word initial consonants, the earlier it appears in spontaneous speech (Van Severen et al 2012).

Other Materials

Star charts with stickers were provided in each folder to help provide motivation for the children. Parents were provided with a Parent Diary which had specific sections for each day, what activity and/or story was carried out, and comments on how it went (e.g. level of enjoyment, progress, setback, and the amount of time spent). This ensured fidelity to and compliance with the HP.

Experimental Design

A pre-test – post-test study design was used for all participants. Two control groups were also used via a multiple baseline design. Participants were allocated into groups depending on when they were sourced.

Participants in the control groups, NTGp and 1-1Gp, were assessed three times (see Table 2). After the first assessment they were assigned a diagnosis and severity (see Table 3). The NTGp received no treatment for five weeks to allow researchers to see whether improvements made with the intervention was greater than improvements due to maturation alone. The 1-1Gp spent fifteen minutes per day, six days per week for five weeks, to replicate time spent with the HP, with their parents engaging in a child led play activity with one-to-one interaction. The purpose of the 1-1Gp was to allow the researchers to see whether any improvement made with the intervention is solely due to the extra time parents spend with their child, rather than to the intervention activities. Parent Likert Scale 1 was given to each parent to complete at every assessment to measure their perceptions of their child's speech.

Following the second assessment, the NTGp and 1-1Gp were given the HP. The PPGp were given the HP after the first time they were assessed. After five weeks with the HP, speech was re-evaluated using the assessment as discussed earlier. Another Likert scale, Parent Likert Scale 2, was also given to each parent to complete to measure their perceptions of their child's speech after the HP.

Results

Group Analysis of PCC Scores

Exploration of the changes made in children's speech following the HP (as measured by PCC) was conducted through a variety of statistical analyses. Further analysis investigated whether a relationship exists between change in PCC and factors such as compliance, age and maternal education. These included nonparametric related samples, exploration of box plots and correlation through scatter plots. The level of significance used was 0.05.

There was a relatively even spread of male and female participants in each group, except in the NTGp (n=3) where there were two males and one female. This is representative of the prevalence found in the literature which states that more male than female children will present with SSD (Dodd 2005).

As shown in Table 6, NTGp had the oldest participants while PPGp had the youngest. The range in ages was large within the groups with 26 months between the oldest and youngest in NTGp, a range of 16 months in 1-1Gp and 22 months in PPGp. Children with CPD have the best intervention outcome when therapy is given at 48 months and below and children with PD respond best to therapy at 60 months and above (Dodd 2005).

Table 6. Mean Age of Participants at Pre HP Assessment Time within Groups

Group	Mean Age in Months	Range in Months
NTGp	58	26
1-1Gp	52	16
PPGp	51	22
Whole Group	53	29

15% of participants had a positive family history of speech difficulties. As this number was low, no further analysis was required.

Maternal education level varied from Junior Certificate to 3rd level. It is assumed that 3rd level includes from level 7 to level 10 (NQAI 2009). Almost half of the mothers had received 3rd level education, and two received junior certificate and leaving certificate level respectively (see Table 3).

All groups had participants with a diagnosis of PD and one male child in each group had CPD. PCC's obtained for all participants at each assessment are displayed in Fig. 1.

Main Results for All Participants

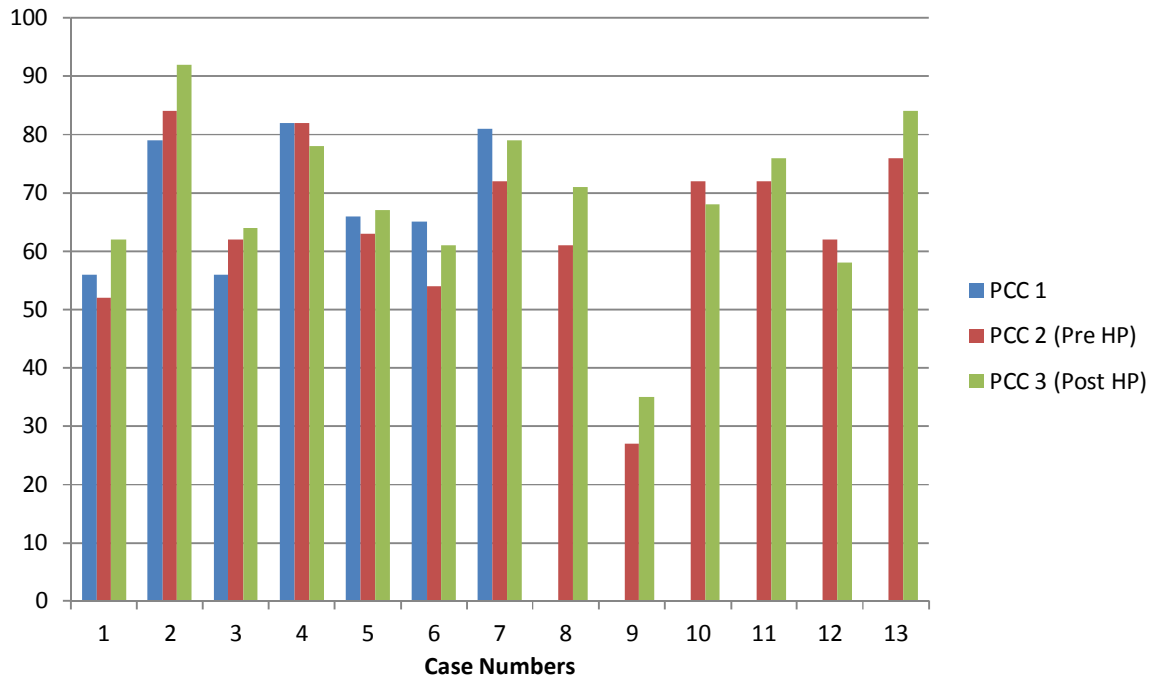


Figure 1. Bar chart showing PCCs obtained at each assessment, PCC1 at T1, PPC 2 at T2 (pre HP) and T3 (post HP).

T1=Assessment time 1 case 1-7, T2=All assessments pre HP, T3=All assessments post HP.

62% of participants scored a higher PCC at the post HP assessment time compared with pre HP assessments. The variable results in the two control group's assessments at T1 and T2 are considered further in the discussion.

PCC was calculated after each assessment for all cases. The range in PCC for each group between the assessment times are shown in Table 7, along with the mean PCC and standard deviation.

Table 7. Range, Mean and Standard Deviation of PCCs from Different Groups.

	Range T1	Range T2	Range T3	Mean T1	Mean T2	Mean T3	SD T1	SD T2	SD T3
Case 1-7	56-82	52-84	61-92	69.29	67	71.86	11.37	12.74	11.51
NTGp	66-82	63-82	67-79	76.33	72.33	74.67	8.96	9.5	6.66
1-1Gp	56-79	52-84	61-92	64	63	69.75	10.86	14.62	14.89
PPGp	27-76		35-84	61.67		65.34	18.01		17.18
Whole	27-82		35-92	65.15		68.85	14.63		14.16

The ranges vary greatly from group to group. At Range T2, all of the lower limits are lower than at T1, followed by an increase at Range T3. T2 was prior to intervention with the HP.

From Fig. 2, the range of PCC is shown for each group. The NTGp median is lower at T3 than T1, however the bottom of the range has improved. Both the median and the range improved in 1-1Gp. PPGp's outlier moved into the range at the post HP assessment and the median and higher level of the range improved.

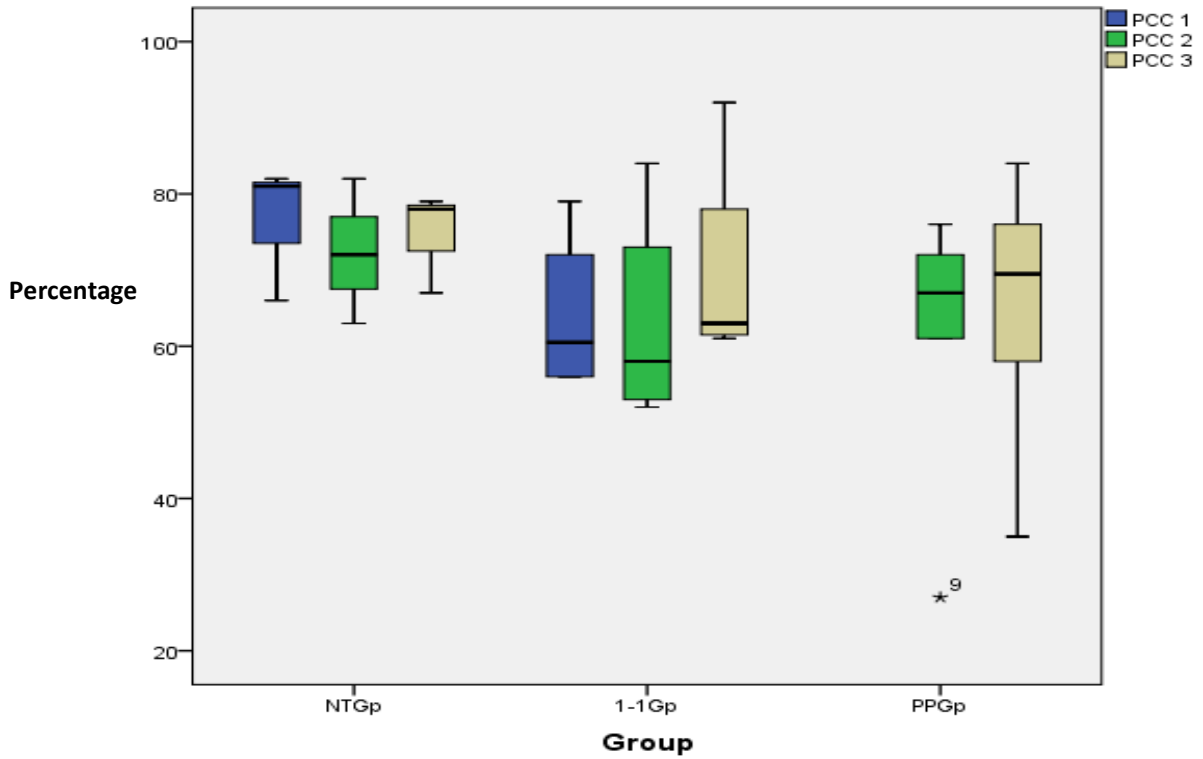


Figure 2. Box plot showing range in PCC from three groups

Fig. 3 shows a 2.5% increase in the median at T3 and the range from the outlier to the top of the range went up. The NTGp upper limit at Range T3 is lower than at T1 and T2.

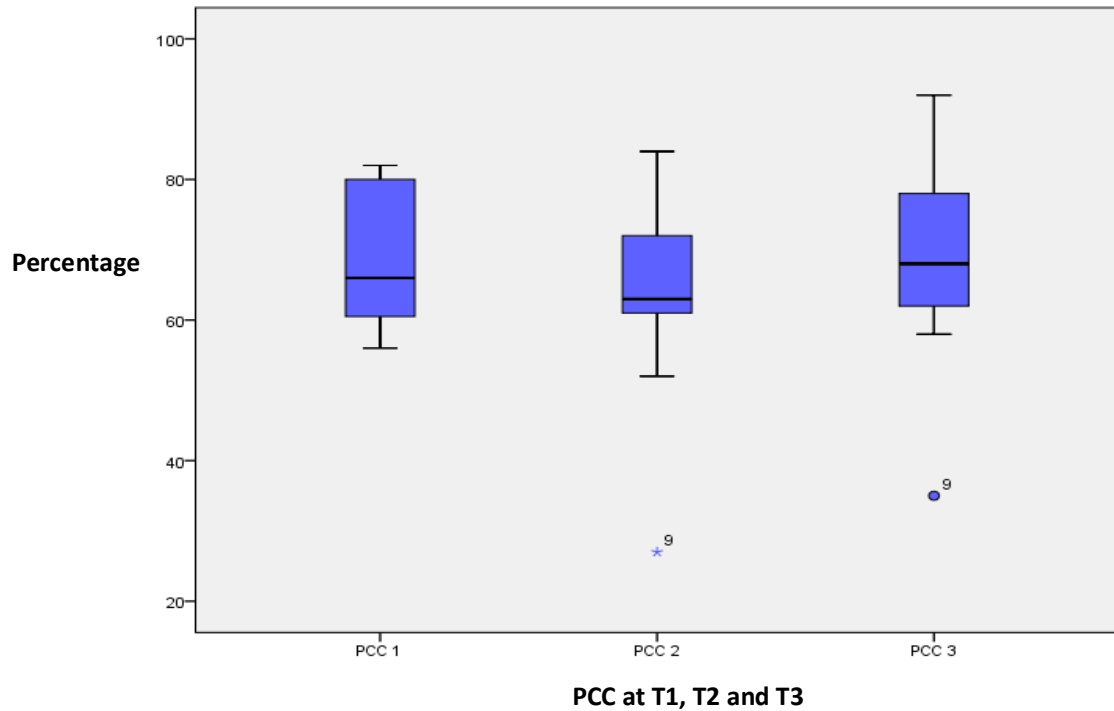


Figure 3. Box plot showing range in PCC at different assessment times for all groups together

Although improvements made were not clinically significant, Figs. 2 and 3 display that there were some improvements made, which suggest there is value in conducting further investigation.

Statistical Analysis

Statistical analyses were used to compare the PCC scores from the NTGp, the 1-1Gp, (case 1-7) which all had three assessment times, the PPGp and the pre and post PCCs for the whole group.

Hypothesis 1

This HP will be more effective at improving children's speech than receiving no intervention as measured by improvement in PCC (n=3).

Case 4, 5, and 7 were in the 1-1NTGp. Fig. 1 shows that Case 4's PCC did not change from T1 to T2 and decreased at T3. Cases 5 and 7's PCC decreased at T2 and increased at T3, with only Case 5 improving above their highest pre HP PCC. The changes made were not

statistically significant (Friedmans Two Way ANOVA Ranks test, $p=0.441$), which indicates that the hypothesis is not proven.

Hypothesis 2

This HP will be more effective at improving children's speech than receiving one-to-one play based parental interaction as measured by improvement in PCC (n=4)

Case 1, 2, 3, and 6 were in the 1-1Gp. All cases improved from T2 to T3. Case 2 and 3 improved after T1 and again after T2. Case 1 and 6's PCC decreased at T2. Both Case 1 and 6 improved after T2, however, Case 6 did not improve on their highest pre HP PCC. The changes made were not statistically significant (Friedmans Two Way ANOVA Ranks test, $p=0.174$), which indicates that the hypothesis is not proven.

No stable baseline was achieved for the NTGp and 1-1Gp pre HP. The immediate pre HP assessment score was, for most children, lower than the initial assessment score, so could not be taken as an accurate reflection of their ability. However, statistically there was no difference between scores at T1 and T2, so an average was taken of scores at T1 and T2 to get a pre HP baseline, allowing for comparison of results for the group as a whole.

Hypothesis 3

Children who receive the HP will make similar gains in speech accuracy (as measured by PCC) as children in a typical block of SLT directed therapy (n=13).

A comparison of scores at T1 (pre HP) and T2 (post HP) showed a median increase of 4%. This was statistically significant (Wilcoxin Signed Ranks test, $z=-2.036$, $p=0.042$), indicating that the hypothesis is proven. However, changes made were too small to be clinically significant.

Fig. 4 shows the difference in PCC pre and post HP for each case. For cases 1-7, the pre intervention score was calculated as explained above.

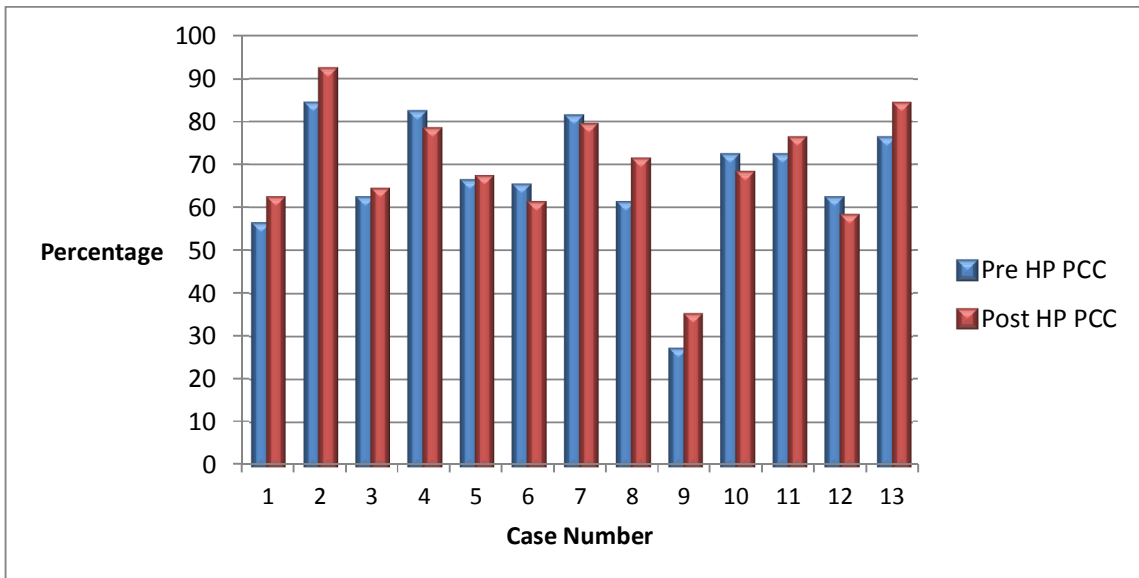


Figure 4. Bar chart showing PCC1-Pre HP and PCC 2-Post HP for all cases

As changes were perceived by the parents and the researchers, which may not have been evident in the outcome measure, a post hoc analysis of the Parent Likert Scales was carried out.

Post-Hoc Analyses

Changes in PCC pre and post HP ranged from -4% to +10%. Compliance with the HP was approximated by getting a percentage of how many days were filled in in the parent diaries. As the HP showed variable results, coupled with the variability in the pre HP assessments for the NTGp and the 1-1Gp, further analyses was necessary as to why the HP did not have clinically significant improvements. Factors considered include percentage of compliancy, age of participants at the beginning of intervention with the HP and level of maternal education.

Table 8. Change in PCC, Percentage of Compliancy, Age and Maternal Education

Case Number	Change in PCC	% of Compliancy	Age at Pre HP Assessment time	Maternal Education
1	6	73	54	3
2	8	100	57	4
3	2	57	54	4
4	-4	40	70	4
5	1	100	44	4
6	-4	100	41	3
7	-2	100	61	4
8	10	100	45	4
9	8	100	42	3
10	-4	63	47	3
11	4	100	54	1
12	-4	100	53	2
13	8	100	64	3

1 = Junior Certificate Level; 2 = Leaving Certificate Level; 3 = Higher Education/FETAC; 4 = 3rd Level

A correlation between compliance with the HP and change in PCC from the highest pre HP PCC for each case and the post HP PCC was considered. Data (see Table 8) was analysed to determine if a relationship exists between the level of compliance with the HP and the subsequent level of change in PCC score (Fig. 5). A linear trend line was fitted to the data ($y=0.0949x-6.0388$; $R^2=0.138$). The slope of the trend line indicates a positive relationship between the level of compliance and the change in PCC. A 10% increase in compliance resulted in an average PCC increase of 0.949%. However, the relatively low R^2 value of 0.138 indicates that there is not a strong relationship between level of compliance and subsequent change in PCC. A similar analysis was carried out looking at the correlation between age and change in PCC (Fig. 6), and also maternal education and change in PCC (Fig. 7). No associations were found.

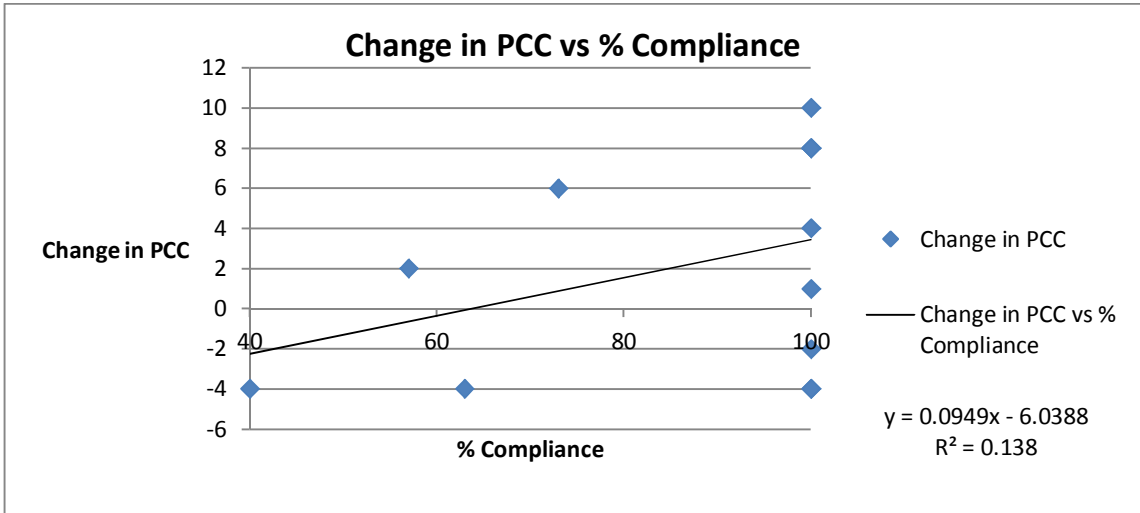


Figure 5. Scatterplot examining association between Change in PCC and Compliance.

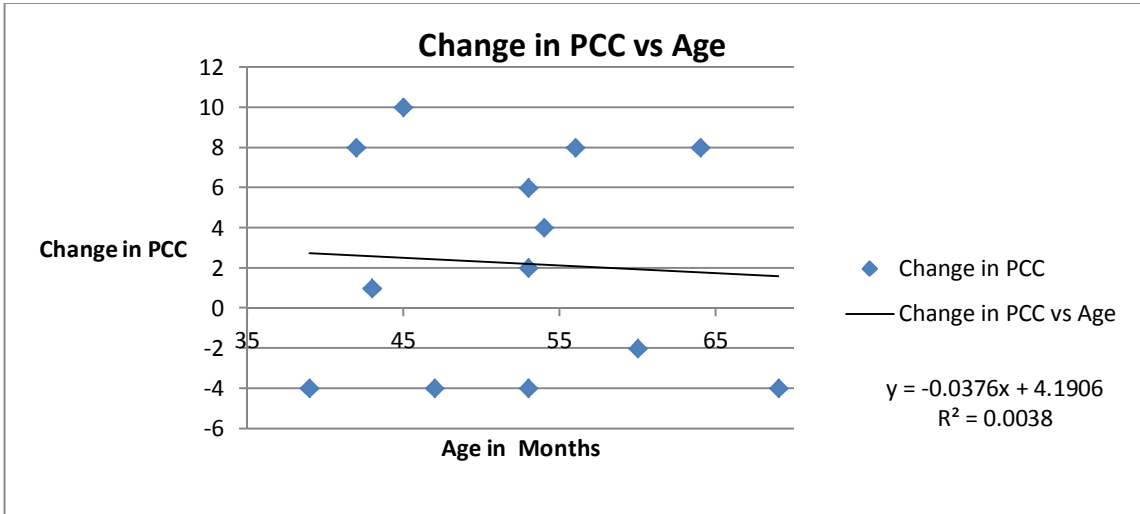


Figure 6. Scatterplot examining association between Change in PCC and Age.

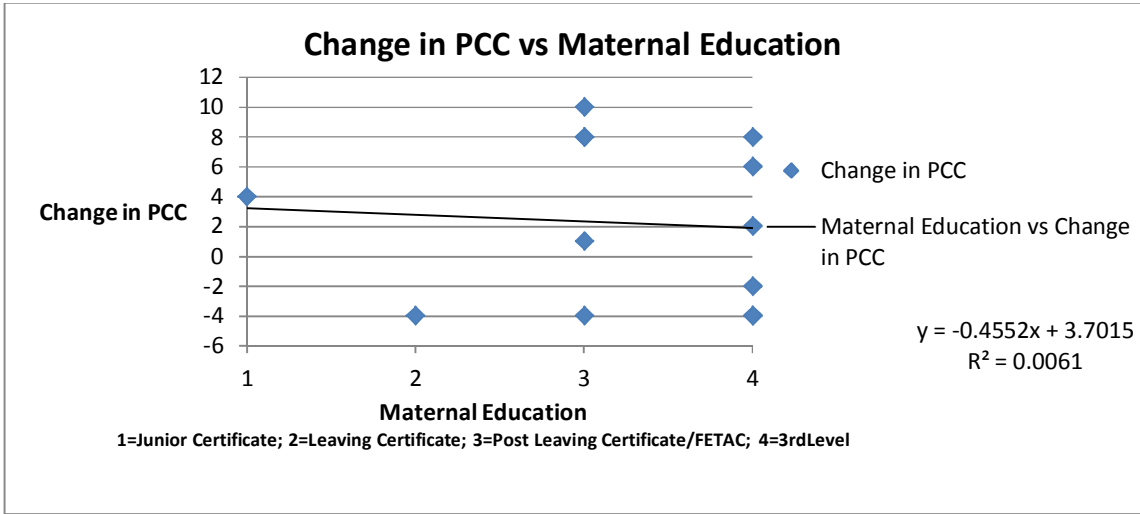


Figure 7. Scatterplot examining association between Change in PCC and Maternal Education.

From another study using the same participants, parental perceptions of improvement was measured. 92% of parents reported an improvement. It was noted that some parents found it difficult to find the time to carry out the programme, which may have affected compliance.

Discussion

Effectiveness of Intervention

This study investigated the effects of a novel HP on 13 children with SSD as measured by PCC with no parent training necessary in order to reduce pressure on SLT resources. Variance in the PCC scores at T1 and T2 for the groups using multiple baseline approaches (NTGp and 1-1Gp) was evident; however the differences were not statistically significant. The overarching hypothesis explored whether children make similar gains post intervention with the HP as in a typical block of SLT directed therapy. PCC scores from pre and post intervention with the HP were statistically significant; however gains made were too small to be clinically significant.

The PCC scores obtained for each child showed that the response to the HP was variable. There is strong evidence that Case 2 was improving spontaneously, or that the 1-1 interaction was as effective as the HP. Progress varies for different children receiving the same intervention as observed in a previous study (Baker and McLeod 2004) where different children require different amounts of therapy. Baker and McLeod (2004) suggested that differences between children such as the child's overall capability and focus, motivation and the motivating factors in their environment may influence their response to therapy.

Compliance with the programme may have affected the outcome. Fidelity in compliance was recorded in the parent diaries. However, it may have been possible that the diaries were not filled in regularly or accurately, indicated by the variability in the details provided. Compliance appeared to affect the results. People may not have been compliant as they might have had considerable demands on their time already, with young families and occupation, or they may not have understood that the programme needed to be carried out with the intensity recommended by the researchers (fifteen minutes per day, six days per week for five weeks). However, given that the HP has the potential to be free, for example if

it was provided for parents via access to the internet, then parents would have the option to access it if they so wished.

Hypothesis 1 and 2 aimed to show that the HP would be more effective at improving children's speech than receiving no intervention (NTGp) or receiving one-to-one structured interaction (1-1Gp), respectively, as measured by PCC. No effect of one-to-one interaction was seen as a group, and children in the NTGp did not improve during the waiting period. However, due to recruitment difficulties, the sample size was very small, so the control groups were not large enough to gain representative information for the population.

Nearly all parents reported that they thought that their child's speech had improved after the five weeks of using the HP. Researchers observed an improvement in intelligibility in spontaneous speech in most of the participants. Repeated measurement on the same instrument may have affected outcome, for example, Case 3 used the error form /tʌitʃ n/ for /kitʃ n/on all three assessments. However, after the final assessment, Case 3's parent said that he could now say it correctly. On eliciting the word within a phrase from Case 3, he produced it accurately.

It is possible that more gains would be made with increased use over time as it has been suggested that there is an indication that intervention may be more effective when carried out over a longer period of time than those carried out over a shorter period (Law et al 2003). The HP was given for five weeks to reflect the time of intervention typically given to a child with SSD in Ireland. However, it may not have been enough, as we know that change can often be slow with the SSD population.

The HP is somewhat a 'one-size-fits-all' approach, even though the diagnosis and the children are all very much different and using different processes. All participants were thus exposed to the homonymy in all the processes that the HP used. Benefits of this may have been increased motivation, as if the child did not use some error patterns, the stories and activities for those may have given the child a sense of success. A consequence may have been that the time devoted to the intervention using the HP may not target the individual child's needs if the appropriate stories and activities are not being carried out. The HP did work for some of the children and so, this makes it a reasonable option to give it to parents of children awaiting SLT directed therapy.

Several parents reported that some of the stories were too difficult for the children and the confusion related to the homonymy was too advanced for them. The child may not have understood the confusion in the stories or the effect of the confusion. With the older participants, some parents reported that the children guessed ahead what the mixed up words were, thus showing excellent engagement with the activities. Taking this into account, there are implications for adapting the design of the HP to further investigate the effects of the HP, i.e. simpler words could be used in stories and activities for younger children.

Limitations

The small sample size means that the results must be interpreted with caution. Where the research designs had allowed for a control group to see if changes made were due to increased parental interaction, the sample size was too small to be representative of the population.

Fidelity in compliance with the HP was a limitation. The HP parent diary given was useful to gain fidelity in compliance, however, it was possible that some of the diaries were filled out after the five weeks and so were not accurate. There was variability in the information provided in the diaries and so sufficient time spent with each parent to discuss the requirements and the reasons for each detail would have been useful. However, this is reflective of what occurs in clinical practice, as not everyone will comply. Nonetheless, even if only some comply and improvements are made, this will relieve some pressure on resources, particularly as the HP is potentially cost neutral if provided on the internet, for example.

Future Research

Due to the current strain on resources and SLT time, HP's are an important service delivery option, particularly for children with SSD as they make up a large portion of the waiting lists and respond well to intervention (Joffe and Pring 2008).

Further investigation into the efficacy of this HP is necessary. Where the HP is not clinically significant in improving children's speech as measured by PCC, it is cost effective; parents reported to enjoy it and reported that it helped to improve their children's speech. Alternative outcome measurements and baseline measures may be useful to capture the

more sensitive changes and progress made, as PCC may not fully reflect the progress made by the child (Hall et al 1998). FOCUS, a clinical tool designed to evaluate change in communicative participation in preschool children, has been suggested in another study (Smith 2013). Spontaneous speech analysis obtained by eliciting particular problem sounds may have provided an opportunity to obtain more natural speech production, thus gaining a more accurate representation of the child's speech. Preparation of particular toys or games to elicit all of the sounds in a more natural setting may have been a way to do this.

Adaptations to the parent diary to ensure fidelity in compliance may be necessary for future research. Perhaps a 'tick the box' method would be preferable for parents. Additionally, researchers should make more of a point of going through the HP parent diaries prior to giving out the HP, to ensure that parents would be willing to fill them out accurately, whether they carry out the recommended time or not, and that they are aware of the commitment involved in this. The same introduction to the HP and all of its components should be provided to all parents, perhaps with brief training that would take place during the initial assessment appointment, in order to clarify instructions.

Lastly, future studies should explore whether similar gains are made via the HP and SLT directed therapy using a sample size with the same diagnosis and dosage time. While this research aimed to make similar gains using a novel HP as in SLT directed intervention for children with PD and CPD, and statistically significant changes were made, clinically significant changes were not made. The evidence base around the input only approach used in the HP requires further investigation. Improvements were reported and parents enjoyed carrying out the HP with their children, hence the HP may be a cost effective way of treating children with PD and CPD in the future.

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Appendices

Appendix A: Parent Information Sheet, Consent Form and Case History Form

Appendix B: Recruitment Email and Poster

Appendix C: Parent Likert Scale 1 and 2

Appendix D: Modelling and Recasting Handout

Appendix E: Home Programme Parent Diary

Appendix F: Sample Story and Activity from the Home Programme

Appendix A

Parent Information Sheet, Consent Form and Case History
Form



UNIVERSITY of LIMERICK

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Parent Information Sheet

Study title: A novel home program for children with speech sound disorders

We would like to invite your child to take part in a research study. Before you decide you need to understand why the research is being done and what it would involve for your child. Please take time to read the following information carefully. Talk to others about the study if you wish. Ask us if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part.

What is the purpose of the study?

Children with speech sound disorders are the biggest group of children who present for Speech & Language Therapy Services. At the moment they often spend a long time on waiting lists before they get treatment. The purpose of this study is to find out if a new treatment program that can be carried out by parents is effective.

Why has my child been invited to take part?

Thirty to forty children will take part in this study. Your child has been chosen because:

- He/she has difficulty with speech sounds
- He/she is in the age range of the study: 3 to 5 years.

Do I have to let my child take part?

It is up to you to decide. We will describe the study in this information sheet. We will then ask you to sign a consent form to show you have agreed to take part. You are free to withdraw at any time, without giving a reason. This would not affect any services you or your child receives.

What will happen to my child if we take part?

Your child will be given some tests by the researchers, who are final year student SLTs under the supervision of a qualified Speech & Language Therapist. These tests will include activities such as asking your child to name pictures, to repeat words and sentences, to find matching pictures and to point to the correct picture. This will take about 30 to 40 minutes.

These tests will be carried out three times: first to get a picture of your child's speech difficulties. Then again after six weeks, so we can see if your child's speech is getting better without treatment. At this session you will be given the program, which is a mixture of stories and activities that you do with your child for about 15 minutes every day, six days a week for six weeks. You will also be given a diary to fill in to say which activities you did. After the six weeks of the program we will test your child again to see if his/her speech is better.

Are there any disadvantages or risks in taking part?

There are no risks to your child. A disadvantage is that your child might become more aware of his/her speech difficulty. However the activities are designed to be fun for the child and to present speech difficulties in a fun way.

Are there any benefits in taking part?

Your child will receive a very thorough speech assessment and you will get a program that should help improve your child's speech. The information we get from this study should help improve the treatment of children with speech sound difficulties in the future.

What happens when the research study finishes?

After all the results have been collected, the researchers will write the study up. The results will be analysed and shared with other Speech & Language Therapists to help them decide the best way to treat children with speech sound difficulties. We will give you a summary report of the findings regarding your own child. You may request a copy of the report of all the findings at the end of the study. Your child will not be identified in any research report or publication.

Will my child's taking part in the study be kept confidential?

Yes. All information which is collected about your child during the course of the research will be kept strictly confidential, and any information about him/her which leaves the clinic will have the name and address removed so that he/she cannot be recognised. You have the right to check any data held about your child for accuracy and correct any errors.

What will happen if I don't want my child to carry on with the study?

You can take your child out of the study at any time, without giving a reason. This will not affect any services you or your child would normally receive.

What if there is a problem?

If you have a concern about any aspect of this study, you should ask to speak to the principal investigator who will do her best to answer your questions (Aileen Wright, 061 234234). If you remain unhappy and wish to complain formally, you can do this through:

Who is organising and funding the research?

The research is being carried out as part of final year Speech & Language Therapy students' Master's thesis under the supervision of a lecturer and qualified SLT at the University of Limerick in Castletroy.

Who has reviewed the study?

All research in the University is looked at by independent group of people, called a Research Ethics Committee to protect the safety, rights, wellbeing and dignity of those taking part. This study has been reviewed and given favourable opinion by the University of Limerick Research Ethics Committee. If you have concerns regarding this study, please contact: *Chairman, Education and Health Sciences, Research Ethics Committee, EHS Faculty Office, University of Limerick, Tel (061) 234101 Email : ehsresearchethics@ul.ie*

Further information and contact details.

For further information please contact the researcher, Aileen Wright (061 234234, or aileen.wright@ul.ie).

Thank you very much for taking the time to read this information sheet. We will be very grateful if you decide to let your child take part in the study.

If you decide to let your child take part in the study, please sign the attached consent form and return it to Aileen Wright, Department of Speech & Language Therapy, Health Sciences Building, University of Limerick, Limerick. You will then be contacted by phone to arrange an appointment.

This research has received ethical approval from the University of Limerick Research Ethics Committee. If you have concerns regarding this study, please contact: Chairman, Education and Health Sciences, Research Ethics Committee, EHS Faculty Office, University of Limerick, Tel (061) 234101 Email : ehsresearchethics@ul.ie



UNIVERSITY of LIMERICK
OLLSCOIL LUIMNIGH

Parent Consent Form

Study title: A novel home program for children with speech sound disorders

Name of Principal Researcher: Aileen Wright, BA(Hons), MSc. MIASLT. University of Limerick

- I confirm that I have read and understand the information sheet dated.....
(version.....) for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.
- I understand that my child's participation is voluntary and that I am free to withdraw him/her at any time without giving any reason, and without his/her healthcare or legal rights being affected.
- I understand that my child's identity will be kept confidential and it will not be possible to identify him or her in any reported findings.
- I agree to let my child take part in the above study.

Name of Child: _____ DOB: _____

Name of Parent : _____ Date: _____

Signature: _____

Address: _____

Telephone: _____ Email address: _____

Case history form

Case No:		Date	
Child's Name:		DOB:	
Address:			
Mother's name		Phone:	
Father's name		Phone:	
Carer's name (if different from parent)		Phone:	
Brothers and sisters		Age	

I consent to this session being recorded on audio. The recording **may/may not** (delete where applicable) be used for teaching purposes by the University of Limerick. My child will not be identified.

Signed: _____ Date: _____

Diagnosis:	Normal	Articulation	Phon. Delay	Consistent Phon. Disorder	Inconsistent Phon. Disorder	Other:
Recommendations:	Discharge	Review	Waitlist for therapy	Assess language	Other:	
Signed:				Aileen Wright, SLT		

Your Concerns					
My child does not speak properly		Y/N			
My child is difficult to understand:		Y/N	For me	for family	for strangers
My child has very few words		Y/N			
My child is not joining words into phrases		Y/N			
I am concerned about my child's behaviour		Y/N			
I have other concerns (Please give details):					
Family history					
Other people in my child's family have difficulty with speech or language. (Please give details):					Y/N
Other people in my child's family have difficulty with reading or writing (Please give details):					Y/N
Parents' education: Please tick each box that applies:					
Mother	Junior Cert	Leaving Cert	Post leaving cert e.g. FETAC	Third level (University, IT etc)	
Father	Junior Cert	Leaving Cert	Post leaving cert e.g. FETAC	Third level (University, IT etc)	

Birth & development			
My child was born prematurely	Y/N	No. of weeks?	
My child needed special care when born	Y/N	How long?	
My child had some feeding difficulties as a baby	Y/N		
My child has some eating/drinking difficulties now	Y/N		
My child drools a lot	Y/N		
My child uses a soother	Y/N		
My child sat up at age:	Months		
My child walked at age:	Months		
My child has difficulties with motor skills, e.g. running, climbing, picking up small things	Y/N		
Communication development			
My child babbled as a baby	Y/N		
My child said his/her first words at age:	Months		
My child joined words together at age:	Months		
Medical			
My child has a health problem: (please give details)			Y/N
My child has been in hospital: (please give details)			Y/N
Hearing			
My child has had a hearing test:	Y/N	At age:	
Result of hearing test:	Normal	Not normal	
My child has had ear infections:	1 -3 times	4-6 times	more than 6 times
Personality			
My child plays well with others	Y/N		
My child is very shy	Y/N		

Child care	
My child is at home with a parent	Y/N
My child is looked after by a childminder	Y/N
My child goes to crèche/nursery	Y/N
My child goes to playschool	Y/N
My child goes to school	Y/N
Exposure to other languages	
English is the only language spoken at home	Y/N
My child hears Irish spoken in the home	Y/N
My child hears another language spoken at home	Y/N
My child hears another language spoken outside home	Y/N
My child speaks another language	Y/N
My child goes to Naionra/Gaelscoil	Y/N

Appendix B

Recruitment Email and Poster

Recruitment Email



Do you know a child who has speech sound difficulties?



Final year Master's students in Speech and Language

Therapy in the Department of Clinical Therapies are looking for parent volunteers to test a new program of stories and activities that should help children's speech sounds to develop.

If you have a child **aged between 3 and 5** who has difficulties with speech sounds, or you know someone who does, and would like to know more, please ring or email Aileen Wright: 061 234234, aileen.wright@ul.ie.



DEPARTMENT OF
CLINICAL THERAPIES



Is your child's speech hard to understand?

Would you like to take part in a
program that might help?

Speech and Language Therapists in the Department of Clinical Therapies at UL are looking for parent volunteers to test a new program of stories and activities that should help children's speech sounds to develop.

If your child is aged between 3 and 5 and he or she has difficulties with speech sounds, you could take part.

Interested? Ring or email Aileen Wright: 061 234234,
aileen.wright@ul.ie, to find out more.



Appendix C

Parent Likert Scale 1 and 2

Parent Likert Scale 1

HOME PROGRAMME PROJECT – PARENTAL QUESTIONNAIRE

Please answer the questions on a scale of 1-5 where:

1 = strongly disagree	2 = disagree	3 = neither agree nor disagree	4 = agree	5 = strongly agree
-----------------------	--------------	--------------------------------	-----------	--------------------

1. I think my child is aware of their speech delay/disorder

1 2 3 4 5

2. My child's speech delay/disorder affects conversation between us as parent and child.

1 2 3 4 5

3. My child's speech delay/disorder affects their conversation with extended family.

1 2 3 4 5

4. My child's speech delay/disorder affects their interaction with their friends/peers.

1 2 3 4 5

5. My child's speech delay/disorder affects conversation with people they do not know.

1 2 3 4 5

6. I am concerned about my child's speech delay/disorder.

1 2 3 4 5

Parent Likert Scale 2

Home Programme Project – Parental Questionnaire

Case number:
Initials:

Please answer the questions on a scale of 1-5 where:

1=Strongly disagree	2=Disagree	3=Neither agree nor disagree	4=Agree	5=Strongly agree
---------------------	------------	------------------------------	---------	------------------

1. The home programme was beneficial for my child.

1 2 3 4 5

2. I think my child’s speech has improved over the last five weeks.

1 2 3 4 5

3. I think my child is a more confident communicator now.

1 2 3 4 5

4. Other people have commented that my child’s speech has improved over the last five weeks.

1 2 3 4 5

5. My child enjoyed the programme.

1 2 3 4 5

6. I enjoyed doing the programme with my child.

1 **2** **3** **4** **5**

7. The instructions provided were adequate to carry out the programme.

1 **2** **3** **4** **5**

8. The materials provided were adequate to carry out the programme.

1 **2** **3** **4** **5**

9. It was easy to find time to do the programme with my child

1 **2** **3** **4** **5**

10. I spent more one-to-one time with my child because of the programme.

1 **2** **3** **4** **5**

11. I will continue doing these activities with my child.

1 **2** **3** **4** **5**

12. The activities are useful to do with my other children (if applicable).

1 **2** **3** **4** **5**

13. I felt confident using the programme with my child.

1 **2** **3** **4** **5**

Any other comments or feedback?



Thank you for completing the programme.

We hope that it was a positive experience for you and your child.

Appendix D

Modelling and Recasting Handout

Parental advice

Helping your child's speech and language develop.

All children are language learners.

- Part of their speech and language development is innate.
- Part of it is learned through the Modelling of people around them.
- Parent(s) are young children's main speech and language models.

Modelling

What is Modelling?

The term has two meanings in a speech and language aspect:

1. Providing a 'model' or example, all the time of how to communicate
2. 'Modelling' an example of a specific language or speech '*target*'

What is a '*target*'?

A '*target*' is a speech or language 'behaviour' we want to encourage your child to use when communicating: e.g.,

- a speech sound might be a '*target*' e.g /b/ /g/ /k/ /t/ /d/ etc..
- or a grammatical structure (a sentence) might be a '*target*'

Providing a 'good' model requires **YOU** to use:

- an unhurried speech rate
- clear speech
- short sentences
- appropriate vocabulary
- more repetition and re-stating than with an adult communicative partner.

Ineffective Conversational Modelling:

- **Pointless Modelling**

Child: That's a bid bird.

Adult: Not a bid bird. A *big* bird.

What did the child hear? 'bid' was heard twice and 'big' once! adult cancelled him/herself out!

- **Ineffective Modelling**

Child: That's a bid bird.

Adult: Not a bid bird. You don't say 'bid bird' You have to remember to say 'big bird'.

Child tunes out. Child heard 'bid' three times, and 'big' once (if they were listening)

- **Effective conversational Modelling**

Child: I like his punny pace.

Adult: I like his *funny* face too. It's a really *funny* face. A *funny* face.

Do you know what that guy with the *funny* face is called?

Child heard correct model of word four times.

- **Effective Modelling corrections**

Child: Det it down!

Adult: *Get* what down? Oh, *get* this down? OK. I'll *get* it for you. I think I can reach.

Uh-huh, I can *get* it.

When modelling for your child always make sure you have your child's attention. Make sure your child is looking at you so they can see how your mouth makes a sound(s).

Recasting

Child: "Baby crying."

Adult: "Yes, the baby is crying."

That's all there is to it—you don't need to emphasize THE or IS as if you're correcting the child, and you don't make the child say it back to you correctly; you just say it matter-of-factly, as if you're simply repeating what the child said.

- **Recasting for syntax(sentence)**

Child: What time it is?

Adult: What time is it?

- **Recasting for vocabulary**

Child: Shall I get Daddy's sword?

Adult: Shall I get Daddy's saw.

- **Recasting for speech sounds**

Child: I want the lellow one.

Adult: I want the yellow one.

Looking at pictures in a book

- Talk about what your child is looking at.
- Ask questions about what your child is looking at (What is Spot doing?).
- Wait for your child to say something (Spot hiding.).
- Add a little bit more to what your child says (Spot is hiding under the bed.).

Talking about things outside

Talking to children about what they see or hear teaches them new words.

Ask your child questions about things he/she sees outside:

- What color is it?
- What do you see?

•How does it feel?

•What shape is this?

Talk about something your child can touch and feel.

•Help your child to describe things with more than one word (brown, smooth, hard).

•Ask your child simple questions (Is this a rock? Is it a tree? Etc..)

•Describe something nearby and see if your child can find it. Have your child describe something for you and try to find it.

Other useful tips

1. Refrain from interrupting you child during his speech attempts, or telling him to slow down or start over, as that may break up his speech fluency.
2. When discussing stories, ask for specific information or details; this shows the child you expect good listening during the story. When reading stories, ask the child to predict what happens next
3. Take advantage of language stimulation opportunities in everyday living events (e.g shopping) Talk about what you are doing, what you see, and where you are going.
4. Play games involving “spatial terms” (i.e., under, in front of, etc.).
5. Use snack and meal times to increase vocabulary by talking about how things taste and using actions words about eating (suck, eat, sip, gobble).
6. Normal routines, such as feeding, dressing and bath time, are ideal opportunities for your child to understand and learn new words. The shared attention between you and your child and the repetition that takes place in these situations, is very helpful. Playing games such as peek-a- boo, ball play and sound play e.g. nursery rhymes/songs are important activities for your child’s language development

Appendix E

Home Programme Parent Diary

Home Programme Diary



(Name)

Instructions

Carrying out the program

- Try to spend 15 minutes each day using the program with your child in a one-to-one situation. Please read at least one of the stories to him/her and carry out one of the activities each day. Let your child choose the story or activity as much as possible, but try and spend some time on the stories that demonstrate difficulties like those she/he has a few times a week.
- If your child would like to read lots of stories or do lots of activities, that is fine! Just take into account that you need to keep his interest for five weeks.

Filling in the diary

- Please fill in the diary each day with the name of the story or stories you read and activity you did. Please also add any comments about things like whether your child enjoyed the activity, or whether you felt it was suitable.
- If your child is sick or out of sorts, or if you have to miss a day for any reason, please just note this in the diary so we know how much time your child spent on the program.
- **Please fill in a comment also whenever you see signs of progress, for example if you hear your child use a new sound, or if a relative comments that they can understand him/her better, or if your child shows more confidence, e.g. speaking on the phone or to a stranger for the first time.**

Using the star chart

- We have given you a star chart so you can put a star or sticker in each day that the child does something in the program. If your child is hard to motivate, you might use a little reward, such as an outing to the park or something nice to eat, every time they get a certain number of stars.

Have any questions or need some advice?

- Please ring 086 4478771 or contact aileen.wright@ul.ie if you need any help or advice.

Week 1	What you did you do today? (which stories or activities)	Comment: (e.g. enjoyment, progress)
Day 1		
Time spent:		
Day 2		
Time spent:		
Day 3		
Time spent:		
Day 4		
Time spent:		
Day 5		
Time spent:		
Day 6		
Time spent:		

Week 2	What you did you do today? (which stories or activities)	Comment: (e.g. enjoyment, progress)
Day 1		
Time spent:		
Day 2		
Time spent:		
Day 3		
Time spent:		
Day 4		
Time spent:		
Day 5		
Time spent:		
Day 6		
Time spent:		

Week 3	What you did you do today? (which stories or activities)	Comment: (e.g. enjoyment, progress)
Day 1		
Time spent:		
Day 2		
Time spent:		
Day 3		
Time spent:		
Day 4		
Time spent:		
Day 5		
Time spent:		
Day 6		
Time spent:		

Week 4	What you did you do today? (which stories or activities)	Comment: (e.g. enjoyment, progress)
Day 1		
Time spent:		
Day 2		
Time spent:		
Day 3		
Time spent:		
Day 4		
Time spent:		
Day 5		
Time spent:		
Day 6		
Time spent:		

Week 5	What you did you do today? (which stories or activities)	Comment: (e.g. enjoyment, progress)
Day 1		
Time spent:		
Day 2		
Time spent:		
Day 3		
Time spent:		
Day 4		
Time spent:		
Day 5		
Time spent:		
Day 6		
Time spent:		

Appendix F

Sample Story and Activity from the Home Programme

Marty and Sue go to Spain

Marty and Sue were very excited. It was their first holiday abroad and the first time they had been on a



plane. They really enjoyed the flight.

When they got to Spain there were lots of new things to see and the sun was very hot!! They all decided to go to the market to see what they could buy.

Marty had never been so hot. "I'm too hot", he said, "I think I am going to faint!"

"You can't faint here, Marty!" said Sue, "there is nowhere to sit and no paints."

Then she looked at him, he looked very white! "Oh no, I think you're going to faint, not faint! We'd better get you a fan to keep cool."



"That's a good idea", said Marty. They saw a stall selling lots of useful things.

"Look, there are some fans," said Sue.

Marty said to the man at the stall, "I would like to buy a fan please." The man reached down a fan from the back of the stall.





"Here you go, here's a strong pan for you." he said.

"A PAN?" said Marty, "No thank you, I would like a *pan* please!"

"But this *is* a pan.", said the shopkeeper.

"But I really need a *pan* for this hot weather." Marty said. The man was very confused.

Sue could see that Marty had mixed up again. "He means a *fan*, not a *pan*!" she said to the man.



"Ah! You are looking for a *fan*!" said the man. "Well I have lots of fans here as it is very hot outside. What colour fan would you like?"



"I would like a green one please." said Marty, and Sue wanted an orange one.



The fans helped them to keep cool. "I feel better now." said Marty. "Let's get something to eat".

"There's a lovely fruit stall over there," said Sue.

There were apples, oranges, bananas and grapes. But also some fruits that Marty and Sue had not seen before. Sue pointed at a small green fruit that she didn't know. "What is this please?" Marty asked the fruit seller.



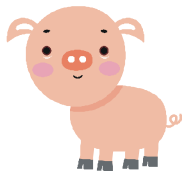
"These are figs", replied the fruit seller.



Oh, they look tasty, I will buy one to try, thought Marty.

So he asked the fruit seller, "Could I have one pig please?"


The fruit seller looked very surprised. "A pig?" he said. "I think you have come to the wrong market stall, I only sell fruit."



"Not a pig", said Marty, "a **pig**, I would like to buy a pig."
The fruit seller pointed over to another part of the market. "You will find the pigs over there."

Sue knew what was happening and said to the fruit seller. "Marty has got mixed up. He would like a **fig** please, not a pig."

"Oh, I see!" said the fruit seller, and he put one ripe juicy fig into a bag for Marty to eat later. It was delicious!

Marty had got mixed up again. He said paint  instead


of faint



pan instead of fan



, and pig  when

he meant **fig** .








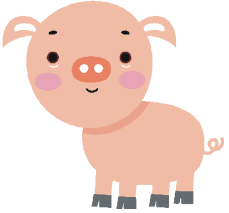




look at the figs next time you go to the market or supermarket. Maybe you could try one!











Why not make a fan by pleating a sheet of paper and folding the bottom.



Practice fanning each other.

Can you find other words that Marty might get mixed up?

			
fan	pan	fin	pin
			
faint	paint	fig	pig
			
farm	palm	foal	pole

			
cuff	cup	sheaf	sheep
			
leaf	leap	half	harp
			
chief	cheep		

Slippery slide game

Instructions

Get ready: Cut out the pictures on the third page. Put the picture of the slide (next page) on the table. Put one of the white pictures at the bottom of the slide. Put the big S the top of the slide. Spread a couple of the blue pictures out on the table. You must include the one that rhymes with the white picture, e.g. if **pin** is at the bottom of the slide, you must have **spin** out, and a couple more.

Show and tell: Push the big S down the slide slowly saying “sssss”, when it touches the picture at the bottom say that word, e.g. **pin**, making “sssss**pin**”.

Say “Look the sss makes a new word. With the ssss, pin turns into spin!” Find the spin picture and put it next to the s+ pin.

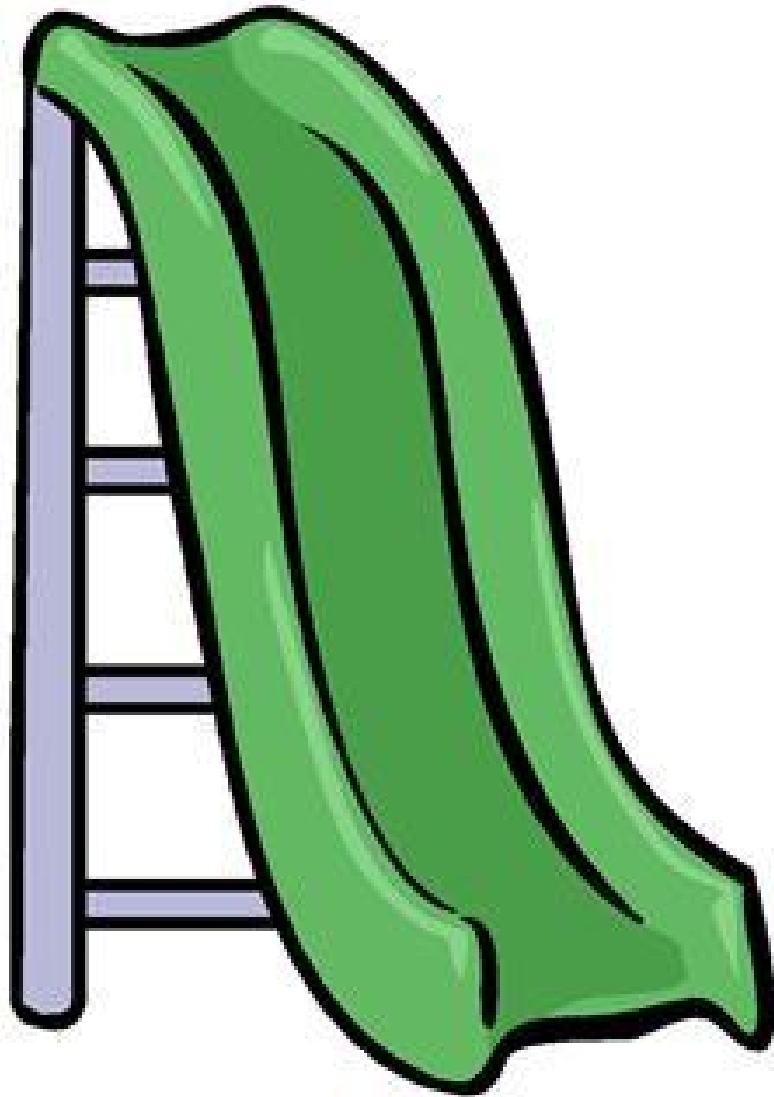
Repeat with some more words.


Now play: When you have done it a few times, say “now you find the word it makes”. Push the big S down the slide again with a new picture at the bottom. Your child must find the picture of the words it makes. He or she doesn’t need to say it.

Make it harder: Put more pictures out to choose from.

Make it easier: Just two pictures out to choose from. Say “ssssssno, does it sound like snow or spin?” If your child still doesn’t get it, just go back to demonstrating. Keep the pictures and try again another day





<p>no</p> 	<p>snow</p> 	<p>top</p> 	<p>stop</p> 
<p>wing</p> 	<p>swing</p> 	<p>nail</p> 	<p>snail</p> 
<p>witch</p> 	<p>switch</p> 	<p>tool</p> 	<p>stool</p> 
<p>tick</p> 	<p>stick</p> 	<p>nap</p> 	<p>Snap</p> 
<p>cool</p> 	<p>school</p> 	<p>key</p> 	<p>ski</p> 