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A follow-up study of children who attended the Centre for Language and Hearing Impaired Children

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A FOLLOW-UP STUDY OF CHILDREN WHO ATTENDED THE CENTRE FOR LANGUAGE AND HEARING IMPAIRED CHILDREN

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A research report submitted to the Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, in partial fulfilment of the requirements for the degree of Master of Science in Medicine in Child Health (neurodevelopmental option)

Johannesburg, 2012

I, Judith Elizabeth Hyslop, declare that this research report is my own work. It is being submitted for the degree of Master of Science in Medicine in Child Health (Neurodevelopmental option) in the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at this or any other University.

……..

…..day of October, 2012

This is dedicated to my children
Kirsten, Andrew and especially James,
who taught me so much about the development
of children and language.

Abstract

Language is integrally involved in all stages of the learning process. Children who have a language disability are therefore likely to have difficulty with their schooling. The Centre for Language and Hearing Impaired Children was established to provide these children with an optimal start to their education and to maximize the impact of early intervention. The aim of this retrospective study was to obtain follow-up information about the pupils who attended this language-rich nursery school environment, and to discover if their progress reflected significant long-term improvements in their education. The study design involved both quantitative aspects, for which it became necessary to create an educational outcome scoring system in order to objectively assess children's outcomes, and descriptive components to understand the children's progress. The data collection involved two phases, where the initial data provided the basic demographics of 94 children who attended the Centre, and the second stage considered information obtained in the follow-up interviews with 32 families that could be traced. The latter data showed that, in spite of previously reported improvements while at the Centre, significant disabilities persisted in 56.25 % of the children, where they were unable to reach mainstream education. In addition, there were significant numbers (81.25%) that attended or passed through remedial/special education during their formal school career, reinforcing the need for supportive, therapeutic forms of education for children with language impairments.

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The Mission Statement of

The Centre for Language and Hearing Impaired Children

To be a Centre of excellence in the identification and management of pre-school children with specific speech, language and hearing impairment. This is achieved in a multi-disciplinary framework through the provision of:

- A facilitatory, small group, pre-school environment, which is clinically driven.
- Individualised, intensive therapy.
- Early intervention programmes.
- Outreach initiatives.
- Being a resource for research, education and training.

Taken from the 2008 Annual Report

Centre for Language and Hearing Impaired Children.

www.speechandhearing4kids.org.za

Section 1: Introduction

In general, an individual's ability to succeed in life is inseparably linked with his or her educational success and this significantly influences his or her future. In a similar manner a person's schooling is affected by his or her language abilities, since one learns, thinks and reasons in language. Children with normal language and speech development acquire speech and language by exposure to the spoken language of their family, peers and teachers. This means that they are equipped to go out into the educational world with a good language basis at the school-going age (approximately six years of age); however, this is not so for the language-impaired child. Children with language difficulties do not passively learn language skills and rather need these to be actively taught to them, involving repetition and extensive learner support in a language-rich environment (Fletcher & Hall, 1992). It is important therefore to investigate how language-impaired children in South Africa achieve academically, to determine whether we are providing them with sufficient therapeutic services or whether we can improve these support systems.

Communication can be broken down into a number of components in order to understand each child's disability and therefore its management. **Language** is defined as 'a system of symbolic representation that is used to communicate feelings, ideas and intentions' while **speech** is the 'expression of language in its verbal mode' or the actual 'motor production of an acoustic signal'. These actual sounds or acoustic signals make up patterns and groups which are then interpreted by the listener, according to his or her language. This, in turn, depends on **phonation,** the 'physiological process of vibrating the vocal folds', together with **articulation**, the process involving 'formation of the speech signal by the oral structures' (Kelly & Sally, 1999, p 621).

Language consists of expressive and receptive language, together with the actual social use of language, which includes the context of use (**pragmatics**). **Receptive language** involves the ability to recognize the meaning of the spoken words and combinations of words together with the ability to interpret the sounds. Conversely, **expressive language** involves correctly forming the sounds into words and sentences, to use in the correct social context (Kelly & Sally, 1999).

Development of communication skills is a gradual process starting with the first eye contact and smile in an infant around four to six weeks of age, continuing up to around five years when a child has a range of near adult forms of language, which follows most of the grammatical rules. This is a gradual process involving a number of processes and abilities that all work together to enable meaningful communication. Of note is that verbal communication is one of the important abilities that have evolved only in humans, and which differentiates us from the higher apes. The first part of social interaction to develop is pre-verbal skills, which need to be established before any meaningful speech develops. Law (1993) claims that there are four components to verbal communication. First is the creation of **speech** that involves the actual verbal output, which is the physiology of making sound, motor skills including praxis (the voluntary motor execution of speech) and the phonological systems. In addition, the development of language also is aided by the ability to hear and so provide access to the spoken word. Second is the component of **language,** which includes syntax (the order of words to make up sentences), morphology (e.g. prefixes, suffixes), semantics (words and their meanings), pragmatics (the social use of language) and prosody (the intonations and inflections of speech) (Kelly & Sally, 1999). This revolves around recognition of meaningful input, comprehension or decoding of information resulting in the ability to encode verbal output.

Third is **communication** which involves the use, form and content of speech and language making up conversation, as well as non-verbal behaviour. The last component is the development of **intelligence** and cognition, which then provides the higher control of communication. A delay in any one of these components results in poor communication skill (Law, 1993).

Delay in language development is the single most common developmental abnormality in the pre-school age group (Ward, 1999), being present in 7.4% of all children at this stage of development (Leonard, 1998). As with all childhood development, there is a 'normal' range in age over which the acquisition of language occurs, from early non-verbal communication (under one year) to development of first words at 12 months to word combinations and the rapid growth in vocabulary in the second year. Although there are variations in the form and severity of the disability, and some children may simply be 'late bloomers' (late talkers who catch up their development after their second birthday) (Thal & Tobias, 1992), it is essential that intervention be instituted as early as possible. Deviation from or delay in this range of development is indicative of language impairment (Fletcher & Hall, 1992). Researchers have determined early predictive indicators for children who will go on to have language difficulties. There are two important features that point to future difficulties. Firstly, is the failure to develop gesture, both conventional (pointing and sharing) and symbolic (e.g. panting like a dog) (Thal & Tobias, 1992), and secondly involving the non-development of receptive language (Thal *et al.*, 2004). In addition, the development of comprehension by 13 months of age reflects the future development of receptive language and of grammatical complexity by 28 months (Watt, Wetherby & Shumway, 2006). Meanwhile, the 'late bloomer', in fact, has a compensatory increase in the use of gesture, which is a positive prognostic sign, and so differs from the child with impairment (Thal & Tobias, 1992). The absence of these skills should alert

the therapist to high likelihood of future disability and early aggressive intervention should be initiated (Seiger-Gardner, 2010).

The definition of language impairment excludes children with severe hearing loss but does include those with **language learning disability** (LLD) and the group with **pervasive developmental disorders** (PDD), (e.g. autism). The term **specific language impairment** (SLI) is a specific disorder within the group, applied to those who have a serious delay in language development, and previously thought to be associated with 'normal' scores in non-verbal intelligence testing (taken to be a non-verbal IQ greater than 70). The more recent research on this group shows that this is not purely a disability of language but rather a more complex condition where the children also have significant difficulties with non-verbal intelligence, which are not directly related to language (Conti-Ramsden, 2008). In addition, there is difficulty in achieving accurate testing of intelligence as most of the tests used are language based, which immediately places the language-impaired child at a disadvantage (Jacklin, 2004). The group with specific language impairment is also not a homogeneous group and the actual form of impairment varies. Each form of disability has its own features, but they all affect the ability of the child to function within the educational system. Without intervention, children with specific language impairment will not catch up with their age-matched peers (Owens, 1999).

Long-term follow-up studies on adolescents that were once so-called 'late bloomers' have recently shown that they do in fact suffer from academic and language delay in high school. These children had achieved 'catch up' when tested at 5.6 years of age but when re-assessed at 15 years had significant deficits in short-term memory, phonological skills and literacy skills

when compared to their peers. (Stothard, Snowling & Bishop, 1998). In addition they had struggled with acquiring word meaning (Alt, Plante & Creusere, 2004) and word retrieval (Bishop & Donlan, 2005). In other words, the term 'late bloomer' is not benign and these children would also benefit from monitoring and possible early therapeutic input to avoid these long-term sequelae, if given therapy timeously (Rescorla, 2005).

The manifestations of specific language impairment include weakness of receptive and/or expressive language as well as difficulties with auditory processing. The processing weaknesses are more difficult to detect during the pre-school age due to immaturity of cognitive skills. Specific language impairment may therefore be under-detected and under-managed at the stage during which the brain can still undergo developmental changes. This is significant because after the age five, the child's brain starts to lose the property of 'plasticity'.

'Early intervention' has become the major focus of therapeutic intervention for children who suffer from any form of developmental delay. The aim of this intervention is to detect, by screening, the child who displays early deviation from the 'norm' and who has not yet developed the full pathology. Extensive work by Makati (2010) has shown that the young child's developing brain has an incredible capacity for modification, by which stimulation can improve and rearrange the neurological connections and with synaptogenesis, lay down new pathways to alternate parts of the brain. This process is termed the 'plasticity' of the developing brain in the child under the age of five years. These new pathways are reinforced by use and established by the process of 'pruning' and this is the essential basis upon which therapeutic 'early intervention' rests.

These processes of synaptogenesis and neurogenesis occur throughout life; however the major activity is in the young child's brain. The peak developmental activity in the temporal area, where the language centres are situated, occurs between the ages of two and four years. The process of synaptogenesis occurs when stimulation by an enriched environment on the immature neuron results in the release of glutamate from the neuron together with calcium entry into the cell. As a result of the glutamate together with the excitation, the astrocyte releases neurotrophins (BDNF and TNF-alpha). These act as a neuronal growth factor and they result in 'long-term potentiation' or the development of a memory, which reinforces the use of that pathway. This then increases the survival of the neuronal pathway together with increased synaptogenesis. Any further developmental enrichment results in the increased formation of dendritic branches together with an increase in dendritic spines (Makati, 2010). Ultimately there is a permanent change in the function of the young brain.

The actual causes of developmental language disorder are not generally known. Delay in language development is seen as a lag in verbal skills of one to two years behind a child's chronological age while developmental language disorder is defined as 'the inability to understand or express yourself in the same effortless way as your peers' (Haynes & Naidoo, 1991). Radiological imaging is of limited value in a child with delay in language development. The simplest imaging that will illustrate areas of the cortex that are being activated is the fMRI (functional magnetic resonance imaging), by which some of the underlying pathology and functioning has been suggested. In the presence of language disability, there is less activation of the left parietal and left frontal regions of the brain during testing, but normal activation of the areas involved in language processing. These abnormal areas are those involved with

memory and attentional processes (Weismer *et al.,* 2005). These researchers also found reduced activation of the left inferior frontal gyrus, which is the region involved with semantic processing and retrieval. The areas of the angular gyrus and the planum temporale have been found to have altered function in people with language difficulties as well as the associated condition, dyslexia. It appears that the left posterior perisylvian (planum temporale) region is involved in the processing of phonemes, the units of sound in speech (Kelly & Sally, 1999), and auditory information. In addition Herbert *et al.* (2003) found that there is also a relative increase in the volume of white matter present, particularly involving the radiate white matter. Recent research has found that there is actually a relative increase in size of the right perisylvian area (Broca's area) rather than a decrease in development on the left (Williams, 2010), which is a reversal of the norm (De Fosse *et al.*, 2004). This is not present in all children with language disabilities. Functionally, using event-related brain potentials (ERP), Ors *et al.* (2002) showed slowed neuronal responses to auditory stimuli in children with language disabilities, particularly those with receptive weaknesses.

Similarly, recent improved imaging with functional MRI scans shows that in males there is only activation of the left inferior frontal gyrus with phonic processing while in females there is bilateral, more diffuse neuron activation (Shaywitz, Shaywitz & Pugh, 1995). This in turn is related to the significant male dominance in language disabilities, as the female child inherently has protection of her language development (Kelly & Sally, 1999). Bishop (1992) postulates that language disability may be linked to the high testosterone levels in the developing male foetus and neonate, which is associated with decrease in 'lateralization' (growth and establishing function) of the left developing hemisphere, and so reduced development of the language centres in the left frontal and temporo-parietal areas of the brain.

A familial, if not genetic, component in malfunctions of these areas has also been suggested (Fletcher & Hall, 1992; Newbury, Bishop & Monaco, 2005).

The activity and development of a cortical area can be shown by positive emission tomography (PET) scanning, which displays the cellular metabolism of the area of brain functioning at that time, reflecting increased oxygen or glucose uptake (Law, 1993). In a similar way the opposite process, by which reduced stimulation leads to an increase in pruning and reduction in both synaptogenesis and neurogenesis, can be illustrated. The only other imaging that at this time can reveal a change in function with speech or language impairment is regional cortical blood flow imaging. Computerised axial tomography (CAT) scan and simple magnetic resonance imaging (MRI) are of little value (Fletcher & Hall, 1992).

With these concepts in mind, the Centre for Language and Hearing Impaired Children was established 35 years ago to undertake the intensive management of young children in a nursery school setting. The Centre was started as the so-called 'Units' (Unit for Hearing Impaired Children and Unit for Children with Language Difficulties) that were originally based at the Transvaal Memorial Institute, Johannesburg, under the guidance of the Department of Speech Pathology and Audiology of the University of the Witwatersrand. The Centre moved to its current position in Parktown and is now under the guardianship of the Society for Language and Hearing Impaired Children. The Centre is aimed at pre-school children who are not benefiting from weekly speech therapy and a conventional pre-school environment. The mission at the Centre is to accept children of more or less average IQ whose primary pathology is with speech, language and/or hearing impairment. Children with severe autism or intellectual disability are not really suitable as they cannot be offered sufficient support to meet their more

complex needs. However, although the Centre is aimed mainly at children with specific language disorders due to difficulties with comorbidities as well as conditions such as pervasive developmental disorder and autism, there is a range of disability and severity amongst the children. This does affect the level of progress in spite of treatment.

Once a child is struggling in his or her current nursery school situation as well as spending afternoons going from one therapy session to another, their self-esteem starts to lessen and they become aware that they are different. At the Centre, the school day is organised to include therapies covering gross and fine motor skills, perceptual abilities, as well as provide an intensive language-rich day where language is actually taught to them. Children are screened before they are accepted by the nursery school and if there is any uncertainty, they are invited to attend the school for a trial period of three days. The philosophy of the Centre acknowledges that language development is the single best predictor of later school success. The overall aim is to maximize the learning potential of each child.

With time and the ever-apparent needs of disadvantaged children, the staff at the Centre is expanding the available services to include African language support, involvement in two nursery schools in disadvantaged areas, as well as involvement in other community outreach programmes. The services provided at the Centre primarily revolve around early diagnosis and intervention to provide each child with intensive therapy as early as possible during the stage of brain plasticity. This is extremely intensive with individual speech therapy three times a week as well as the therapists' involvement in the classroom.

With changes in economics as well as within the social structure of South Africa it becomes necessary to assess whether this intensive, expensive type of intervention can be justified and whether it actually has an effect on the child's long-term academic outcome. Following the issue of the White Paper in 2003 by the Department of Education (Dept. of Education, 2002), there has been a change within the education system from the management of special needs education for children within their own schools, to the current program that uses inclusive education at primary school level with a few designated support schools or LSEN (Learners with Special Educational Needs) schools at which the children with difficulties can be helped. This program was developed by the Department of Education in an attempt to provide basic education to all learners within mainstream schools, but particularly those with disabilities that were from disadvantaged backgrounds. The opinion was that under the old system with specific special needs schools, many children with disabilities were not accessing any form of education, let alone receiving support or special education. There was also found to be a racial basis for the allocation of funding. In response to this situation, the inclusive education system was introduced where all learners have access to the same education system and recognition and allowances are made for all types of barriers to learning, be they 'physical, intellectual or sensory'.(Department of Education (SA), 2002).

Under this system a school such as the Centre would be perceived as no longer having a role in the current form of education in South Africa. However, firstly, the literature reflects an opinion that language disabilities are rarely cured and individuals do not just out-grow this difficulty. Secondly, the child with language disability has a different manner of learning, is not able to readily process linguistic input and cannot utilize the more subtle learning strategies of non-disabled learners. A child suffering from specific language impairment has notable difficulty with syntax, morphology and the phonology of language. These children are unable

to undergo passive learning around these areas, need a specific language-rich environment with specialized programs that encourage their acquisition of language, and need to be specifically taught the principles of language form (Law, 1993; Botting Crutchley & Conti-Ramsden, 1998). In addition, language difficulties have been found to be associated with perceptuomotor problems particularly temporal sequencing, as well as poor symbolic thinking, imagery and short-term memory (Montgomery, 2003). Other cognitive areas affected are those of auditory processing and sequencing (Rutter, Mahood & Howlin, 1992). It also appears that although speech therapy can well lead to an improvement in a child's verbal IQ, these gains are not matched by similar gains in non-verbal IQ, as there is dissociation between verbal and non-verbal cognition (Fundudis, Kolvin & Garside, 1979) and significant fall-off in the academic level achieved as the children enter adolescence (Conti-Ramsden, 2008).

There are also reported associations between the different components of language disability and elements of education and school work. Poor phonological coding is associated with poor reading skills as is difficulty with phonic awareness, which is the awareness of rhyme and the ability to segment words. In addition, a child is unable to develop these phonic skills if his or her memory age is below three years and ten months, and so his or her reading skills do not progress beyond seven years of age (Haynes & Naidoo, 1991). Tomblin (2008) reported, following the Iowa study, that 19% of the children with specific language impairment remained functionally illiterate (that is, a reading age below eleven years) once they had reached adolescence. Similarly, poor auditory short-term memory results in impairment of comprehension skills as does any low verbal IQ, because language is a strong predictor of comprehension ability (Conti-Ramsden, 2008). The construction and structure of sentences are affected by any impairment of expressive language ability. However, there is no association between the age of first learning to talk and the child's verbal and non-verbal cognitive ability.

In addition, one must differentiate between disorders of speech and problems of language production, which have different outcomes (Haynes & Naidoo, 1991).

Ward (1999) undertook a study around the hypothesis that if the delay in language was detected before the age of one year and intervention was started immediately, by the time these children had reached the normal age of referral (two to three years), their language would be age-appropriate. In this study the mean age of intervention was 10.6 months with follow-up until 36 months of age. The results reflected a marked reduction in language difficulties. In the control group, without early therapy, language delay persisted in 85% with language delay, compared to only 5% that still had detectable difficulties in the group receiving the very early intervention. Stothard *et al.* (1998) found that the critical age that determined whether a child would succeed was 5.6 years. If language difficulties are still present at this stage the child would have on-going problems with schooling. However, in a review of the literature presented by Law (2004), he found that even when the child's language difficulties had resolved by this age, the children still had weaker long-term literacy skills including poor phonological awareness, in spite of a better overall outlook for spoken language.

Law (1993) reported that even children attending specific language centres displayed significant persistence in their disabilities. When they reached eight years of age, they were falling behind with their reading skills as well as having expressive difficulties resulting in an overall lower IQ. He also suggested that while early tests detect generalized difficulties, only later do the disabilities become more clearly defined. In addition, weakness of auditory processing skills can improve with therapy, but some residual disability remains, which negatively affects the child's abilities in his or her education.

When children had obvious language difficulties present, there was a poor prognosis with high risk for educational, language and literacy abilities. In the Manchester Language Study, they found that language is the strongest predictor of reading accuracy and comprehension, but that non-verbal IQ is in fact the strongest predictor of academic achievement (Conti-Ramsden 2008). Similar work carried out in Ohio found that when language difficulties were still present at 54 months (4 years, 6 months) of age there was delay in a child's school readiness (Justice *et al.*, 2009). In the literature, language delay was found to persist in 40-80% of cases (Johnson *et al.*, 1999). This variation reflects the range of severity of language disability as well as different facilities and intervention protocols. Research has also shown that the language-impaired child has marked difficulty with learning a second language, particularly with morphology (Fletcher & Hall, 1992), which becomes very significant when the education department requires that each child learn a second and even third language at 'first language' level.

Law (2004) found that the best predictors of final outcome in the young child with early initiation of language therapy were maternal–child interaction, environmental quality, maternal education and support systems available. In studies of children at school entry (at 5.6 years) in Canada, he found that the best single predictor of future language performance is sequencing ability. Communication ability is also useful as a predictor and prognosis depends overall on the nature of the problem and the number of aspects of language development that are dysfunctional. He found that children with poor semantic and syntactical ability have the worst outcome (Law, 2004). There is no similar predictive information available at this time in South Africa.

Overall, it is reported that delay in speech is a significant predictor of poor verbal and performance intelligence. Particularly when combined with a delay in the motor milestone of walking, there is good predictive power for poor cognitive, language and educational development (Kolvin, Fundudis & Scanten, 1979). Strum and Johnston (1999) suggest that with language impairment, there is less use of 'private speech' in order to direct and facilitate one's thought processes and so problem-solving abilities; therefore these children are unable to use speech and language as a tool for thought , and may use more audible speech to help cognitive processes.

Donlan (1998) emphasises that language-delayed children are not only at high risk for later literacy difficulties. There has also been found to be a complex association between language difficulties and the verbal and non-verbal aspects of a child's mathematical ability, with dissociation of the higher numerical skills involving comprehension and processing (Donlan, 1998). Classically these children may be able to count or perform simple addition but are unable to decipher a numerical problem. In addition, due to weakness of semantic abilities, they have difficulty with complex verbal instructions and explanations, and in general, have literal interpretations of comments (Seidenberg & Bernstein, 1986). Another important consideration is the potential difficulty with the use of textbooks that a language-impaired child would find difficult to interpret and so would provide little support. In addition, the child has poor prior knowledge and retrieval ability, upon which to interpret these textbooks (Paul, 2005; Bernstein & Levey, 2002).

The academic environment and the teacher's perception of the suitability of the match are also reported to have an important impact on a child's academic outcome. When a mainstream teacher feels that she, herself, is under-skilled and unable to cope, the child has a worse outcome in that school (Conti-Ramsden, *et al.*, 2002). Into this equation come the social and behavioural difficulties experienced by the child with a language disability, and the problem here is to assess the child separately for his or her difficulties with language and function compared to his or her social skills and behaviour. There are significant reports in the literature of social difficulties experienced by children with language disabilities, with fewer friendships, poorer quality of these relationships (Durkin & Conti-Ramsden, 2007) and difficulty with peer relationships. In addition, from the pre-school stage on, the language impaired child struggles with conversational skills, having difficulty in initiating a conversation as well as sustaining one. (Hadley & Rice, 1991). They have poor skills in settling conflict situations and when challenged, become either aggressive or withdrawn (Leonard, 1998).

The other important fact that impacts on a child's progress at school is the high incidence of co-morbidities. A child's difficulty in language and communicating go hand-in-hand with psychological stresses, and is commonly a cause of poor self-esteem. Botting *et al.* (1998) quote that learning difficulties are present in 21% of children with language impairment and 31% of these children has emotional or behavioural problems. The most common associations with language impairment are attention deficit disorder (ADD) with or without hyperactivity (Beitchma *et al.*, 1996), as well as anxiety or depression (Beitchma *et al.*, 2001), learning disabilities and behavioural difficulties (Brownlie *et al.*, 2004). Even a related delay in motor neurodevelopment has been noted. For example, a study undertaken at Dawn House School in Nottinghamshire found some delay in motor milestones of walking as well as achieving

bladder and bowel control (Haynes & Naidoo, 1991). Another factor that also can blur the true picture is any clumsiness or motor developmental delay (Redmond & Rice, 1998).

A recent study undertaken by Mulligan (2007) aimed to find whether children attending the Centre for Language and Healing Impaired Children, benefited from this type of pre-school exposure. Comparing test results on admission to the pre-school, to those obtained when they had completed their time there, she found that all children showed a marked improvement with the intensive input, particularly in the groups with moderate delay in receptive and expressive language or delay in expressive language with normal receptive abilities. Even when there was severe delay in all aspects of language, the children showed a significant improvement and in the less severely-disabled groups, some children achieved catch-up to normal language ability for age. Her final conclusion was that 'intensive intervention in a language-rich environment is a successful and effective approach especially for the child with severe delay, where there is a 29-34 % catch-up'.

There is unfortunately little research available against which to compare our experiences in South Africa, as the Centre is one of only two pre-schools in Johannesburg and other overseas facilities are either at a primary school level or revolve around short-term exposure to a language-rich environment. In overseas research the level of children achieving mainstream education is quoted as being 35 to 80 % (Botting *et al.*, 1998; Stothard *et al.*, 1998). Following the Manchester Language study, however, Conti-Ramsden (2008) reported that by the time the adolescents reached the stage of the end of compulsory schooling, 76% of the children with language impairment had needed some form of specialized educational support. When one

looks at the type of schooling available in South Africa, particularly under the previous system of education, we were able to match children with one of three different tiers of education, namely mainstream, or remedial, or special education. In most other countries there are only two different levels of schooling, namely mainstream or special education. This means that world-wide there is very little research in the literature of a similar situation as a comparison. The general consensus amongst language therapists is that inclusive education is not suited to the language-impaired child, who needs a specialised education facility with structured, intensive therapy programs (Johnson *et al.* 1999; Law, 2004; Dockrell & Lindsay, 2008). Meanwhile educators believe that every child has the right to attend inclusive, mainstream education (Lindsay, 2003). This, however, only takes into account the academic placement, not the social and emotional difficulties faced by the language-impaired child, and do not consider the benefits of the intensive therapy received in specialized schools (Dockrell & Lindsay, 2008).

The question now arises as to whether the improvements in language functions following therapeutic intervention during the pre-school stage result in better long-term outcome, which may be defined by educational success and specifically, the ability to cope in mainstream education. As discussed, the difficulties experienced by children with language disabilities are pervasive and persistent, but does intensive early intervention result in a better outcome than only intervening after school-going age? This study attempted to address the question by gathering information retrospectively from past pupils of the Centre and assessing their academic progress and achievements in a number of areas. In addition, information was

gathered concerning the social successes and difficulties of the past pupils, as well as the ease with which they could cope with learning a second language.

Section 2.0: Subjects and Methods

2.1 Study Design

This study was a retrospective record review coupled with a structured interview of a subset of the subjects that could be contacted. In addition, a quantitative assessment of each child's progress was used as well as descriptive consideration of the disabilities and requirements of the child. The hypothesis on which this study is based is that intensive therapeutic intervention during the preschool age has a significant improvement in outcome. Inclusion criteria were:

- Children who attended the Centre as full-time nursery school pupils for a minimum of 12 months, receiving intensive language-based therapies and education;
- Complete records were obtainable at the Centre;
- Parents were contactable and agreed to be interviewed.

2.2 Data collection

The data was collected through the Centre for Language and Hearing Impaired Children in two stages. The first stage involved retrospective data collection using the files stored at the Centre to create a basic sample from which children could be followed up. In setting up the study, the plan was to collect details of the children who left the Centre over a ten–year time period from 1993 until 2002. The files available covered the time period from admission in 1991 until departure of the 2002 leavers. Due to the variation in time periods spent at the preschool, there was some deviation from this original plan in the time span over which data was collected. Most files included the full details. However some were found to be incomplete, or even empty. The initial information collected included such data as age, gender and primary pathology (Appendix B). Family, birth and medical histories were also considered as these

may be important factors for any child who is suffering from any form of developmental delay. The primary pathology was categorized as hearing impairment or language impairment with either receptive or expressive difficulties. Unfortunately the presence of auditory processing disorders was not listed under the primary diagnosis, which due to the multi-faceted nature of this area, involves extensive testing.

When planning this project, the original intention was to obtain data on each child's language disability when first admitted to the Centre and then compare this to scores for the same tests when the child left the school. Unfortunately this sequence proved not possible for a number of reasons. Firstly, there was a range of thirty possible tests used depending on each child's age and initial level of language. The tests used on the children varied between individuals, ages and therapists. The breakdown of this range of thirty tests used, covered three for receptive vocabulary, four for receptive language, two for expressive vocabulary and twelve covering expressive language which touches on facets of auditory processing. The remainder included play, speech and phonology, pragmatics and lastly concepts and oral motor aspects. The exact tests used for each child varied through the time period of the admissions with older files showing different tests used from newer files. The interpretation of some of these tests is reliant on the different therapists involved and so there can be user variation. Also, without adequate training and understanding in the precise use and interpretation of the tests, the researcher could not always utilize the results and significance correctly. Secondly, all the data was not always retained in the file although the initial assessment was present. In addition, with changes in the centre administrative staff, some of the files were destroyed during the time period over which the data was being collected so that although the admission details were present, the results achieved on discharge, were no longer available.

The second phase of data collection was again retrospective and involved contacting each family to collect the information concerning the child's achievements at school and in the academic field by means of a standard questionnaire (Appendix.C). The most effective way to collect the data was found to be telephonically. Of three questionnaires sent out by post, only one response resulted and there were marked delays related to difficulties with the postal services. At the start of each interview, parental consent was obtained either telephonically or written, in the case of the single postal response.

The main information collected in this phase related to the type of school the child was currently attending as well as previous academic history. Other issues which were considered in the follow-up interview included the need for further therapies once the child reached school as well as ease of learning a second language. There were also efforts to look at the child's social interactions with peers and teachers, as well as the parental perception of the Centre. These scores were not included in the overall educational outcome score but are seen more as a marker of social 'success' for the language impaired child. All of these issues were scored on a scale of 1 to 5, as they all have variable outcomes or responses. The results from these areas were more qualitative, particularly as they are a measure of individual perception, by the parents. They are significant as social success is seen as an important domain of achievement and are strongly linked to language ability (Conti-Ramsden, 2008). The other areas that were investigated included further medical conditions and the need for medication, in order to assess for the presence of co-morbid conditions that would influence the child's scholastic achievements.

2.3 Educational outcome scoring

Firstly, it is necessary to define what is considered to be achieving "normalized" educational placement and a child's academic difficulties are seen to have recovered or been remediated once he or she reaches mainstream education. Once the higher educational setting is reached (i.e. mainstream schooling), the child has achieved an improved overall intellectual status. (Tomblin, 2008). In particular, adults view academic success and attainment of main-stream education as the most highly attained domain of success. This differs from children who do not view this state as being so important (Tomblin, 2008). While developing the questionnaire, it was found to be necessary to have some objective tool by which the child's achievements could be quantified in order to compare outcomes. Towards this end, an **educational outcome score** was developed.

The educational outcome scoring system was developed by the researcher and has not been previously used in any research. It uses a number of objective facts which can reflect on a child's scholastic progress. It was necessary to incorporate not only the initial school attended and the final scholastic level achieved, but also changes in the types of school, as well as therapies needed. The difficulty lies in the fact that each child has reached a different level of schooling, purely due to the variation in age, and has a different progression through the education system. These multiple factors needed to be taken into account. Originally, the scoring system had a total or highest score of 25 and this was seen as a perfect score. The initial plan was to incorporate the most recent school marks obtained, but with many of the children, these were not available, due of the nature of school they were attending, which either did not issue marks or inflated them. Very often there was no formal testing carried out on the children either so that school marks were totally unstandardized and subjective according to the

individual school attended. In addition, the original aim was to use copies of their most recent school report. However, as the level at school varied widely and the form of assessment and report writing varied so widely, this was not a useful tool.

Once the actual practicality of the scoring system was reassessed, the maximum or total score was reduced to 20 and the number of items actually taken into account was reduced to four. The components as finally used are described below:

1. Type of school first attended after leaving the Centre, which provides a baseline from which an outcome is computed.

   The type of school was scored as follows:

- Mainstream school: 20 points
- Remedial school: 15 points
- Special school: 10 points
- Training centre: 5 points.

2. Therapy received once reaching primary school provided a score of negative 1 per type of therapy with a maximum reduction of minus 2. This included occupational therapy, speech therapy and any form of remedial or extra lessons.
3. Any academic year which is repeated and there is a value of minus 1 per year repeated. The inaccuracy arises with the academically less structured forms of schools where academic grades or classes become blurred or less clearly defined
4. A change in the type of school is also scored as significant and has a greater value than item 3. This scores minus two for dropping a level or type of school as reflected in item 1 and plus two for changing up a level in terms of the type of school. So if a child

moves from remedial to mainstream education the score is plus two but a reverse change is minus two.

2.4 Score interpretation

As the scoring system was an untested tool, until the majority of the scores had been calculated it was uncertain at what level the total result would be significant. In view of the design of the calculation, it was anticipated that sixteen would be the cut-off result of achieving academic recovery or not. However with continuing data comparisons it became apparent that fifteen was the watershed score. Of the eight individuals scoring 15, six went on to mainstream education while only two had on-going difficulties and remained in remedial or special schools (discussed later).

2.5 Ethical clearance

At the start of the project, both the initial data collection as well as the manner in which the follow-up interview and information were collected, was approved by the Committee for Research on Human Subjects (Medical) of the University on the Witwatersrand. Ethical clearance was granted under **Protocol Number M040629** (Appendix A). Informed parental consent was sought either telephonically or written at the time of the interaction. The details of the information provided to parents to obtain informed consent was standardized and cleared with the University Ethics committee, and each parent or guardian was informed of the intended research as well as the type of information to be gathered. In two situations, parental consent was not available so these individuals could not be used as study subjects. Anonymity was ensured as each child was allocated a number and all information was collected and stored

under this number. In relation to the seeking of copies of academic reports, it was deemed not suitable to use as these would compromise the subject's anonymity and confidentiality.

2.6 Statistical analysis

The strength of a study lies in the number of participants as well as the use of a control group. Unfortunately the number of children for which information was finally obtained is statistically very small and ethically no comparable control group was available. The statistical analysis of the data had to take these factors into account. This was achieved by selection of appropriate testing tools that are specific to small sample size, qualitative data and unmatched sample groups. The tests used were the Fisher's exact test (Pathsnap statistical package) for comparing proportions, the Student t-test (Microsoft Excel statistical tools), for comparison of means and the Wilcoxon rank sum test (Statistix 7) for nonparametric comparison of non-normally distributed data.

2.7 Funding

This was overall a low-cost project and was self funded. The major cost was that of telephone calls, which although time-consuming was found to be the most successful method to contact families. The other costs were a small fee for postage and the cost of printing for the data collection sheets, scoring sheets and some parent information sheets.

Section 3: Results and Discussion

3.1 Initial data collection

The first phase of research resulted in the names and contact details of 94 children being collected. Of this number, eleven were found to be unsuitable for the study as they only attended the Centre for therapy or attended the preschool for a month or two, leaving due to financial difficulties or unsuitability. Of the remaining children, nineteen suffered from pure hearing loss as the primary pathology and four had hearing impairment associated with language disabilities. Initially these hearing-impaired pupils were not to be included in the study; however, there were a significant number of language-impaired children who suffered from associated hearing loss and as they all attended the Centre, they fulfilled the inclusion criteria.

Originally the plan was to contact the families and then to return to their files and collect and compare the results achieved at initial testing with those obtained during their last assessment at the Centre. The aim, as stated in the hypothesis, was to show that children who showed the best improvement while at the Centre, possibly achieved the best outcome ultimately. As discussed earlier, this was not as simple as first thought, and could not be fulfilled within the time constraints of the study.

In gathering initial data from the Centre, 94 files were studied and information obtained from the initial assessment on admission to the facility. Obviously the quality of useful information depended on how accurately the forms had been completed, as well as whether the files were complete. In a number of cases, the files lacked any contact details or were even empty. These were deemed to be unsuitable for the study. Also unsuitable were the children who had a file

but attended the Centre only for therapy rather than attending the pre-school component. In all likelihood these children could be viewed as being a less severely affected group or unable to attend for financial reasons. However, they could not be used as a control group due to lack of information as well as their lesser therapeutic input.

3.2 Demographics of the Centre

The initial data provided demographic information concerning the patterns of attendance at the Centre. Of the 94 subjects, 61 were male and 26 were female, with no details available for 7 children. This mirrors the well-known male: female distribution of language and learning disabilities. The average age of first attending the facility was 3.75 years of age with an average duration of stay of 22.2 months. The range of pathologies is illustrated below (Fig. 3.1) and reflects the most frequent diagnosis as being phonological difficulties associated with a mixed language deficit

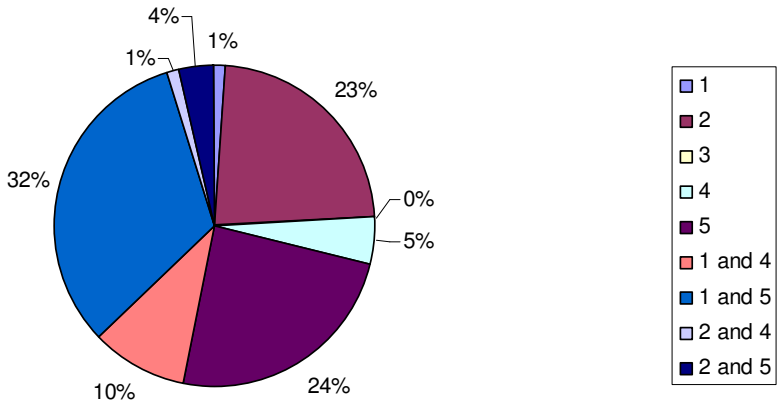


Figure 3.1. Primary pathology of children attending the Centre

Key: 1: Phonology 2: Hearing Impairment

3. Receptive language impairment 4. Expressive language impairment

5. Mixed language impairment (receptive and expressive)

(27/94). There is a similar prevalence of pure hearing impairment and pure mixed receptive and expressive difficulties (19/94 and 20/94 respectively).

Children are only admitted to the Centre if they are deemed to be suitable, have disabilities which are severe enough to require this specialized form of environment, and are referred by a professional who knows of the facility. The most common source of referral was a speech therapist (57 children; see Fig. 3.2).

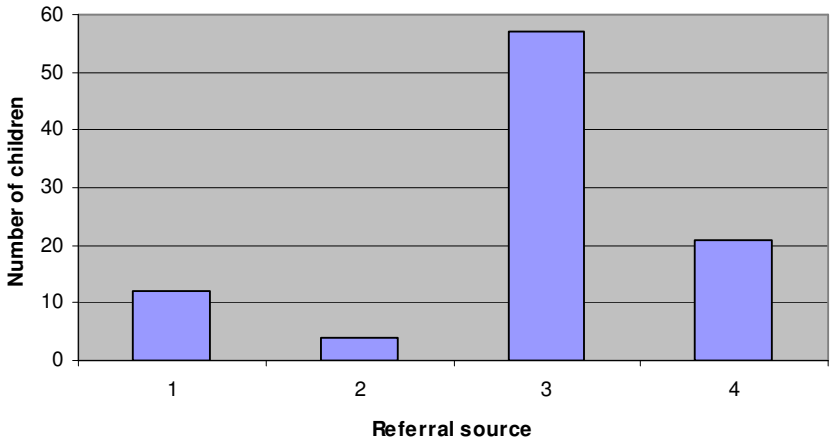


Figure 3.2. Sources of referrals for admission.

Key: 1: Medical doctor 2. Teacher

3. Speech therapist 4. Not recorded

Of the 94 children in the sample, 22 had positive family histories of either language difficulties or were 'late talkers', usually reflecting some delay in language development. The literature quotes a high level of a positive family history and Spitz et al (1997) found the level to be as high as 50%, particularly affecting delay in the acquisition of language and involving both receptive and expressive language. In studies at Dawn House (a residential school) in the

United Kingdom, they found a positive family history in 30-40% of their children (Haynes & Naidoo; 1991). The incidence of a positive family history at the Centre was lower than both of these at 23.4 % (95% confidence interval, 15.6 to 33.5 %).

The children who reach the Centre do so because of significant difficulties that need multidisciplinary therapeutic support. To this end, the children attend therapies during their school day. These include speech therapy, which every child received, occupational therapy, physiotherapy and play therapy. The high number of multiple therapies that were required reflect the number of associated problems and co-morbidities these children exhibit (Fig. 3.3).

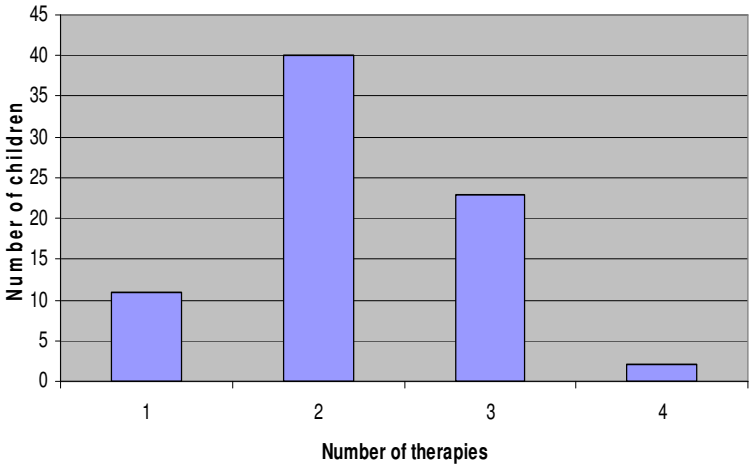


Figure 3.3 Number of therapies received by each child. (Therapies considered include Occupational therapy; Speech therapy, Physiotherapy and Play therapy).

The high incidence of co-morbidities, as well as the need for multidisciplinary assistance, supports the pervasive nature of these children's disabilities. These aggravate the child's situation reinforcing the need for a specialized, therapeutic-intensive learning environment. In

the inclusive education system, there is not always the integrated therapeutic approach required by each child, unless in the LSEN form of school. These would need to focus on motor difficulties as well as the severe disabilities of poor visual perceptual and integration skills. The cumulative effect of more than one disability has an exponential effect.

3.3 Final sample data collection

In spite of attempts to contact the families of the 94 children whose files were available, the actual response rate was only 34 %, which was rather lower than hoped; however, of the 32 responses with consent, all had required details and information and therefore formed the actual study sample. Unfortunately with a small sample size like this, the study has limited statistical power. This means that the information obtained, although useful, cannot be extrapolated to the larger group of all children with language disability. Also it was rather disappointing that the largest group were the non-responders (Table 3.1). Ideally any further

Table 3.1 Details of responses to all files/ pupils available

Total files considered	94
Responded	32
Traced but moved away or emigrated	8
Deceased	1
Not suitable for study	11
Non responder/not traceable	42

research in this area should be prospective and so there should be better follow-up, compliance and better information obtained.

The collection of follow-up results became an interesting study into population geography with families relocating, emigrating and changing within the telephone system. Firstly, the sample of families displayed marked mobility, moving house within the city, country or even emigrating. Secondly, over the time period, there has been a change and expansion in the telephone system with telephone numbers changing and home numbers becoming business numbers and vice versa. The movements of some of the families could be traced but their new contact details could not always be obtained.. The collection of the actual information about the children's achievements in their education, proved to be the most time-consuming and difficult part of gathering the data. The telephone was found to be the most effective method of contacting families. The final yield was only 34% of the original sample of children for whom information was collected at the Centre.

In this secondary sample of 32 children, the average duration of their stay at the Centre was 28.4 months, which is nearly six months longer than the larger 94 size sample (average 22.22 months), which is significantly different (p-value 0.01, Wilcoxon rank sum test). This might suggest that the ultimate sample had slightly more severe pathology. However, this is a supposition and cannot be confirmed without further investigation, but is does mean that unfortunately the ultimate results cannot be extrapolated to the full ten years-worth of pupils in the initial group. When the male predominance is compared between the two groups, 64.9 % was male in the full sample (n=94) while in the final sample (n=32) this rose to 84.3 %, which may reflect that there is less information about how the girls ultimately achieve at school. There was no difference in the gender ratio between the two profiles (p-value 0.18; Chi-square test). This is similar to the male-to-female distribution discussed in the literature.

3.4 School placement

Ultimately details were obtained concerning 32 children's progress in formal schooling. South African has been fortunate to have had three tiers of education, mainstream, remedial and special needs schools, although some of this will change following the issuing of the White Paper by the Department of Education (2002). The difference between these levels is that remedial teaching handles the main-stream syllabus at a gentler pace with smaller classes while in special needs settings, each child works to an individual, adapted curriculum. Of the children about whom information was obtained, 26 had passed through or were still in the remedial education system. In addition, only 14 of the 32 children had reached mainstream education (43.75 %) (CI: 26.8-62.1%) and the majority (18 or 56.25 %) had remained in remedial or special education. These figures can be compared to other studies internationally. Figures issued by the British Department of Education and Skills, (2005) quote that 60% of the children with language disability achieved mainstream education while Botting et al,(1998) studying a large "language" orientated school, found only 35% of the children achieved mainstream education before reaching school-leaving age. Some of the variations reflect the differences between schools as well as in selection criteria. The British education system aims at returning children to mainstream education or supplying support within mainstream schools (Dockrell & Lindsay, 2008) but most of these schools are at a primary school level rather than a preschool level, such as occurs at the Centre. However, children enter primary school in England in the year they turn four. Also of note is that in the present study, 81.25% (26) passed through the remedial/special education system and only 30.77% (8 of 26 children) of those children who entered remedial education after attending the Centre, managed to reach mainstream education. There is an improvement in the proportion of children who ultimately reach mainstream schools, compared to the proportion going directly to mainstream schools

upon leaving the Centre, which nearly reaches significance at the 95 % confidence level (p-value 0.058, Chi-square test). This is a significant improvement in the type of school attended and is highly supportive of remedial education playing a positive role. This indicated that remedial support can improve a child's academic ability and therefore the language-impaired child's school of attendance.

3. 5 Pathologies

The ultimate range of pathologies was mainly phonological defects associated with mixed expressive and receptive language deficits, found in 43.75% (14/32), and hearing loss with mixed language defects and pure mixed language difficulties, each in 21.87% of children (7/32) (Fig.3. 4). Nine children suffered from significant hearing loss so are not classified as pure language disabilities. However, what can be noted is that of the children with hearing impairment, seven children had significant

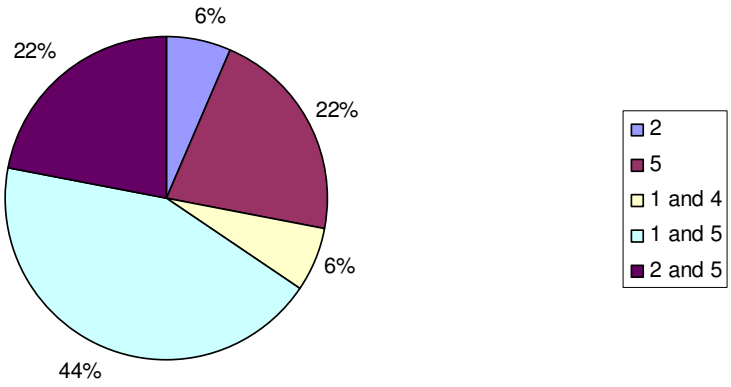


Figure 3.4. Break-down of pathologies of children where follow-up was achieved

Key: 1. Phonological difficulties 2. Hearing impairment

4. Impaired expressive language 5. Mixed language impairment

language disability while only two children, about whom further information was obtained, were recorded as suffering from pure hearing impairment.

3.6 Educational outcome score

The educational outcome score was created in order to provide an objective, quantitative method to assess a child's achievements and success in his or her schooling. The average educational outcome score of the group of nine hearing-impaired children was 14.222 compared to the score for the language group which was 14.130. Statistically there is no difference between these groups (p-value 0.85, Wilcoxon rank sum test), which means that the children with hearing impairment could be included in the sample of children whose educational outcomes were assessed. The average educational outcomes score for the overall group was 14.156. In a similar manner there is no significant difference between the numbers of children with hearing difficulties compared to those with language difficulties when considering the number of children who attain mainstream schooling (p-value 1, Wilcoxon rank sum test). The important advantage of this is that, although numbers are small, it increases the size of the available sample.

As previously stated, when the educational outcome score was first developed, the level which reflected 'success' was intended to be 16. However as the information was collected and the scores were calculated and compared, 15 was clearly the appropriate the cut-off score. As illustrated below (Table 3.2), six out of the eight children who achieved a score of 15, reached

mainstream education. This reflects that in general this level of achievement is 'successful' and that these children do well in terms of their education.

If we consider these figures to support the cut-off score as 15 and above, this is statistically highly significant for children achieving mainstream schools, with a p-value of 0.00001

Table 3.2. Children who achieved mainstream according to their educational score

	Score <15	**15**	**>15**
Reach m/stream	1	6	7
Not reach m/stream	16	2	0

(Fisher's test). Scrutinizing the scatter of all results of the educational scores, as illustrated in Fig.3.5, the majority of the total scores lie between 10 and 15. It also reflects the smaller group who lie above 15 (the group with successful' educational outcomes) and that only two lie below 10.

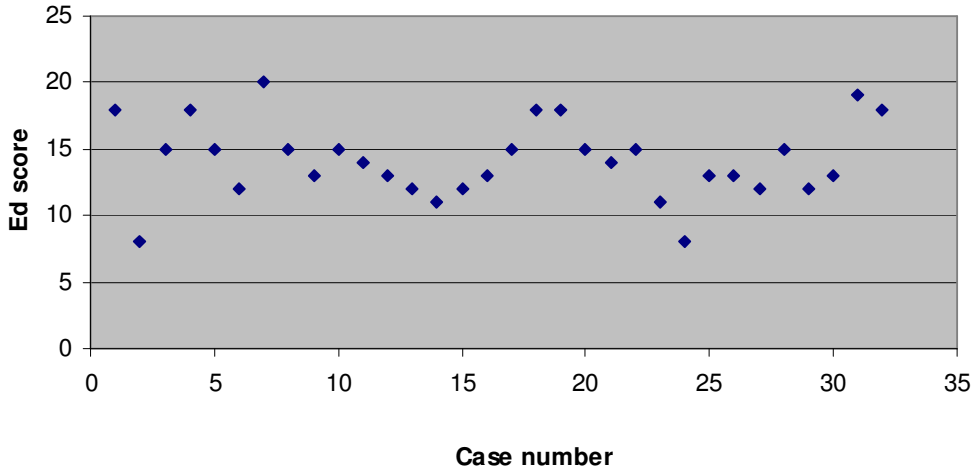


Figure 3.5 Scattergram of all educational outcome scores obtained

3.7 Gender distribution

There would appear to be a difference between the overall outcome score of the boys as compared to girls (14.53 to 12.2) but this probably reflects sampling error, due to the low number of responses achieved from the families of girls who attended the Centre as compared to families of boys (girls: boys = 5:27). In addition, when considering the outcome score, there is no statistically significant difference between the two genders (p-value 0.45, Wilcoxon rank sum test). Whether this holds for all children attending the Centre would need to be reassessed with a bigger sample. In trying to extrapolate back to the larger sample from the Centre, there is no statistical difference between the two distributions, with a p-value of 0.18 (Fisher's test). It is found that there is a significant male dominance in language disabilities in children from the Centre which matches that reflected in the literature.

Unfortunately, due to the actual data obtained, we are not able to accurately study language disability in girls. As stated in the introduction, the prevalence of language difficulties is much higher in males reflecting the physiological differences between males and females. This is supported with both the initial data and the final sample. However, the very small sample of girls who were able to be traced fared particularly badly but was not a significant sample when compared to the 'bigger picture'. It is possible that when bilateral centres in the female brain are affected, the level of language disability is much more severe with markedly worse injury to the developing hemispheres, more co-morbidities and worse outcome. There is no mention in the literature of these disabilities in females being more severe but this is one area that needs more specific monitoring, particularly with reference to their final outcome.

3.8 Therapies

In the sample, most children received two or three forms of therapy. All children had speech therapy, with occupational therapy being the second most common. The majority of children (96.87%) required further speech therapy after leaving the pre-school. This includes children attending remedial schools and those going directly into mainstream education. This reflects the persistent nature of language disability. Of the sample, 71.8% (23/32 children) needed additional occupational therapy after leaving the Centre.; However there was no significant association between educational outcome and the need for further occupational therapy (p-value 0.31, Fisher's test). A number of authors have reported the association between language delays and visual perceptual disorders (Johnston, 1992), weak perceptuo-motor skills particularly with sequencing (Rutter et al, 1992) and failure of improvement in verbal skills to be matched by a similar non-verbal improvement (Haynes and Naidoo, 1991). However, when we consider our sample of children, the motor and perceptual difficulties that require occupational therapy are not the major factors in determining which child would reach mainstream school and which would not.

Regarding other predictive measures that could be linked to educational outcome, a number of factors were investigated. Firstly, family history of language difficulties does not have any bearing on whether the child will succeed. There is no statistically significant difference between a positive family history and the child's ultimate educational outcome (p-value 0.14, Chi-square test). There also is no significant association between time spent at the Centre and educational outcome (p-value 0.54, Chi-square test), (when considering score achieved). Spending less than 24 months at the Centre or staying for a longer period does not have a significant effect. Botting *et al* (1998), when considering placement in specialized primary

schools, report that the persistent nature of language disability means that receiving intensive input for 2 or even 3 years does not signify that a child will do well at school. He or she frequently continues to have learning disabilities. It is significant that here we are comparing two different levels and ages of schooling and the basic premise at the Centre is that with 'early intervention', this situation would improve.

3.9 Second languages

Any child that has difficulty with his or her first language should in principle have similar difficulty with learning a second language. This is frequently reported in the literature (Botting *et al*, 1998) and it appears that similar difficulties are experienced with the second language as

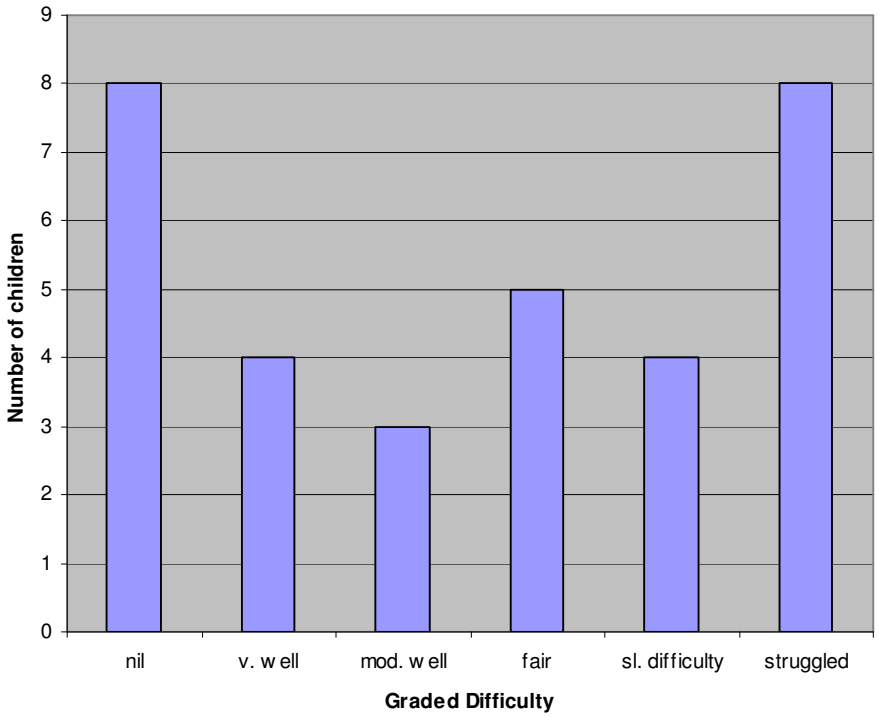


Figure 3.6: Graded difficulty of children in learning a second language (includes 8 children who had not attempted any second language as well those with variable abilities).

with the first. Generally, therapists recommend that, particularly initially, dual-language families only use one language in the home. In the children who had attended the Centre, there was a similar scenario.

Eight children had not even attempted a second language, in many cases due to severe difficulties and the associated educational placement (Fig. 3.6). In the sample group, twenty children had learnt some level of Afrikaans, while three had learned Hebrew and one Zulu. Within this group of 24, fifty percent had experienced significant difficulty with their second language, which accords with the literature.

3.10 Co-morbidities

A child's achievement at school is affected by many factors, one of which is the presence of co-morbidities, particularly attention deficit disorder (ADD). This condition on its own causes difficulties without medication. However, it increases the problems when it co-exists with other developmental delays. In the initial sample, at pre-school age, this condition is probably under-diagnosed as well as under-treated, as the medication is less effective in the younger child and is not registered for this purpose. In our initial sample, if we take medication usage (anticonvulsants, Risperdal and stimulants) as indicating presence of co-morbidity, but not specifically ADD, the incidence was 19.1% (18/94 children).

In the final sample, the medication usage is much higher with 17/32 (53 %) children treated for ADD (Fig.3.7). In the literature, there is a high association between language and behavioural

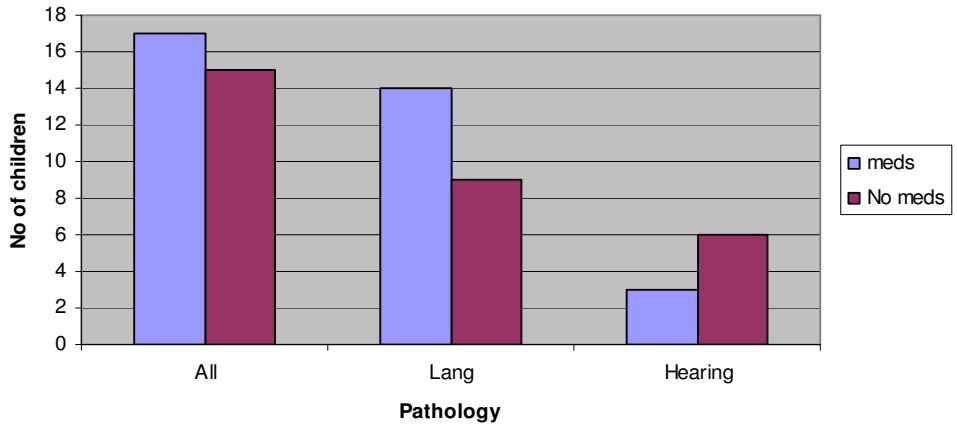


Figure 3.7 Stimulant medication usage in the follow-up sample

disabilities, the highest of which is ADD, quoted as being around 50% (Redmond and Rice, 1998; Haynes and Naidoo, 1991). This is very similar to the Centre's figures. However, when considering our sample, there is no significance between stimulant usage in hearing-impaired compared to language-impaired children (p-value 0.31, Fisher's test). The only variation lies in the smaller numbers of children with hearing difficulties. Greathead (2009) suggests that children with ADD are more likely to have difficulty with language or auditory processing.

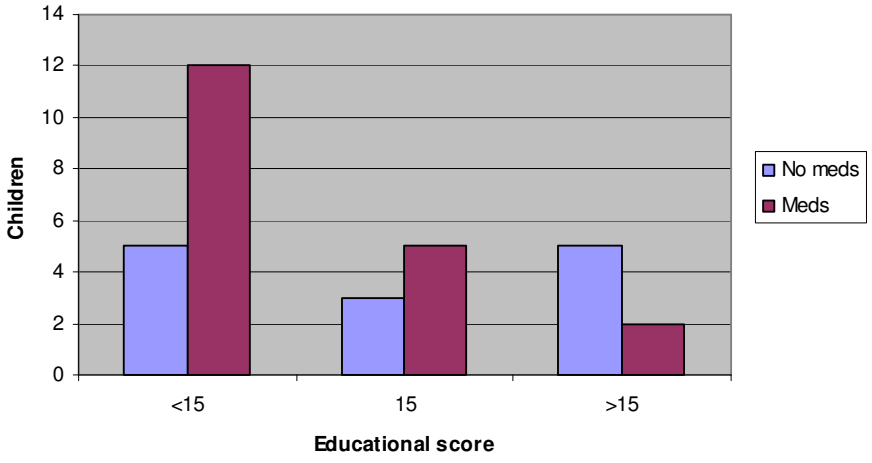


Figure 3.8. Medication usage related to educational score

This is supported by the findings in our sample, which reflects greater co-morbidities in the children with lower educational scores. More children used medication in the group with an educational score below 15 (12/17). However, there is no significant difference in usage compared to the group who achieved the higher scores (p-value 0.31, Chi-square test), partly because the sample sizes are so small (Fig. 3.8). Here medication usage reflects ADD, epilepsy or autism.

3.11 Social achievements

Other areas of difficulty experienced by children with poor language are in social interactions, particularly with their peers. Frequently, these children interact well with their teachers and other adults and in the playground are found playing either with a more junior group of children or the older children (from personal observation). As a rule these other groups are less critical or challenging of social and associated co-ordination weaknesses. This is supported by the information obtained from the families of the sample group. The responses were collected on a graduated scale with **'1'** being poor social interactions and **'5'** being coping well in social situations. Figure 3.9 reflects the responses obtained from parents looking at overall social skills, in situations with a person of authority, using teachers as an example and lastly when with his or her peers. The response is similar to those reported in the literature with generally better skills with adults or teachers and slightly more difficulty when with their peers. At the lower end of the scale is where the poor language and peer relationships start to negatively impact on all social skills. In addition these reflect the difficulty experienced with conflict resolution, where when challenged the child with poor verbal skills will either withdraw or become aggressive (Leonard, 1998).

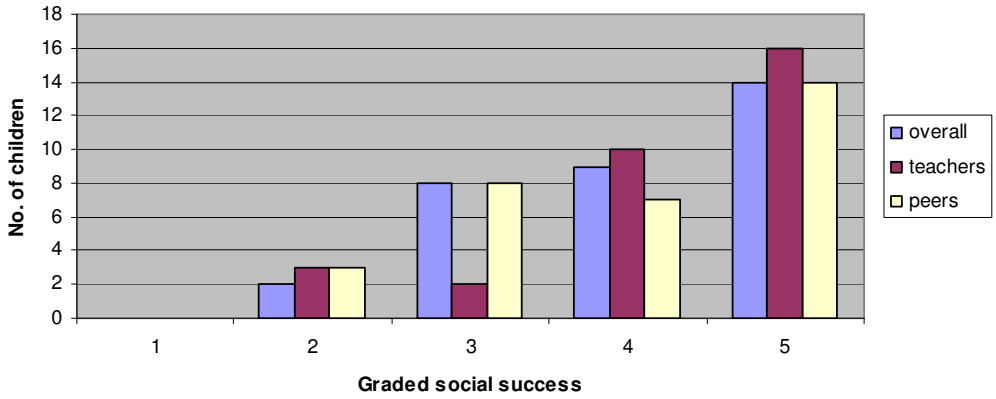


Figure 3.9 Parents' reporting of child's social success according to situations

3.12 Discussion

The weakness of a descriptive study of this nature is the lack of a control group of children with similar disabilities who did not attend the Centre, and this arises for a number of reasons. Firstly, it would not be ethical to withhold these therapies from children who are equally disabled in order to create a control group. Secondly, the group who did not attend the Centre, on whom we have data, could not afford an equivalent intensity of therapy outside of the Centre. Alternatively the child's disability was assessed as being not severe enough to require the specialized services of the pre-school or they had too severe a disability to receive sufficient support at the Centre. For whatever reason, they could not be used to create a matched control.

The original plan would have enabled a search to detect any predictors of good outcome comparing original diagnosis, progress/improvement and final outcome, but this was not possible. The value of detecting predictors would be to utilize the limited resources where they

can be most successful. In addition it would enable us to select children with potentially lower outcomes and again use the resources in a manner which they would benefit from the most. Other possible predictive factors could be length of stay at the Centre but this factor could either reflect the severity of language disability or conversely the positive effect of longer intensive therapy. However, research from other centres has also illustrated the persistent nature of language disabilities. Future prospective research would be much more effective and would yield stronger results. In addition, standardization of testing techniques, at all stages, would improve the quality of the results.

As a child ascends the grades at school, the higher cognitive functions and forms of processing are required, which is where ongoing deficits become significant. In the preschool situation, these higher levels of processing skills, auditory, visual and cognitive, are difficult to accurately test due to the child's academic immaturity. However in the primary school and then secondary schools, these processing skills become more in demand and vital for a child to cope. Therefore we find the child may cope in grades 1 and 2, but starts to struggle thereafter as he or she has to perform more independent work with greater comprehension, initiative and maturity. The child is unable to understand the less clearly defined instructions and is unable to process what is required of him or her. In addition when the task is to listen to information, process it and then deliver a solution, particularly in a group, as with outcomes based education, the child cannot complete the task. Thereafter, the language-impaired child with poor listening skills and residual difficulties falls behind and becomes lost to the class and teacher.

When one looks at the demands in a classroom which increase with each grade, together with the increase in independent work, one can see that a child with processing disabilities will have marked difficulty with his or her mainstream education. A similar situation has been found following early intervention programs for cognitive and motor delay in preterm infants who initially exhibit 'catch-up' in cognitive milestones in the infant and preschool age groups, but when they reach 'school age' there is no sustained benefit (Orton *et al*, 2009). This illustrates the importance of future prospective studies where, for example, the children tested by Mulligan (2007) should be followed up and re-assessed at both five and ten year periods after leaving the Centre. In addition, these results might provide the predictors of good outcome.

Section 4: Conclusion

Within the broader context, this study illustrates a number of important facts that can be utilized for future planning of the management of the language-impaired child. Firstly, a child's academic achievements are a reflection of his or her success in life and are important in affecting the individual's ability to receive vocational training or a tertiary education, and so to compete in the job market and be independent. The literature, as well as research carried out at the Centre on the 'short-term' outcomes of developmental delay in language, reveals significant improvements in the children's ability as a result of remediation and intervention. This mirrors the reported worldwide success of early intervention programmes.

However, the long term outcomes may not be as positive. Of the 32 children that were subjects of this study, 56% continue to suffer from significant educational difficulties that precluded their achieving the ultimate goal of reaching 'mainstream' schools. The results obtained in this study reveal that the language-impaired child continues to have significant difficulty in academics once he or she reaches 'formal' schooling. In a similar fashion, persistent cognitive and motor difficulties at school-going age were found by Orton *et al.* (2009), during a meta-analysis of 11 studies that all revealed little long-term improvement in spite of early intervention in ex-premature infants. As Mulligan (2007) illustrates, the intensive form of educational input as used at the Centre does lead to a significant improvement; however, the severity and nature of the pupils' disabilities means that they need ongoing therapeutic and educational support on entering primary school.

Unfortunately, this study was unable to detect any predictors of good outcome which could be used to determine which children might benefit the most from intensive early intervention. This is mainly due to the retrospective nature of its design, but it does pose the ethical dilemma

of whether certain children could be excluded from this language-rich type of environment, due to possible poor prognosis. However, Mulligan (2007) did show significant early benefit from attendance. In addition, the benefits that each child receives towards his or her social health and development cannot be ignored. The active intervention provided in pragmatics and social interaction, provide the child with important life skills as well as good self-esteem, the long-term significance of which should not be underestimated.

In addition, outcomes-based education, although helpful for some children, increases the demands on the ability to process incoming information, to act and to plan upon it. This in turn, aggravates the situation for the language-disabled child. The essence of this form of education is to provide the knowledge or skills for the child to process instructions, to develop a plan and to present a solution. These all rely on the child's ability to understand the instructions, to utilize his or her knowledge, process the problem using symbolic thought and develop a solution. Again, a child with poor auditory processing skills and any difficulty with expressive language, struggles within the class.

This raises the question of inclusive education and the language-impaired child. Currently, in many schools, the teacher: learner ratio is very low (ranging from 1:26 to 1:40) and frequently the teacher is severely under-qualified. When we see the relatively poor outcomes of children who have received this intensive start to their schooling, the child with a language disability who starts his or her education without this assistance, is at an even greater disadvantage. In addition, the child who has not previously been diagnosed as suffering from a language disability may easily be missed in these large classes. The under-trained teacher is unable to correctly refer the child, who is at a marked disadvantage, and who then fails to obtain any level of education having not received appropriate therapy, support or referral.

Conversely, these findings also lend support to the important role that remedial forms of education do play, supported by the significant improvements seen in the educational outcome of recipients, and the numbers who have managed to advance to mainstream education. When one looks at the difficulties encountered in implementing inclusive education within the current situation in South Africa together with these significant improvements achieved, this supports continuation of the remedial system, even if it is in a limited capacity. In particular, it is needed for children with language difficulties. If one looks at the situation in terms of current economic circumstances, where economists foresee a decrease in structured, formal employment together with an important increase in informal, entrepreneurial employment, it is vital that each individual receives his or her best opportunities for the future. In South Africa at this time, there is no well resourced social-support system to help language-impaired individuals, and so they need the optimal assistance and educational environment.

All the information and results from this study point to the need for future, on-going language-rich learning environments in at least primary school, to assist the child with language delay. The results from this study reflect those in the literature on the pervasive and persistent nature of language impairment, in spite of early therapy. In addition, these results also reflect the importance of the intensive therapeutic environment of a language-rich nature, and suggest that the child's progress could be assisted further during formal schooling.

Ultimately this research reinforces the importance of early, language-based education for all language-impaired children in spite of the relatively poor prognosis for these children. However, these children do have a right to be remediated as early as possible, to achieve their best potential abilities.

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Appendix A

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

Division of the Deputy Registrar (Research)

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)
R14/49 Hyslop

CLEARANCE CERTIFICATE	**PROTOCOL NUMBER M040629**
PROJECT	A Follow-Up Study of Children Who Attended the centre for Language and Hearing Impaired Children
INVESTIGATORS	Dr JE Hyslop
DEPARTMENT	School of Clinical Medicine
DATE CONSIDERED	04.06.25
DECISION OF THE COMMITTEE*	Approved unconditionally

Unless otherwise specified this ethical clearance is valid for 5 years and may be renewed upon application.

DATE 04.08.06 **CHAIRPERSON** .....
(Professor PE Cleator-Jones)

*Guidelines for written 'informed consent' attached where applicable

cc: Supervisor : H Jordaan

DECLARATION OF INVESTIGATOR(S)

To be completed in duplicate and **ONE COPY** returned to the Secretary at Room 10005, 10th Floor, Senate House, University.
I/We fully understand the conditions under which I am/we are authorized to carry out the abovementioned research and I/we guarantee to ensure compliance with these conditions. Should any departure to be contemplated from the research procedure as approved I/we undertake to resubmit the protocol to the Committee. **I agree to a completion of a yearly progress report.**

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES

Appendix B

DATA SHEET: PART 1 STUDY NUMBER:

Date of Birth Chronological age on admission:
Sex M / F
Referred by: Doctor / school / therapist(OT, Speech Physio)

Home language : Other languages in the home:

Year started at the Centre:
Year left the Centre:

Presenting Problem: Speech impairment / Hearing / Language Impairment.

Nature of Impairment: Receptive language only /expressive language only / mixed language
Degree of hearing loss:

Results of assessments (by age equivalent score):

	Score on admission	**Age on Admission**	**Score on leaving**	**Age on Leaving**	**Improvement**	**p-value**
Speech/phonology						
Receptive Vocab						
Peabody picture vocab test						
Receptive lang(TACL-R)						
Expressive Language						
LARSP						
PEST						
Auditory Processing						
Aud. Att. Span Rel. Syllables						
Aud. Att. Span Unrel. Syllables						

KEY: Results of test equivalent to expected for chronological age: 0
Results below expected for age : negative by the number of months difference.
Results above expected for age : positive by the number of months difference.

Therapy received before the Centre: Speech
OT
Physio

Therapy received at the Centre: Speech
OT
Physio
Play therapy
Other.

Behavioral problems:

Social Problems: Self / Others

Medication : Name Dosage:

Family history of significance:

Medical history of significance: Prematurity
Ante-natal problems
Ear infections and problems
Convulsions
Hospital admissions
Infections or meningitis
Other.

Developmental history (age in months or years).
Walked
First words
Talked in sentences
Toilet trained – Bladder
Bowel.

IQ Assessment : Performed Y / N
Results Overall
Non-verbal
Verbal

Records of any formal developmental assessment done:
(Results if available)

Educational Placement: Recommendation:
School actually attended:
Grade entered:

Other information needed:

Appendix C

QUESTIONAIRE: (CONFIDENTIAL) **STUDY NUMBER**:

NB! THE PERSONAL INFORMATION WILL NOT BE PUBLISHED, PRINTED OR USED IN THE STUDY EXCEPT FOR MAKING CONTACT WITH Y0U!

Consent Obtained: Verbal/ Written

SCHOOLING:

Name of Current school:
Current grade in school:

Type of school (please tick appropriate one): Mainstream
Remedial
Special school
Training Centre.

Has your child attended any other schools since leaving the Centre ?
(If so, please give details of name of school, type of school, reason for change and the time spent at each school).

Has your child received any therapy since leaving the Centre, and is it still ongoing?

Speech therapy Duration

Occupational therapy Duration

Physiotherapy Duration

Play therapy or psychotherapy Duration

Remedial or extra lessons Duration

Has your child repeated any grades at school?

Has your child been taught a second language yet?

How has your child managed with this second language?
Scale: Very well..1…..2…..3……4…..5...Struggled.

Has your child had any severe medical problems since leaving the Centre? (Please give details where necessary).

Is your child on medication every day?
Name of medicine: Dose: Times given:

SOCIAL OUTCOME:

How does your child cope socially?

Scale: Poorly….1……2…..3…..4…..5...Very well.

How well does your child interact and respond to his/her teachers?
Scale: Poorly…1……2…..3…..4…..5...Very well.

How well does your child respond and interact with other children?
Scale: Poorly…1…..2……3…..4…..5...Very well.

Does your child have a best friend?

How often does your child change his/her friends?
Scale: Seldom….1…..2….3……4…..5...Often.

Does your child often get involved in fights?
Scale: Seldom..1…..2…..3……4……5...Often.

PARENT'S OPINION OF THE CENTRE:

Do you think the Centre helped your child?
YES / NO

Did the Centre achieve what you wanted it to do?
YES / NO

Do you view your experience at the Centre as being positive?
Scale: Definitely not…1…..2……3……4……5….Definitely yes.

What in your opinion was most helpful about the Centre…
For you?

For your child?

Did your expectations of the Centre change during the time your child attended there?
YES / NO

In what way?

Finally, I would greatly appreciate if you could send me a copy of your child's most recent school report, in the enclosed envelope or fax it to me at 011- .
Please remember to cover your child's name and fill in your allocated study number. This is to provide an objective reflection of your child's school progress.
Thank-you very much for giving your time and patience to help me with this information.

Appendix D

INFORMATION SHEET (To be used with a postal interview)

Hi, my name is Judy Hyslop.

I am a medical doctor who is currently doing a Masters degree in Child Health Cneurodevelopmental), at the University of the Witwatersrand. This involves undertaking a short research project for which 1 am planning to carry out research through the Centre for Language and Hearing- Impaired Children, in Parktown. The project I am doing, involves contacting the families of all past pupils at the Centre who left the Centre over a ten year period, and then studying the group of Language Impaired children and finding out how these special children are progressing in their further schooling. Previous research overseas has shown that these children have a different way of learning and some struggle in their education, especially with reading,

1 would like to ask you to complete this questionnaire about your child's school progress since leaving the Centre(Units), and also about any problems he/she has experienced. This should take only about 5 minutes of your time. All the information will be totally confidential and only combined figures will be used. No personal details will be published and personal details are only being used to make this contact with you. All names will be kept separate from the information collected, which will be considered under an allocated study number.

The participation in this study is totally voluntary and you do not need to feel obliged to become involved or that refusing to answer will in any way act against you, but your help will be greatly appreciated, if you fill in the questionnaire and return it to me, I will take it to mean that you have consented to take part and for the information about your child to be used in this study.

Yours sincerely
Dr Judy Hyslop

INFORMATION SHEET (To be used with a telephonic interview)

Hi, my name is Judy Hyslop,

f am a medical doctor who is currently doing a Masters degree in Child Health(neurodevelopmental), at the University of the Witwatersrand, This involves undertaking a short research project for which I arn planning to carry out research through the Centre for Language and Hearing- Impaired Children, in Parktown, The project I am doing, involves contacting the families of ail past pupils at the Centre who left the Centre over a ten year period, and then studying the group of Language Impaired children and finding out how these special children are progressing in their further schooling. Previous research overseas has shown that these children have a different way of learning and some struggle in their education, especially with reading.

Today, 1 would like to ask you some questions about your child's school progress since leaving the Centre(Units), and also about any problems he/she has experienced. This should take only about 5 minutes of your time. AH the information will be totally confidential and only combined figures will be used. No personal details will be published and personal details are only being used to make this contact with you. All names will be kept separate from the information collected, which will be considered under an allocated study number.

The participation in this study is totally voluntary and you do not need to feel obliged to become involved or that refusing to answer will in any way act against you, but your help will be greatly appreciated. You may decline to answer any question you don't %vant to and we can stop at any time. Before we begin, I need to request that you give your consent that the information about your child may be used in this study.

Yours sincerely

Dr Judy Hyslop..

Appendix E

SCORING SHEET STUDY NUMBER:

SCHOOL OUTCOME SCORING .

1. Type of school:	Mainstream	20
	Remedial	15
	Special school	10
	Training centre	5

2. Therapy: Need for ongoing therapy, including Speech, OT or any remedial or extra lessons. -1 for each therapy (max -2)

3. Repeating a year -1 for each year

4. Change in type of school	Up	2
	Down	-2

5. Class-mark from most recent school report:
(according to the nature of the school)

As a percentage.

Score:

Type of school:

Therapy :

Repeating

Change:

_____

TOTAL:

Multiply by percentage:
(Ignore step if not available)

_____

Final Total: