

**VARIABLES DETERMINING RESPONSE TO  
INTENSIVE INTERVENTION IN  
PRE-SCHOOL LANGUAGE IMPAIRED CHILDREN**

**A research project submitted to the Discipline at Speech Pathology  
and Audiology, School of Human and Community Development,  
Faculty of Humanities in partial fulfilment of the requirements for the  
Degree: M.A. (Speech Pathology).**

**By:  
Jennifer Mulligan  
9207213E**

**Date:  
February 2007**

**DECLARATION**

I hereby declare that this research report is my own work and that it has not been submitted to any other university.

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Jennifer Mulligan  
Johannesburg, 2007

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## **ABSTRACT**

This was a comparative longitudinal study of the files of 50 children who attended intensive language therapy at The Centre for Language and Hearing Impaired Children over the past 8 years. The research compared initial and final assessment results to determine what specific language areas improve when children attend an intensive therapeutic pre-school environment. A paired comparison t-test with a 95% ( $\alpha = 0.05$ ) level of confidence was used to determine whether the difference between the initial and final assessments was statistically significant. The study also examined and described associated child and family specific variables such as: previous assessments and therapy, gender, pregnancy and birth, birth order, feeding, developmental milestones, medical history, ear infections, family history of disorders, behavioural and emotional issues, medication, play, fine and gross motor development, parental education level and referral to primary school. The sample of children was then grouped into severity and types of language impairment: moderate receptive and expressive language impairment, severe receptive and expressive language impairment, and moderate expressive language impairment. These groups were analysed and described in terms of associated variables, degree of improvement made in receptive and expressive language ability, as well as variables which may influence progress including number of associated variables, age of admission and length of time attending The Centre for Language and Hearing Impaired Children. The findings of this study were statistically significant for intensive intervention in receptive grammatical morphology, receptive syntax, expressive vocabulary in the initial stages of intervention, and expressive syntax, indicating that intensive structured language intervention was effective for this population of language impaired children. Receptive vocabulary was the only language area in the study that did not improve, and this finding highlights the importance of assessment and direct intervention for receptive abstract vocabulary. Certain associated variables manifested more frequently than others in the case history profiles of this population of language impaired children, specifically behavioural problems, medical issues, a family history of related difficulties, and delay in first word and first sentence production. Overall, the number of associated factors in this study had a cumulative effect in determining severity of the impairment, but did not appear to negatively impact progress in intervention. In many of the language areas where catch-up improvement occurred, a high number of associated factors was found. Age at admission and amount of time spent at The Centre for Language and Hearing Impaired Children appeared to be important factors in determining catch-up improvement in the various language areas of this population, particularly the severely impaired children. The limitations of this study and related thoughts for future research are discussed.

## **INTRODUCTION**

This section explains what the study was about and the rationale for the topic. A literature review covers relevant and recent literature related to variables associated with language impairment and finally, the nature of the pre-school where the research took place (The Centre for Language and Hearing Impaired Children), is described.

### **Rationale for the Study**

This was a retrospective study of the files of 50 children who attended intensive language therapy at The Centre for Language and Hearing Impaired Children over the past 8 years. The research compared demographic information and initial and final assessment results to determine response to intensive intervention in a therapeutic pre-school environment.

The literature tells us that language impairment is a common pre-school phenomenon (Law, 1993), which suggests that many pre-school children are being referred for some type of language intervention. However, according to McCartney (2004, pg. 106), "there is at present an overwhelming lack of evidence about intervention techniques and their effectiveness" with this population group. This lack of research leaves a large number of unanswered questions about whether language impaired children in pre-school are getting excellent or even adequate service (McCartney, 2004). To advance our understanding of language impairment, we need group data to establish definite patterns of deficit, determine variables associated with progress, and provide information on whether distinctive profiles can be reliably detected (Bishop, 1999). Differential diagnosis and long-term follow-up is a useful part of clinically based research initiatives to understand language impairment (Lees and Urwin, 1994). This type of information would give insight into a child's progress over time and give an indication of what type of therapy is effective with different types of children

There is a need to continually identify and expand the evidence base with regard to the effectiveness of treatment of language disorders in children (Law, 2004; McCartney, 2004). A recent review by Law (2004) of early language intervention articles found that speech and language intervention had a significant effect when children have phonological or expressive vocabulary difficulties. He found mixed evidence concerning the effectiveness of intervention for children with expressive syntax difficulties and little, inconclusive evidence considering the effectiveness of intervention for children with receptive language difficulties, due to the limited number of studies in this area. Law (2004) commented that one of the characteristics of intervention studies in this area is their relatively small sample size and their short duration in terms of intervention and follow-up.

There is conflicting evidence supporting the effectiveness of early intensive provision for language impaired children (Lees and Urwin, 1994). Evidence for intervention at relatively younger or older ages, within this overall pre-school age period, is not clear for phonology and language disorders. No data indicating that intervention is more effective for older children could be found, and the findings of the few studies that have addressed age suggest that intervention will be equally, if not more, effective if started at a younger age (McLean and Woods Cripe, 1997). From McLean and Woods Cripe's (1997) review of therapy effectiveness studies for pre-school children, no clear conclusions could be drawn regarding optimal scheduling of intervention to achieve maximal effectiveness and efficiency in the treatment of communication disorders in children. Follow-up studies, such as the one by Turner and Vincent in 1987, have considered the effectiveness of speech and language units and their findings indicated that intensive therapy was not significantly related to eventual outcome (cited in Lees and Urwin, 1994). However, most speech and language units researched had children attending for 3-5 half-day or whole-day sessions block of 6-10 weeks (Lees and Urwin, 1994). Warren et al (1994) suggested that the effectiveness of language therapy might be greater in pre-school programme settings where staff and parents interact

with the children and can implement the programme throughout the day (cited in McLean and Woods Cripe, 1997).

It is important to document the therapeutic outcomes of children with language impairment to ensure that we provide them with optimal intervention, to develop ability to predict communicative potential (Bishop, 1999), as well as to provide information on evidence based practice. Being clinically effective implies that an intervention works in real-life situations (Blackman, 2002). Being clinically effective is also about how to collect information and share it with other people (Lees and Urwin, 1994). The Centre for Language and Hearing Impaired Children (The Centre) has been operating for 31 years, and a wealth of untapped information and valuable work has been produced and kept in files stored in cabinets on the property. The Centre provides a unique opportunity to investigate outcomes of intervention with a group of pre-school language impaired children who attend an intensive therapeutic pre-school environment over an extended period of time. How the language impairment unfolds in these early stages, as well as the child's particular response to the therapy programme can be examined. The detailed case history information required on admission to The Centre and the annual child and family related case history updates provide an opportunity to examine various associated non-linguistic child/family characteristics in relation to their progress. Due to the unique type of facility that The Centre encompasses, this combination effect of associated factors and effectiveness of therapy can be examined.

Knowing what happens in practice – the effectiveness of treatment – is as important as knowing the efficacy or idealised effect of a particular therapy (Roulstone, 2000). Most studies reviewed are purified versions of experimental treatment procedures, however, typical real-world intervention programs are likely to combine multiple procedures (eg. focused stimulation combined with incidental teaching). Real world conditions may include some individual instruction, group instruction and parent instruction as part of a total treatment programme (McLean and Woods Cripe, 1997). Unless we are prepared to explore where our clinical intervention leads us, we will not sharpen clinical practice, nor develop new ideas about language impairment and treatment effectiveness (Lees and Urwin, 1994). There is a need for research that looks at intervention techniques with pre-school language impaired children and to examine the outcome of these interventions. The Centre provides intensive intervention in an educational setting where intervention is reinforced by the teachers and parents. This type of intensity of intervention has never, to our knowledge, been assessed in terms of effectiveness and will provide valuable insight into the outcomes associated with such intervention. This information is not only important in planning for the future needs of this client group, but can be helpful to evaluate the future direction of such a programme.

### **General Introduction**

By the time children enter pre-school, they will have developed an extensive language system that they can use for a number of cognitive and social functions, in addition to communicating their basic needs (McLean and Woods Cripe, 1997). During those critical first 5 years of life, children are learning both to comprehend and produce thousands of new words and to use rules of grammar and syntax to combine those words in an infinite number of ways to achieve a variety of communication goals (McLean and Woods Cripe, 1997). The ability to effectively understand and produce language requires mastery of several interrelated, rule governed systems. These include the semantics, syntax, morphology, pragmatics and phonology of language (McLean and Woods Cripe, 1997). Any disorder that specifically affects the development of one or more components of this complex communication system constitutes a communication disorder (McLean and Woods Cripe, 1997).

Language impairment refers to "a heterogeneous group of developmental disorders, acquired disorders, delays, or any combination of these, principally characterised by deficits and/or immaturity's in the use of spoken or written language for comprehension and /or production purposes that may involve the form, content, or function of language in any combination" (Owens, 2004).

Language impairment is generally considered to be one of the most commonly occurring difficulties in pre-school children (Law, 1992). Recent studies of the prevalence of language impairment in the pre-school population give an incidence of between 3% to 19% (Lees and Urwin, 1994; Owens, 2004; Rossetti, 2000). This divergence in figures may be due to lack of consensus as to the degree of severity warranting clinical attention, and imprecise categorization of different types of language impairment (Law, 1992).

Language impairments are not outgrown and may persist across the lifetime of the individual (Owens, 2004). Results from various research studies suggest that a large proportion of children who have difficulties with language in the pre-school years go on to have persistent problems (Law, 1992). Even with intervention, they are rarely "cured" (Owens, 2004). It may be that the initial language impairment changes over time and manifests in more subtle difficulties (Owens, 2004). Follow-up studies have consistently found that these children not only continue to have language learning problems, but that they are also at significant risk for both academic and social failure when they enter school (McLean and Woods Cripe, 1997). Children with pre-school language impairment may go on to have a poor prognosis in terms of all aspects of their school performance, including linguistic based difficulty with reading and writing, as well as difficulties extending beyond language to include poor social adjustment, behaviour problems and low overall IQ (Law, 1992). With or without intervention, certain ramifications of having a language impairment affect academic performance and social acceptance (Owens, 2004). Clearly, as a population, the language impaired group is at risk in the long term (Law, 1992).

Implicit in the need to identify language impaired children at an early stage is the understanding that the problems which they experience are not simply transient (Law, 1992). If they were and children invariably 'grew out of it,' there would be little point in trying to influence their course through intervention (Law, 1992). But if treatment really is effective, why is it that recent data has suggested that for many of these children the prognosis is still poor? (Law, 2004). A study by Glogowska et al. (2000) suggested that normal levels of speech and language intervention may not be sufficient to dramatically affect most children. These authors studied community based speech and language therapy in pre-school children in England and found that the average intervention time was six hours in a period of one year (Glogowska, et al., 2000). Currently, the average intervention time in South Africa is unknown.

There is a plethora of terms used to describe different types and presentations of language impairment (Law, 1992). Mental retardation, Language Learning Disability, Specific Language Impairment, Pervasive Developmental Disorder/Autism Spectrum Disorder, Brain Injury, Neglect and Abuse are all categories of children with language impairment (Owens, 2004). Yet language impairment is heterogeneous in nature (Lees and Urwin, 1994, McCartney, 2004) and these clear-cut categories common in the research literature are seldom immediately recognisable in clinical practice (Law, 1992). Many children with language impairment cannot be described easily by any category. Thus we speak of children with communication problems who have autistic features but for whom a placement in an autistic unit would not be appropriate. Similarly, many language impaired children at three years present as being generally delayed. Yet we would hesitate at referring to them as such, until careful examination of all their related abilities had been made (Law, 1992). Such children may have either more than one primary diagnostic category or characteristics that do not fit into any category.

In general, such categories are useful for discussion, but there is a danger that the category can become self-fulfilling (Owens, 2004). Children assigned to a category may be treated as the category, not as individuals (Owens, 2004). Each child presents a somewhat different set of circumstances (Owens, 2004). For example, several authors have found that the younger the child the more generalised the effect of the language impairment (Law, 1992). In a clinical sense, the important features to which a speech therapist attends are the individual

characteristics of each child, not the diagnostic category. Naming and describing a language impairment does not necessarily explain it nor determine clinical intervention (Owens, 2004).

Research supports the notion that individual differences are present in language impaired children just as they are in normally developing children (Haynes and Shulman, 1998). Thus clinicians must be sure to evaluate both comprehension and expressive language abilities to be sure that individual variations in communication ability are covered (Haynes and Shulman, 1998). The receptive-expressive continuum is useful when diagnosing language impairment. The profiles on this continuum seem to suggest that different aspects of the language system might be differentially affected. In a broad sense, this can be referred to as a continuum from predominantly receptive language difficulty to predominantly expressive difficulty (Lees and Urwin, 1994). Some children may be placed at the extreme ends of this continuum, while most will present with a mixed pattern. Thus, most children will have both comprehension and expressive difficulties, while others have expressive difficulties with normal or near-normal comprehension, and still others have purely comprehension difficulties (Reed, 2005). Although useful, the receptive-expressive continuum provides no features for cross-child comparisons, nor does it help to define valid subgroups (Lees and Urwin, 1994; Reed, 2005).

It is recognised that there will be sub-categorisations within this group of language impaired children, but that prognosis in each case will be dependent on a variety of factors such as the pervasive nature of the impairment, the degree of impairment of the subcategory concerned and finally, a range of mitigating circumstances which interact with the skills of the child – the temperament of the child, the home environment, the school environment, the effects of therapeutic intervention and/or the outcome of medical treatment (Law, 1992).

Whilst differential diagnosis begins from first seeing a child, for those with complex language impairments it may take many years of careful evaluation of intervention and consequent progress before the condition can be named (Lees and Urwin, 1994). A careful description of the unfolding of an impairment is ultimately more important than its name (Lees and Urwin, 1994). Rarely will the name of a particular disorder result in prescriptive treatment. Treating language impairment in children is more a question of carefully detailing how the condition unfolds and the child's particular response to therapy programmes (Lees and Urwin, 1994). Within any pre-school class children may require quite different intervention techniques, due to the heterogeneous nature of language impairment (McCartney, 2004).

Discussing language impairment categories can cause us to overlook the similarities that exist between children classified by different categories (Owens, 2004). Many assessment and intervention strategies and techniques can be used across children (Owens, 2004). The use of the single term "impairment" suggests that, in a broad sense, there is a degree of homogeneity in the group of children concerned. In other words, they are all impaired to the extent that they all have recognisable difficulties in their communication (Law, 1992).

### **Variables Associated with Language Impairment**

When working with these children, one has to consider the varying nature of language impairment, and the severity of associated problems. Language impairment is intricately linked to a whole range of associated non-linguistic factors (Billeaud, 2003; Law, 1992). Multiple risk factors act in a cumulative fashion to increase the likelihood that a child will experience difficulty with language, with the degree and pervasiveness of that impairment possibly associated with the number of risk factors involved (McLean and Woods Cripe, 1997). The way in which each of these risk factors might affect language development is not yet clearly understood. It is certainly not a simple matter of one clear cause having one defined effect. More commonly, these risk factors co-occur and the nature of the relationship between them remains unclear (Law, 1992; Rossetti, 2000).

Mogford and Bishop (1988) support the view that an interaction of factors may underlie difficulty with language development and state that "factors which on their own have no impact on language development might assume significance in combination" (Lees and

Urwin, 1994, pg12). It may be an interaction effect of factors in each individual case which leads to the particular clinical problem. Advocates of this view have suggested a multifactorial etiology of language disorder, of which language impairment is the final common pathway for a number of factors that interrupt development. It is this combination effect of associated factors and outcome of treatment approaches which needs to be the focus of future research (Lees and Urwin, 1994; McLean and Woods Cripe, 1997). Knowing how these associated non-linguistic factors affect therapy outcomes would enable therapists to predict outcome of intervention and improve our clinical practice in this area, and possibly the future prognosis of these children. Some of these relevant factors are described below:

#### Gender issues

The gender issue is a well-documented feature of language impairment, more males than females are affected (Bishop, 1999; Law, 1992). As yet, it has not yet proved possible to isolate a specific genetic marker for this gender difference found in language impaired children (Lees and Urwin, 1994). Jackson and Plante (1997), have linked higher than normal levels of the male hormone, testosterone, with left-right perisylvian asymmetries in brain morphology, which in turn, has been implicated in children's specific language impairment (cited in Reed, 2005). Although more research is required to explain this phenomenon, gender is an established feature of language impairment and is included as a relevant factor in this study.

#### Early intervention

In recent years, there has been increased focus on early intervention for infants, toddlers and young children. There are many advocates of early intervention, including Blackman (2002) who states that "there is no more important period in human development than conception through early childhood in maximizing the potential for living fully. The more we learn about brain development, the more this point gains poignancy." The majority of children with language impairment look like other children in their age groups, however, it is precisely because they "look normal" that their difficulties with communication development may be downplayed or overlooked entirely (Billeaud, 2003).

According to McCall and Plemons (2001), the earlier intervention takes place, the easier and more efficient it is. Evidence for intervention at relatively younger or older ages, within this overall pre-school age period, is not clear for language disorders. Findings of the studies that have addressed age seem to suggest that intervention will be equally, if not more, effective and efficient, if started at a younger age (McLean and Woods Cripe, 1997).

#### Pre and peri-natal issues

Prenatal development encompasses the entire process of growth, maturation, differentiation and development that occurs between conception and birth (Anderson, 1998). Prenatal development may be adversely affected by several factors, including prenatal conditions and maternal health, depending on the stage of development of the fetus (Anderson, 1998; Blackman, 2002). Ionizing radiation, drugs, viruses, malnutrition, trauma and maternal disease may affect the physical development during the early fetal stage (Anderson, 1998; Holm and Dinno, 2000). After 14 weeks, any adverse effects are largely functional (Anderson, 1998).

Peri-natal refers to the time and process of giving birth or being born (Anderson, 1998). The peri-natal period extends from the twenty-eighth week of gestation to the twenty-eighth day after birth (Anderson, 1998). A child can be harmed during the birth process by a difficult delivery, medical instruments and in the aftermath of an accident (Herbert, 2005).

Many studies have reported increased risk of speech and language impairments in children who have had adverse pre and peri-natal conditions (Bishop, 1997). One might therefore expect a high rate of pregnancy and birth difficulties to be reported in the case history of language impaired children. Prematurity and low birth weight, have been increasingly researched in recent years. The magnitude of the effect of prematurity and low birth weight varies considerably across children, and recently a lack of a clear causal link in many children

with language impairment has been documented (Bailey, 1997; Owens, 2004). Retrospective studies of language impaired children, also, have not shown definite associations between inferior pre and peri-natal conditions and language impairment (Bishop, 1997).

#### Position in the family

Position within the family is often considered to be a relevant social factor in language impairment (Law, 1992). It is commonly assumed that the first born has more direct verbal input from parents while second born and later born children have to rely on their siblings for input (Law, 1992). Thus position of birth could be a factor in influencing language development.

#### Feeding

The mouth has extensive sensory nerve endings and is one of the primary areas for tactile discrimination. Feeding is an extremely sensory experience, providing oral tactile stimulation of a natural kind (Faure and Richardson, 2002), which some children find difficult to tolerate. Oral motor and feeding difficulties may stem from a wide variety of sensory-based and behavioural issues (Murray-Slutsky and Paris, 2000). The response may be rooted in a basic survival response, fear of aspiration due to decreased sensory awareness, motor control and poor suck-swallow co-ordination (Murray-Slutsky and Paris, 2000). Children may often mouth objects or bite on towels, shirts and other objects to help organise and calm themselves (Murray-Slutsky and Paris, 2000). Feeding difficulties are often included as a risk factor for later speech and language difficulties (Law 1992; Rossetti, 2000), and is therefore included in this study as a variable that is associated with language impairment.

#### Communicative developmental milestones

Before the emergence of the first purposeful word, a number of behaviours that convey communicative intent, must take place (Reed, 2005; Rossetti, 2000). These behaviours are known as prelinguistic communication skills and includes development of eye contact, turn taking, copying, listening and attending to sounds and voices, affective responses to adult's tone of voice and loudness level, and development of intentional communicative acts to attract attention or engage in vocal play (Billeaud, 2003). These prelinguistic components of intentional communication lay the foundations for language development (Rossetti, 2000).

"Certain behaviours have been traditionally associated with the time lines in which their development would be expected" (McLaughlin, 1998, pg. 184). These time lines or milestones, gauge progress of language development. Infant and child language develops at relatively predictable times (McLaughlin, 1998). Infant vocal behaviours, referred to as babbling, have been a source of scientific curiosity and controversy for many years (McLaughlin, 1998). There are two camps of belief, the first believe that babbling and later speech are distinctly different and unrelated phenomena, while the other believes that babbling is the initial stages of true speech and language (McLaughlin, 1998). Although there are compelling arguments for both sides, the overall results of studies strongly support the notion that an infants babbling gradually approximates the language of their environment (McLaughlin, 1998). Thus, the role of babbling is to lay the foundations for language, and the development of babbling is therefore an important milestone in the development of child language. Any delay or deviation in babbling would surely be a relevant factor that may underlie difficulty with future language development.

Similarly, the production of the "first word" around the child's first birthday serves as a major milestone for language development. The event of the first word has been surrounded by parental pride and excitement as it signifies evidence that true language and improved communication are imminent (McLaughlin, 1998). The "first sentence" does not cause such an emotional reaction from parents, however, it's occurrence, around the time of the second birthday, is also an important milestone in the development of language, as it signals underlying motor and cognitive ability and it represents the appearance of grammar (McLaughlin, 1998). Thus, any delay or deviancy in these areas would potentially impact language development.



### Medical issues

Medical issues relate to the physical and biological aspects of a condition, while neurology deals with the nervous system and its dysfunction (Anderson, 1998). Physical characteristics have their origins in early fetal development (Billeaud, 2003). These characteristics are sometimes referred to as soft neurologic signs and may be associated with syndromes or conditions known to be related to communication difficulties (Billeaud, 2003). The incidence of physical anomalies are more likely to occur in a representative case load of speech, language and hearing impaired children than in the general population (Sparks, 1984). Siegel-Sadewitz and Shprintzen (1980) cited in Sparks (1984) looked at 42 children with a range of communication disorders and found the most frequently occurring anomalies to be dysmorphic eyes and ears and cranial malformations. As early as the first year there is an indication that infants with a high count of minor physical anomalies are not processing information adequately and tend to show attention difficulties (Billeaud, 2003). This has serious implications for language development, which relies on the child's ability to focus and maintain attention (Billeaud, 2003).

It has been proposed that in the absence of gross neurological problems, language impairment may come from mild central nervous system dysfunction (Reed, 2005). Subtle irregularities in brain structure or function may be found. For instance, some children present with language impairment against a background of information that indicates some cerebral dysfunction, of which epilepsy is the most common marker (Law, 1992; Lees and Urwin, 1994). As technological advances are made in neurological testing, these subtle irregularities may be more clearly identified, however, up until now the relationship between prenatal neurological development, genetics, postnatal brain morphological development and endocrinology remains speculative (Reed, 2005).

### Ear infections

Conductive hearing loss caused by ear infection associated with colds are the most common of all childhood ailments (Law, 1992). Fluctuating hearing impairment due to infection may be an additional problem for the language impaired child. Although there is a definite link between slight or fluctuating hearing loss as a result of infection with language impairment, the exact relationship remains unclear (Law, 1992).

### Family history

It has been found that families with language impaired children have a significantly higher proportion of first-degree relatives with similar difficulties. Unlike developmental apraxia, where Hurst et al. (1990) found a specific autosomal recessive trait affecting several family members, no conclusive evidence for a genetic link for language impairment has yet been found (Law, 1992). Nonetheless, a family history of similar difficulties in language impairment is now a well-documented phenomenon (Bartlett et al., 2002; Bishop, 1999; Law, 1992).

### Behavioural problems

One of the more marked associated factors with language impairment is behavioural dysfunction (Law, 1992). This association has been consistently reported in the research literature (Law, 1992; Thomas and Guskin, 2002). In the region of 50% - 70% of language impaired children present with behaviour problems (Law, 1992; Prizant, 1999). The most common of these is attention deficit disorder with or without hyperactivity (AD/HD). Studies seem to agree that children with specific developmental language disorders show a raised frequency of socio-emotional and behavioural problems over time (Rutter et al., 1992; Tallal, 1993; Thomas and Guskin, 2001), thus addressing behavioural and communicative difficulties in these children is important due to the long term implications.

### Emotional and social development issues

Emotional and /or social development problems may be consequent or subsequent to language impairment (Lees and Urwin, 1994). Difficulty with communication can result in emotional and psychological problems, as well as poor self confidence. Botting, Cruthley and Conti-Ramsden (1998) found that 31% of children with speech impairments have emotional or behavioural problems (cited in Law, 1992). Autistic children manifest with both emotional

and communication difficulties which are associated with their autistic condition. There may be a large group of children who could be said to manifest with 'autistic tendencies' (Law, 1992).

#### Medication

Psychotropic drugs affect the mind, experience or behaviour, and their use over the past decade, for the treatment of a variety of behaviour and language disorders of children, has increased dramatically (Tankersley and Balan, 1999). The primary use of medication is to assist in the treatment of behavioural and/or psychological problems. Medication may be administered to aid learning as it alleviates the symptoms of or treats the chemical imbalances associated with specific disorders (Tankersley and Balan, 1999). The six major psychotropic drug classes that are commonly used to treat behavioural and language disorders in children include: anticonvulsants, which manage seizures; antidepressants to treat depression; antimaniacs which manage mania; antipsychotics which manage the symptoms of schizophrenia; anti-anxiety which decrease anxiety and induce a calm state; and stimulants which are the current choice of treatment for attention deficit hyperactivity disorder (Tankersley and Balan, 1999).

#### Play

According to Patterson and Westby (1998, pg. 159), play is "a reflection of learning and a way to learn." Play combines cognitive, social, emotional, linguistic and motor components (Patterson and Westby, 1998), and therefore provides an arena for observing and assessing functional abilities in all these developmental domains (Herbert, 2003). Piaget (1967) proposed that play progresses through three age related stages: practice play, symbolic play and 'games with rules' play (cited in Herbert, 2003). These stages have been related to cognitive maturation, conceptual knowledge and understanding, which are pre-requisites for learning language (Lewis and Boucher, 1997). Practice play occurs in the first two years of life and involves repetitive functional child-centered actions (Herbert, 2003). Symbolic play occurs around 18 months of age and involves pretend play which is doll-related (Herbert, 2003). 'Games with rules' play occurs around the age of 6 years and involves increasingly complex made-up games with spontaneously created rules (Herbert, 2003). The use of symbols in symbolic play has important implications for the development of pre-conceptual thought and words in language (Tiegerman, 1993). Research demonstrates a consistent co-occurrence of the emergence of first words with early pretend play and of word combinations with symbolic play scheme combinations (Patterson and Westby, 1998). Language skills are therefore closely related to the process of play (Law, 1992; Patterson and Westby, 1998), and children with poor language development could present with poor play patterns.

#### Fine and gross motor factors

Given the heterogeneity of language impairment, children are especially likely to have associated deficits (Bishop, 1999). Some language impaired children display neuromaturational delays, resulting in mild or moderate gross and/or fine motor signs (Lees and Urwin, 1994). Signs of unusual neurological development with motoric involvement include slower motor responses (Leonard, 1998), a higher degree of clumsiness associated with motor incompetence and anomalous cerebral dominance as demonstrated by the higher proportion of children who are left- or mixed-handed (Lees and Urwin, 1994). As motor competence improves, it accompanies and even propels language development (McLaughlin, 1998). It has been found, for instance, that children for whom language impairment resolved between ages 4 – 5 ½ years also improved in their manual skills (Law, 1992). Thus motor and language skills are intricately linked, and motor development, or lack of development, could potentially be a risk factor for poor language development.

#### Parental issues

Parents play an important role in their child's life, so it is not surprising that certain issues pertaining to the parents can have a negative effect on their child's growth and development. For instance, parental education of less than Grade 9 is considered to be a risk factor in a child's slow pattern of development (Rossetti, 2000). Chronic or acute mental illness, including depression, acute family crisis, and single parenting are other specified at-risk factors which enhance potential for delayed development (Rossetti, 2000).

### Other issues

There may be many other unpredictable factors which remain undetected and which may have influences on intervention results. Professionals can only deal with factors that are already known and this is a limiting factor in the study of treatment effectiveness in language impaired children (McCartney, 2004).

### **The Centre for Language and Hearing Impaired Children**

The Centre for Language and Hearing Impaired Children (previously known as 'The Units', now referred to as 'The Centre'), was started in 1976 by the University of the Witwatersrand to form part of the Speech and Hearing Clinic of the Department of Speech Pathology and Audiology. It is still affiliated with the University today, and although it acts as a training ground for students, there has been no previous research conducted at The Centre.

The Centre is a pre-school for severely communicatively impaired children. The Centre provides the vital services of multi-disciplinary diagnosis and ongoing intensive therapy for young children with language and hearing impairments. The children accepted by The Centre are either diagnosed with severe language impairments or have a moderate to profound hearing loss. Admission criteria require the child to have no global cognitive impairment or mental sub-normality. The Centre accommodates 50 children 3 to 6 years of age on a full-time basis in a small, nurturing language orientated pre-school setting. The majority of the children start at The Centre from 3 years of age, but some children are accepted into the programme at an older age up to the age of 6 years. All classes contain a maximum of 8 children each, except for the highest level class which accommodates a maximum of 10 children. The school programme stresses communication skills, auditory and visual perception, fine and gross motor activities, pre-literacy skills, socialization and emotional development. Once accepted, each child is assured a yearly place at The Centre until such time as the team makes the joint decision to refer the child elsewhere. This is one of two pre-school facilities in Johannesburg catering specifically for language impaired children, and one of the only known pre-schools of its kind world-wide.

The team of professionals at The Centre includes two head therapists (Head of Language and Head of Hearing), speech and language therapists, an audiologist, occupational therapists, a physiotherapist, experienced pre-school teachers, classroom aides, and part time psychologists and medical specialists. Essential in working with these children is the involvement of the whole family who are part of the team.

In 2003, the Department of Education issued a White Paper laying out a twenty year plan to replace so called 'special classes and remedial schools' with a system of "integrated schooling" for all special needs children (SA Government, 2003). This plan does not directly address the needs of the pre-school child who suffers from severe communication impairment. The type of non-inclusive intensive language learning environment that The Centre offers, differs extensively from a 'normal' pre-school environment in various ways: teacher qualification, high teacher-child ratio, language intense programme, therapeutic input. There is a suggestion in the literature that children with language impairments may differ from normally developing children in the type of learning situation they need to acquire morphological and syntactic forms (Reed, 2005). According to Fey (1986), language impaired children do not actively process linguistic input in an effort to produce its structure. As a result, their rate of development in language form, particularly syntax and morphology, is considerably slowed (Fey, 1986). To learn how to process linguistic form and produce its structure may require a learning environment that differs from those of normally developing children (Fey, 1986; Reed, 2005). Not only does a pre-school like The Centre provide a clinical environment with this different type of learning situation, but the structured therapeutic intervention also provides a supportive and intensive learning environment for each child, which would not be available in an inclusive environment.

### Components of therapy received at The Centre

Assessment at The Centre is carried out by the multi-disciplinary team and is often a lengthy process requiring intensive testing and observation within the school environment. On acceptance to The Centre, each child is assigned to a speech therapist who is the case manager and co-ordinates the team under the supervision of the Head of Language. For continuity, the child attends therapy with the same therapist for every year that he/she attends The Centre. Children receive individual speech and language therapy up to three times per week (1½ hours) for the full school year. Taking school holidays into account, when the children do not have therapy, each child receives a total of 60 hours of individual speech and language therapy per year.

It is a difficult task to describe the type of therapy received at The Centre, because, therapy is first and foremost individualistic in nature. Each child is assessed and treated according to their specific requirements. Individualised therapy programmes are in accordance with current practice which advocates intervention as a process of determining individual goals for the particular requirements of each child (McLaughlin, 1998). Considering the heterogeneous nature of language impairment, this seems to be a practical and realistic approach.

Generally speaking, a structured sequential stage-by-stage approach is taken according to each child's communication skill level rather than age level. No single language approach is adopted or enforced by The Centre, however, therapy according to the developmental Language Assessment and Remediation profile suggested by Crystal (1982) is the principal approach used to address receptive and expressive language impairment. Although the Language Assessment and Remediation profile is the predominant approach, each therapist can be eclectic and resourceful, yet discriminating in her approach. In an environment such as this, flexibility and ability to adapt are important qualities. Each child's specific requirements are considered, appropriate intervention goals are set and therapy tasks achieved, all within each child's level of ability yet challenging enough to allow for growth and learning. As therapy takes place on the pre-school grounds, therapists are able to facilitate successful peer interactions in therapy, within the classroom setting as well as on the playground. This allows for reinforcement of therapy aims in a more functional environment. Once a year, every child is reassessed and their progress and suitability of placement within the school is re-evaluated by the team.

Parents, extended family members and caregivers are encouraged to observe all therapies through a one-way mirror system. Families are provided with training and support to be able to augment, expand and supplement the intervention provided directly by the therapist. Research shows that the benefits parents can gain by working through a treatment programme with the therapist can be considerable (Lees and Urwin, 1994). They may begin to see the scope of the child's difficulties more clearly, as well as the child's strengths. They can then add their observations to assessments and discussions about their child with greater confidence and clarity (Lees and Urwin, 1994). Research data indicates that some of the best intervention results arise when parents are actively involved in the intervention programme (Law, 2004). Realistically, however, many caregivers do not opt in. Thus caregiver involvement is not always consistent and as each caregiver decides their level of involvement in the therapy programme, the level of involvement varies considerably.

## **METHODOLOGY**

This section describes the various research aims, design of the study, and sample selection procedures. It then gives a description of the sample and a description of the test measures used in the study. Finally, validity, reliability and ethical issues are discussed.

### **Research Aims**

The overall aim of this study was to describe the demographics of children who recently attended The Centre, to examine the amount of progress that each child made in various

language areas while attending The Centre, and to ascertain whether type and severity of language impairment and/or demographic variables were associated with response to intensive intervention in these pre-school language impaired children.

To accomplish this overall aim, five sub-aims were required and are described below:

1) Child and Family Data

To describe the demographics of the 50 children who left The Centre for Language and Hearing Impaired Children between the years 2001 and 2005 in terms of: gender; previous assessments and speech therapy; pregnancy and birth difficulties; birth order; feeding difficulties; communicative developmental milestones; medical history; ear infections; family history of disorders; behavioural and emotional problems; medication requirements; play; fine and gross motor development; parental education level and further educational referral.

2) Test Results Data

a) Receptive vocabulary

- i. To determine how many children had receptive vocabulary abilities that were below average at their initial assessment at The Centre.
- ii. To determine how many of these children had improved in their receptive vocabulary abilities by their final assessment at The Centre
- iii. To determine if this improvement was statistically significant

b) Receptive grammatical morphology

- i. To determine how many children had receptive grammatical morphology abilities that were below average at their initial assessment at The Centre.
- ii. To determine how many of these children had improved in their receptive grammatical morphology abilities by their final assessment at The Centre
- iii. To determine if this improvement was statistically significant

c) Receptive syntax

- i. To determine how many children had receptive syntax abilities that were below average at their initial assessment at The Centre.
- ii. To determine how many of these children had improved in their receptive syntax abilities by their final assessment at The Centre
- iii. To determine if this improvement was statistically significant

d) Expressive vocabulary

- i. To determine how many children had expressive vocabulary abilities that were below average at their initial assessment at The Centre.
- ii. To determine how many of these children had improved in their expressive vocabulary abilities by their final assessment at The Centre
- iii. To determine if this improvement was statistically significant

e) Expressive syntax

- i. To determine how many children had expressive syntax abilities that were below average at their initial assessment at The Centre.
- ii. To determine how many of these children had improved in their expressive syntax abilities by their final assessment at The Centre
- iii. To determine if this improvement was statistically significant

3) Type and Severity of the Language Impairment

To describe the type of language impairment and the severity of the language impairment of each of the 50 children according to their initial assessment results

4) Variables Associated with Type and Severity of Language Impairment

To determine whether there are common variables associated with type and severity of the language impairment

5) Variables Associated with Degree of Improvement in Language Areas

To determine whether there are common variables associated with degree of improvement in all of the above language areas

**Research Design**

This was a comparative longitudinal study of demographic information and initial and final language assessment test results obtained from school files stored at The Centre for Language and Hearing Impaired Children. The subjects used in this study attended The Centre between 1998 and 2005. Test results before and after intervention at The Centre were compared to determine areas of improvement.

This study was not experimental in the sense that there was a specific recognisable intervention nor in terms of there being a comparison group of any sort. This study was more typical of clinical research, as it provided data on the effectiveness of therapy (Silverman, 1993) at an intensity level which, to the best of our knowledge, has never been collected in the field of speech and language intervention before.

**Method**

Data Collection

The data in each file was surveyed and retrieved using various data collection sheets compiled by the researcher. The data collection sheets consisted of a demographic information sheet (Appendix 1), and a test scores information sheet (Appendix 2). The demographic information was then transferred to a general information sheet (Appendix 3) for in depth data comparison.

Data Analysis

In this study, data from the initial and final assessments were analysed in the following ways:

a) Statistical analysis

Meta-analysis techniques involve the calculation of effect sizes based on the difference in gains (eg. pre-test minus the post-test results) between the two (initial and final) sets of data (Law, 2004). Significance tests are commonly used in speech, language and hearing research for determining whether the probability of an outcome being due to chance, or random fluctuation, is adequately small (Silverman, 1993). In this study, a paired comparison t-test with a 95% (alpha = 0.05) level of confidence was used to determine whether the difference between the initial and final assessments was statistically significant.

b) Analysis of the patterns of change over time

Improvement or lack of improvement was determined according to whether there was a difference between the initial and final assessment scores, from "could not be tested", below average, average and above average ability. The amount of improvement was determined according to Rossetti's (2000) patterns of change over time:

- 1) *Normal-abnormal development*: when the degree of delay remains the same over time, indicating that the child progressed as a result of intervention, but the rate of progress did not exceed developmentally appropriate transformation. In this outcome, the child is no longer falling further behind their peers over time (Leonard, 1998). This would occur if the initial and final assessment results were the same, eg. both below average or both average.
- 2) *Abnormal-abnormal development*: when there is a widening between age-appropriate skills and the child's level of functioning, so that the child falls behind even while receiving intervention. This would occur if the initial assessment result was better than the final assessment result, eg. initial was average and final was below average.

- 3) *Catch-up growth*: when the deficit gap is reduced, indicating faster than normal mastery of skill. This would occur if the final assessment result was better than the initial assessment result, eg. initial was average and final was above average. This type of pattern shows an increase in standard scores on language measures across time (Leonard, 1998).

### **Sample Selection Procedures**

#### **Sampling**

Children who left The Centre for Language and Hearing Impaired Children over the past 5 years were eligible for the study. As children spend a number of years attending The Centre, it was anticipated that several children would enter The Centre earlier than the past 5 years. Analysis indicated that 15 children started at The Centre prior to 2001, so overall, the sample used in this study included children who attended The Centre from 1998. Thus results reflect a period of 8 years of intervention at The Centre. Table 1 shows a breakdown of the number of children and the year they started and left The Centre.

Table 1: Number of children according to the year they started and left The Centre.

Year	Number of children in the study who started at The Centre	Number of children in the study who left The Centre
1998	1	0
1999	7	0
2000	7	0
2001	13	9
2002	9	9
2003	9	14
2004	4	10
2005	0	8

Limiting the sample to the most recent 8 years helped to ensure that the assessment tools used to assess these children were current, and that they would have been used consistently over several assessment years by all the therapists at the school. Also, evaluating more recent therapy interventions ensured that the interventions studied reflect current practice. All children involved in the study were no longer attending The Centre.

#### **Exclusion Criteria**

Children with hearing loss form a population who have special needs that extend well beyond those of hearing children with language impairments (Long and Long, 1994). Due to the very broad range of issues relative to hearing impairment, such as type, degree and stability of the hearing loss, age of onset and type of intervention (Shaw, 1994), children diagnosed with hearing impairment either before or during their attendance at The Centre were excluded from the study.

Children who are second language English speakers form a population who require special considerations, not the least of which is caution with current standardised assessment instruments which are not developed for nor standardised on bilingual populations (Long, 1994). Although children who are exposed to two or more languages are not immune from language impairment, most bilingual children are at risk for educational failure due to their language background and not because of a language impairment (Long, 1994). Due to these considerations, the children in this study were required to be first language English speakers.

Several files had missing data of initial and final assessment results, and these children were excluded from the sample. Also, children who were assessed using tests that were not consistent with the tests used in this study, could not be included for comparison of results and were therefore not included in the sample. Table 2 shows a breakdown of the number of

children who left The Centre each year, the number of children who were included and excluded from the study and the reason for their exclusion.

Table 2: Number of children who left The Centre between 2001 and 2005, number of children who were included and excluded from the study and the reason for their exclusion.

Year	No. of children who left The Centre	No. of children included in study	No. of children excluded from study	Reason for exclusion
2001	12	9	3	3 = hearing impaired children
2002	16	9	7	6 = hearing impaired children 1 = different initial tests
2003	21	14	7	4 = hearing impaired children 2 = different assessment tests 1 = no final assessment results
2004	16	10	6	5 = hearing impaired children 1 = no final assessment results
2005	17	8	9	3 = hearing impaired children 3 = different assessment tests 2 = second language English speakers 1 = no initial assessment results
Total	82	50	32	

### **Description of the Sample**

The sample consisted of 50 children, 38 males and 12 females, with a ratio of 3.1 to 1. According to several studies, the figures for the ratio of boys to girls with specific language impairment consistently range between two and three to one (Law, 1992), which is concordant with this sample. This gender bias towards males is not surprising considering that it is a well-documented, yet unexplained feature of language impairment that more boys than girls are affected (Bishop, 1999; Law, 1992).

Although the average length of time spent at The Centre was 2.6 years, 2 children attended The Centre for only 6 months, while 6 children spent a maximum time of 4 years at the school. The total time period of intervention was 6 months to 4 years, depending on age at admission to The Centre as well as type and severity of the impairment. Figure 1 shows the proportion of the sample of 50 children according to the number of years that they attended The Centre.

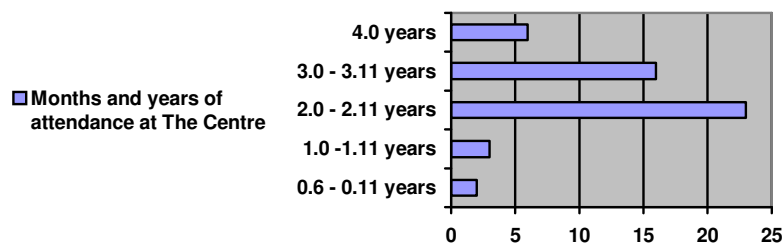


Figure 1: Number of children in the sample who attended The Centre for 6 months, 1 year, 2 years, 3 years and 4 years respectively

As the minimum time of attendance at The Centre was 6 months, the minimum length of time between initial and final assessments was therefore also 6 months. This test-retest time



frame is longer than the time sampling reliability investigations used in the standardisation of the tests, and this instils confidence in each tests stability over time for all the test scores in the study (Brownwell, 2000; Carrow-Woolfolk, 1999).

Only three children did not receive any speech and language therapy prior to enrolling at The Centre, while 12 children received previous speech and language therapy for more than 1 year. The average length of previous speech and language intervention was 10 months. Since the average age at admission to The Centre was 3.7 years, this would indicate that these children are receiving speech and language therapy from around the age of 2.9 years of age. Billeaud (2003) states that if a child is delayed but uses even a few words, age 2 to 3 years of age is not an uncommon referral point for these children. However, considering the importance of early intervention for children with speech and language difficulties (Rossetti, 2000), these figures indicate that earlier intervention is not taking place with these children. It is interesting to note that prior to attending The Centre, 90% (n=45) of the children had between 2 to 8 different assessments from various professionals (neurologists, paediatricians, and therapists), yet early referral and intervention was still limited. It seems that the parents are indicating concern but the children are not necessarily being referred for speech and language intervention by the medical professionals. Refer to Table 3 for a breakdown of all the children in terms of gender, number of previous assessments, years of previous speech therapy, age at admission to The Centre and number of years at The Centre.

Table 3: Sample of 50 children in terms of gender, number of previous assessments, years of previous speech therapy, age of admission to The Centre and number of years attending The Centre.

Child	Gender	Number of previous assessments	Years of previous speech therapy	Age at admission	Number of years at Centre
C105	F	2	0.2	3.4	2
C205	F	3	1.6	3.7	3
C305	F	1	0.8	3.9	4
C405	M	1	0.7	4	3
C505	M	2	1.2	3.5	2
C605	M	3	1.6	4.3	2
C705	M	5	1	3.3	4
C805	M	6	1	3.9	2.3
C104	M	3	1	3.2	2
C204	M	3	2	4.1	3
C304	M	6	0.3	3.1	2.8
C404	M	5	1	3.11	3
C504	M	4	1.6	3.6	4
C604	M	3	2	4.2	2
C704	F	1	0.3	3.6	4
C804	F	3	1	5.1	3
C904	M	5	1	4.1	2
C1004	M	3	0.3	4	3
C103	M	2	1	3.4	3.4
C203	M	3	1	3.5	1
C303	M	3	1	4.5	2
C403	F	6	1	3.2	2.8
C503	M	8	0.6	3.6	3
C603	M	4	1	3.5	3
C703	M	5	1	3.9	2
C803	F	5	2	3.5	3
C903	M	2	1	4.2	2
C1003	F	4	1.6	3.3	4
C1103	M	3	1	3.7	3
C1203	M	4	0.6	4.7	2.3

C1303	M	4	0	2.11	0.6
C1403	M	2	0.7	3.11	0.6
C102	M	4	0.9	3.2	3.8
C202	M	2	0.4	3.11	3.9
C302	M	0	0	3.1	2.6
C402	M	3	2	5.6	1.8
C502	F	3	1.3	3.3	4
C602	M	3	1	3.2	2.3
C702	F	6	0.6	3.6	2
C802	M	6	3	5.2	2
C902	M	4	0.6	4.3	2
C101	F	3	0.1	3.6	3
C201	M	3	0.5	3.5	2.8
C301	M	5	1	4	2
C401	M	5	0.3	4.9	2
C501	M	4	2	5.4	1
C601	F	2	1	4.5	2.3
C701	M	0	0	3.2	2.2
C801	M	5	0.6	3.4	3
C901	M	3	0.6	4.1	3.2

### **Description of the Test Measures**

It has been suggested that clinicians use a combination of standardised and non-standardised techniques for evaluating language (Leonard, 1998). Although both techniques are used to determine language difficulties in the children attending The Centre, due to their objectivity, only standardised tests were used in this study.

Test measures are used at The Centre to determine gains in language ability. To determine whether treatment leads to gains in language ability in children with language impairment, it must be shown that these gains are not likely to be the result of maturation or some other uncontrolled factor (Leonard, 1998). To determine real gain, standard scores were used in this study. As standard scores are anchored to chronological age, one would expect these scores to remain the same if the child merely kept pace with his increasing age (Leonard, 1998). Increases in standard scores reflect an increase in the rate of development, and therefore reflect actual gains from treatment rather than just maturation.

Semantic difficulties are usually the first evidence of a language problem, while syntactic and morphological skills are the classic characteristics of pre-schoolers with language impairments (Reed, 2005). This study looked at receptive and expressive semantics, receptive grammatical morphology, and receptive and expressive syntax. Although language constitutes several other components, including pragmatics and phonology of language, these components were beyond the scope of this study.

### **1) Receptive Vocabulary, Morphology and Syntax**

It is acknowledged that comprehension is multifaceted and that one cannot rely on a single procedure for assessing the auditory comprehension of a child (Bishop, 1999). However, for the purposes of this research, only results from the Test for Auditory Comprehension of Language - 3 (TACL-3) were used to determine level of performance in auditory comprehension of vocabulary, morphology and syntax.

#### **Test for Auditory Comprehension of Language – 3 (TACL-3)**

TACL-3 is the upgraded and refined third edition of the original TACL. The TACL-3 was designed to test a child's understanding of vocabulary, morphology and syntax of spoken language (Carrow-Woolfolk, 1999). It does not attempt to evaluate the totality of a child's ability to comprehend all aspects of language in depth (Carrow-Woolfolk, 1999). The test contains a representative sample of the linguistic forms one encounters in everyday comprehension experiences (Carrow-Woolfolk, 1999). It measures the literal meaning

associated with these forms within a specific linguistic environment and in contrast to related grammatical structures. These structures are measured reliably and validly (Carrow-Woolfolk, 1999). The TACL helps to identify children with receptive language disorders and provides a means of measuring change in grammatical comprehension (Carrow-Woolfolk, 1999). Because the test was carefully built statistically and extensively normed, it is an excellent tool for use in research studies, and may also be used to evaluate the success of language programs (Carrow-Woolfolk, 1999). In 1994, Records and Tomblin found that this was one of the receptive tests that speech and language therapists relied heavily on (cited in Owens, 2004). It has been one of the most popular and respected tests of language (Carrow-Woolfolk, 1999) and is the primary standardized instrument used to test language comprehension at The Centre.

The TACL-3 consists of 139 items composed of a word, phrase or sentence and a corresponding page that has three colour drawings (Carrow-Woolfolk, 1999). For each item, one picture illustrates the meaning of the word, morpheme, or syntactic structure being tested. The other two pictures illustrate either two semantic or grammatical contrasts of the stimulus or one contrast and one decoy (Carrow-Woolfolk, 1999). The examiner reads the stimulus to the child, who then points to the picture that he believes best represents the meaning of the word, phrase or sentence spoken by the examiner (Carrow-Woolfolk, 1999). No oral response is required.

The test comprises three subtests:

1. Vocabulary Subtest

Receptive vocabulary taps one's ability to understand the meaning of words (Brownell, 2000). This sub-test assesses the child's understanding of the literal and most common meanings of word classes including nouns, verbs, adjectives and adverbs. Abstract words and concepts are also tested (Carrow-Woolfolk, 1999).

2. Grammatical Morphemes Subtest

Since many children with language impairment have difficulty with syntax and morphology, the speech therapist is interested in intra-word development as well as sentence development (Owens, 2004). Using the context of a simple sentence, this subtest assesses the meaning of such grammatical morphemes as prepositions, noun number and case, verb number and tense, noun-verb agreement, derivational suffixes and pronouns (Carrow-Woolfolk, 1999).

3. Elaborated Phrases and Sentences Subtest

This sub-test assesses the understanding of syntactically based word relations, elaborated phrase and sentence constructions, including the modalities of single and combined constructions, embedded sentences and partially and completely conjoined sentences (Carrow-Woolfolk, 1999).

The TACL-3 provides raw scores, age equivalents, percentiles and standard scores for the three subtests. Standard scores provide the clearest indication of a child's subtest performance (Carrow-Woolfolk, 1999). They are based on a mean of 10 and a standard deviation of 3 and they allow for cross subtest comparisons.

## 2) Expressive Vocabulary

Vocabulary reflects what an individual knows about the world and contributes to the effectiveness with which he is able to think about the world (Brownell, 2000). Thus, meaning extends beyond knowing a word, to knowing a topic and the context in which that word is found. Receptive vocabulary is usually better than expressive vocabulary. This is because receptive vocabulary requires only recognition of the meaning of a word, while expressive vocabulary requires recognition of the meaning, access to the word, and retrieval from memory (Brownell, 2000). Vocabulary tests determine the current level of an individual's vocabulary and this information, combined with other test results, can help establish a comprehensive profile of an individual's language ability (Brownell, 2000). Vocabulary is often

tested using referent symbol tasks (Owens, 2004), such as the Expressive One Word Picture Vocabulary Test and Renfrew Word Finding Vocabulary Test.

#### Expressive One Word Picture Vocabulary Test

The Expressive One Word Picture Vocabulary Test is the third edition of this test and was developed in the year 2000, after various upgrades and improvements in its effectiveness. It is an individually administered norm-referenced test, designed to assess children from 2 years to 18.11 years of age. The child is asked to name illustrated colour items depicting an object, action or concept. These items become progressively more difficult as the test continues. Raw scores can be converted to standard scores, percentile ranks and age equivalents. This test can be used as a longitudinal measure to monitor growth from year to year (Brownell, 2000). As a research tool, it can be used to evaluate the effectiveness of various types of programmes (Brownell, 2000).

#### Renfrew Word Finding Vocabulary Test

From 1992 to 1995 trial runs to assess the Renfrew Word Finding Vocabulary Test's appropriateness were carried out (Renfrew, 1995). One of the trial areas was Johannesburg, South Africa. The Renfrew Word Finding Vocabulary Test is the fourth edition of this test and was developed in the year 1995, after the various upgrades and improvements were made in its effectiveness (Renfrew, 1995). It is an individually administered norm-referenced test, designed to assess children from 3.6 years to 8.5 years of age. The child is asked to name illustrated items depicting an object or action. These items become progressively more difficult as the test continues. Raw scores can be converted to age equivalents and middle 50% of range of scores.

### **3) Expressive Syntax**

#### Language Assessment, Remediation and Screening Procedure (LARSP)

Analysis of syntax can be useful in providing evidence of whether language advances are emerging (Haynes and Shulman, 1998). One of the first systems for analysing child language came from Crystal et al. (1976) in the form of the Language Assessment, Remediation and Screening Procedure (LARSP). The analysis is psycholinguistic in nature and analyses language on the basis of phrase and sentence structure and on the number of elements found in a child's utterance (Owens, 2004). A naturalistic sample of the child's expressive output is taken from semi-structured and free play sessions (Law, 1992). All utterances are included in the analysis. They are transcribed and then transferred to a developmentally presented Profile Chart. In-depth analysis is accomplished by using the developmental stage portion of the chart (Owens, 2004) consisting of seven theoretical stages of syntax acquisition. This profile can be used for comparison with other children (Law, 1992). One of the drawbacks of the LARSP is that it neglects the dynamic interactive nature of communication which is inaccessible to the linguistic profile (Law, 1992). The LARSP is widely used in England, Canada, and Australia (Owens, 2004) as well as in South Africa. It is an integral part of assessment and therapy at The Centre for Language and Hearing Impaired Children and was the primary measure used to determine improvements in expressive syntax in this study.

#### **Validity and Reliability**

The child and family data was obtained from The Centre's mandatory Case History forms, which are handed out to each child on their acceptance to The Centre and are to be completed and returned to the school files. These forms are completed by a family member, usually the mother and/or father. The Case History form is self-report, and relies on the parents memory of their child's development and knowledge of family issues, thus accuracy of data may be unreliable. Missing data also negatively impacts sample size for each item that was left out. This reduction in sample size can reduce the sensitivity to differences that may exist.

Although the general components of therapy at The Centre were outlined at the beginning of this study, it was not possible to document the particular type of treatment approach that

was used with each child. Both therapy and assessments of the child's progress are performed by the speech and language therapist working with that child. Thus, the initial and final test measurements used in this study were obtained by ten speech and language therapists who were employed at The Centre. Each therapist worked with two to several of the children in this study. The number of therapists involved was a necessary part of the study and the quality of therapy delivered by any one therapist could indeed be an issue. However, due to the severity of the language impaired pre-school children, only qualified and experienced language therapists are employed to work at The Centre. Six of the therapists in this study had obtained a Masters degree in Speech Pathology through the University of the Witwatersrand, while two were in the process of completing it.

Although several therapists administered the tests, all tests used in this study are standardised, and can be administered and interpreted accurately by qualified speech and language therapists (Brownell, 2000; Carrow-Woolfolk, 1999). Standardised tests in clinical examination and in research have the advantage of being objective. The clear-cut directions for administration allow for replication of the test by different examiners with the same or different individuals. Standardised measures are useful in providing an objective way of determining when the level of performance of a child falls outside the range of normal variability for any age or stage of development (Carrow-Woolfolk, 1999). Standardised tests were used in this study to improve the reliability of the interpretation of findings.

An investigator can bias research results by not reporting the effects of therapy on all persons on whom it was tried (Silverman, 1993). Several children, who may have been eligible subjects for this study, were not included due to vast amounts of missing information on test results and non-administration of tests used in this study (refer to Table2). This study relies on data from assessment results reported by various therapists over several years. Missing information and administration of tests other than those used in this study, reduces sample size. This reduction in sample size can reduce the sensitivity to differences that may exist.

### **Ethical Considerations**

As The Centre is affiliated with the Department of Speech Pathology and Audiology at the University of the Witwatersrand, the parents or guardian of every child who attends The Centre for Language and Hearing Impaired Children signs a consent form allowing their child to be involved in student teaching. This also allows for details relating to each child to be made available to the students. Nevertheless, all parents were contacted telephonically to obtain permission to view the files and use the data in the study (Appendix 4). Confidentiality was assured and anonymity of both the child and the therapist who treated the child were maintained by assigning numbers to each individual. Written permission from the Head of Language at The Centre to conduct research and use the files for data collection was obtained during the submission of the research proposal to the Human Research Ethics Committee.

## **RESULTS AND DISCUSSION**

This section describes the data from the demographic information questionnaire as well as from the initial and final assessment results. The meaning of these findings are discussed and related to findings and comments from other research work.

### **1) Child and Family Data**

Child and family specific data was collected as previous research has found links between language impairment and various child and family variables (Bishop, 1997). This information was examined to determine relevant child and family variables, discussed in the literature review.

### **Pre-natal issues**

28% (n=14) of the mothers of these children had difficult pregnancies. These difficulties included one or a combination of the following: depression (29% ; n=4), premature labour (21% ; n=3), bleeding (14% ; n=2), marriage break-ups during pregnancy (14% ; n=2), pre-eclampsia (7% ; n=1), chronic pain (7% ; n=1), toxemia (7% ; n=1), gestational diabetes (7% ; n=1), lost twin in utero (7% ; n=1), alcohol abuse (7% ; n=1), placenta coming away (7% ; n=1) and hyperemesis gravidarum (7% ; n=1). 36% (n=5) of these mothers were on medication such as Prozac (n=3), chest medication (n=1) and insulin (n=1) during pregnancy.

It has been widely accepted that factors which operate during pregnancy can influence the developing infant's brain functions in the way the brain develops (Bishop, 1992), which could have negative implications on future functioning. Various studies over the years have implicated pre-natal complications in increased risk of speech and language impairments (Bishop, 1997). Lawrence Impey (2003) cited in Herbert (2005) studied 8580 women and concluded that most damage to an infant occurs during pregnancy. Maternal infections which have mild or no symptoms in the mother can be devastating to the fetus brain (Holm and Dinno, 2000). Factors such as viral infection, drugs in the maternal circulation, exposure to irradiation or toxic agents, and the health and nutritional status of the mother have all been implicated in affecting the processes of cell proliferation, differentiation and migration to the appropriate area in the infants brain (Bishop, 1992; Holm and Dinno, 2000). Factors in late pregnancy that might predispose the fetus to a compromised outcome include toxemia, pre-eclampsia, hemorrhage and premature birth (Holm and Dinno, 2000).

Harder to detect prenatal influences, such as the psychological state of the mother during pregnancy, have been implicated in having direct biological effects on infant development that are independent of genetic or parenting influences (Carter et al., 2001). For instance, studies have shown that stress hormones divert blood flow to the large muscles and therefore impede the flow of oxygen and nutrients to the fetus (Herbert, 2005). A longitudinal study by O'Connor, Heron and Glover (2002) cited in Herbert (2005), found a strong and significant association between extreme anxiety at 32 weeks gestation and behavioural/emotional problems in 10% of children at the age of 4 years. In a study by Bishop (1997), associations of specific language impairment with toxemia of pregnancy and hypertension were reported. The conclusion of several decades of research is that stressful periods of short duration (eg. an argument, a frightening experience or a fall) have few if any harmful consequences for the mother and her unborn child (Herbert, 2005). However, severe and prolonged emotional stress is associated with premature delivery, low birth weight, stunted prenatal growth and birth complications (Herbert, 2005).

With all this research positively implicating pre-natal influences in effecting brain development and later functioning of a child, it was surprising to find that in this study, although pre-natal complications did occur in 28% (n=14) of the mothers, 72% of the mothers did not have any pre-natal complications. Thus in this study, difficulties during pregnancy do not appear to be significant in the history of this language impaired population. A large scale study by Jacobsen and Kenney (1980) cited in Herbert (2005) found that more than 60% of all pregnancies experienced at least one complication, but that most of these complications caused no problems. They stated that it is possible that peri-natal complications compound whatever damage has already occurred prenatally (Herbert, 2005). Further analysis of the data indicated that 57% (n=8) who had pre-natal complications also had peri-natal complications. However, only 36% of the children with peri-natal complications also had pre-natal complications. Thus it appears that those who have difficulties during pregnancy are more likely to have peri-natal difficulties, however, peri-natal difficulties do not appear to be related to pre-natal complications.

### **Peri-natal issues**

44% (n=22) of the children experienced problems during and/or just after birth. 9% (n=2) of the births were premature, and 9% (n=2) were emergency Caesareans. 18% (n=4) were low birth weight, 18% (n=4) were breech position babies. 14% (n=3) of these children were

delivered using forceps or vacuum. 18% (n=4) were born with the cord around their necks and 18% (n=4) were reportedly blue at birth. However, only 1 child was reportedly born both with the cord around his neck and blue. 36% (n=8) required oxygen, 5% (n=1) required lung suctioning, 18% (n=4) were incubated and 18% (n=4) were in ICU. 55% (n=12) experienced difficulties ranging from bruising, a short cord, and floppiness to being semi-comatose at birth. Refer to Table 4 for a break down of these results.

Table 4: Break down of children with associated birth risk factors

Child with reported birth difficulty	Prem	Emer Caesar	LBW	Breech	Forceps Vacuum	Required Oxygen	Incubate	ICU	Lung suction	Blue	Cord round neck	Other	Total risk factors
1. C105	0	0	0	0	0	0	0	0	1	0	0	0	1
2. C205	0	0	0	0	1	1	1	0	0	0	0	1	4
3. C505	0	0	0	1	0	0	0	0	0	0	0	1	2
4. C605	1	0	1	0	0	1	0	1	0	0	0	1	5
5. C705	0	0	0	0	0	1	0	0	0	0	0	0	1
6. C104	0	1	1	0	0	0	0	0	0	0	0	0	2
7. C504	0	0	0	0	0	1	0	0	0	0	1	0	2
8. C704	0	0	0	0	1	0	0	0	0	0	0	0	1
9. C904	0	0	0	1	0	0	0	0	0	0	1	0	2
10. C1004	0	0	0	0	0	1	0	1	0	0	0	1	3
11. C103	0	0	0	0	0	0	0	0	0	1	1	1	3
12. C203	0	1	1	0	0	1	0	1	0	0	0	1	5
13. C503	0	0	0	0	0	1	0	1	0	1	0	1	4
14. C703	1	0	0	0	0	0	0	0	0	0	0	0	1
15. C1003	0	0	0	1	0	0	0	0	0	0	0	0	1
16. C1103	0	0	0	0	0	1	0	0	0	1	0	1	3
17. C1303	0	0	0	0	1	0	1	0	0	0	0	1	3
18. C1403	0	0	1	0	0	0	0	0	0	0	0	0	1
19. C101	0	0	0	1	0	0	1	0	0	0	0	1	3
20. C301	0	0	0	0	0	0	1	0	0	1	0	0	2
21. C401	0	0	0	0	0	0	0	0	0	0	0	1	1
22. C801	0	0	0	0	0	0	0	0	0	0	1	1	2
	2	2	4	4	3	8	4	4	1	4	4	12	52

Problems during labour and delivery in the normal population account for 20% to 40% of cerebral palsy and 10% of severe mental retardation (Sparks, 1984). The findings in this study of 44% (n=22), is a high incidence of birth difficulties in a single population. Although various retrospective studies have failed to find a strong link between children with speech and language disorders and peri-natal hazard (Bishop, 1997), this finding suggests that in this specific population, peri-natal hazards are significant factors in their case history. This finding supports numerous studies that have reported increased risk of speech and language impairments in such children (Bishop, 1997). These studies document poor neurological and cognitive outcomes of children who have suffered hazardous birth experiences such as extreme prematurity, fetal distress, abnormal presentation, anoxia and asphyxia (Bishop, 1992; Bishop, 1997; Holm and Dinno, 2000). When we consider ways in which normal brain function can be impaired, the obvious factors to consider are those which can lead to permanent destruction of neural tissue: infection, trauma or disruption to the oxygen supply (Billeaud, 2003; Bishop, 1992). If any of these factors occur at or after birth, they will result in permanent loss of brain cells as neurons cannot regenerate to repair brain damage after this time (Bishop, 1992). Birth factors such as anoxia, have been linked to potential language problems (Reed, 2005). The single highest risk factor in this study was 36% (n=8) of the children requiring oxygen at birth.

A premature infant is defined as "a child born at or before the 36<sup>th</sup> week of gestation, one month before the ideal estimated date of delivery" (Rossetti, 2000, pg. 15). Low birth weight (LBW) refers to a newborn who may have been born at term or have been premature, whose birth weight is below 2.5 kg's (Rossetti, 2000). Premature and LBW infants are subject to an

array of complications that contribute to the potential for later communication impairment and delay (Rossetti, 2000).

In this study, the average birth weight of all the children was 3.12 kg's, with a maximum of 4.1 kg's and a minimum weight of 800 g's. Only 2 children were born prematurely, of which one was also LBW. Three other children were also LBW, although not premature. Thus in a group of 50 children with speech and language impairments, only 4% (n=2) were premature and 8% (n=4) were LBW. It would seem that prematurity and LBW do not feature significantly in the medical history of this sample of children with language impairments. This finding is in contrast to the proposition that children are at increased risk status for communication delay that is associated with birth weight and gestational age (Rossetti, 2000). Rather, it supports Aram, Hack, Hawkins, Weissman and Borawski-Clark (1991) cited in Reed (2005) who found that children with very low birth weights were at no greater risk for later language problems unassociated with other developmental problems such as lowered cognitive level, neurological abnormalities and hearing impairment (Reed, 2005).

### **Position in the family**

42% (n=21) of the children were first born, 38% (n=19) were second born, 16% (n=8) were third born and 4% (n=2) were fourth born.

With regard to birth order, the literature states that the first born has more direct verbal input from parents while second born and later born children have to rely on their siblings for input (Law, 1993). This notion assumes that second and later born children have less verbal stimulation and are consequently more at risk for language difficulties. Although there are more children altogether who are second, third and fourth born (58%; n=29) than first born children (42%; n=21) who attended The Centre due to language difficulties, birth order in this population sample does not appear to be a significant factor in determining language impairment. In fact, the number of first born children who attended The Centre for language impairment is considerably higher than would be expected. Law (1992) suggests that in certain circumstances, first-born children have a more disruptive effect on a new parent, who may not feel confident in their handling of their first child (Law, 1992).

### **Feeding**

36% (n=18) of the children previously had, or were experiencing feeding difficulties when enrolling at The Centre. Of these children, 28% (n=5) had poor latching and 11% (n=2) had poor sucking abilities. 17% (n=3) were described as 'failure to thrive' babies, 11% (n=2) had reflux, 11% (n=2) had long, tiring and difficult feeds, and 6% (n=1) suffered from malnourishment. 44% (n=8) were reported as being fussy eaters, of which 63% (n=5) gagged or vomited while eating.

This high figure is not unexpected as feeding problems have been shown to be related to parent/child interaction and ultimately expressive language difficulties (Law, 1992). Lockwood (1994) has noted that deviations in sucking or feeding are a positive indicator for communication disorders if accompanied by a NICU stay or if these problems persist and are accompanied by a lag in early speech development (cited in Rossetti, 2000). In this study 44% (n=8) of the children's feeding difficulties persisted, while only one child had a feeding difficulty accompanied by an ICU stay. Thus the persistence of a feeding problem, specifically being a picky eater, was a positive indicator for communication difficulties compared to an ICU stay.

Signs of a feeding disorder include difficulty latching as a newborn; difficulty tolerating a change from breast to rubber/silicone teat; not having an established feeding routine; demonstrating distress around the process of feeding, often regurgitating and spitting out food; and being extremely fussy about textured food (De Gangi et al., 1996; Murray-Slutsky, and Paris, 2000). Some children may even respond to food with fear and hysteria. All these signs of feeding disorders were identified by these parents in the demographic questionnaire. Many of these difficulties stem from sensory difficulties, although some may be behavioural in nature (Murray-Slutsky and Paris, 2000).



## **Communicative developmental milestones**

### **Babbling**

Traditional milestones of pre-linguistic development focus on the various sounds produced by infants (McLaughlin, 1998). Marginal babbling occurs from 4 to 6 months and is described as the production of a variety of vowel-like sounds consisting of consonant-vowel and vowel-consonant syllables (McLaughlin, 1998). A greater variety of sounds and sound combinations occur over time as the infant "playfully" experiments with longer strings of syllables. This stage is traditionally called vocal play and occurs from 6 to 8 months of age. The next stage occurs from 8 to 12 months and is referred to as echolalia, where the child imitates the speech he hears. The final phase of the pre-linguistic stage is the jargon stage, consisting of strings of syllables produced with stress and intonation that mimic real speech (McLaughlin, 1998). These stages make up the pre-linguistic phase of development from 3 to 12 months of age.

As the parents were required to state when their child first started babbling, and no definition of the stages of babbling were given, all of the above stages of pre-linguistic development could be considered as possible answers. Therefore, babbling from 4 months up to 12 months will be considered within the expected milestone of communication development.

Only 16% (n=8) of the children started babbling between 3 to 6 months of age, and 28% (n=14) of the children started babbling between 7 to 12 months. Thus 44% (n=22) of the sample of children babbled within the expected milestone of language development. 18% (n=9) of the children experienced late or unusual pre-linguistic development: 4% (n=2) babbled very late at 18 months old, 10% (n=5) did not babble at all, 2% (n=1) reportedly squealed rather than babbled, and 2% (n=1) started babbling late at around 12 to 18 months and then stopped. Late and unusual babbling patterns were not an unexpected finding, as similar findings have been reported in the literature. For instance, Billeaud (2003) reports that children who do not exhibit variety in their babbling or whose babbling is discontinued after what seemed to be normal onset, are possibly at risk of a problem resulting in delayed or disordered expressive language and speech. According to Oller and Lynch (1992), one can find indicators of emerging speech and language disorders by examining the vocal sounds of infants. Other authors have suggested that the complexity of babbling in language impaired children is reduced (Reed, 2005). Thus late and unusual babbling patterns can be an indicator of impaired language development.

38% (n=19) of the parents did not complete this section of the questionnaire form, and thus it cannot be determined if these children were delayed or within the expected developmental milestone. This lack of information on babbling may be relevant in itself. Perhaps the parents were uncertain as to what was meant by babbling or had forgotten when their child started to babble and left the section blank. Both these reasons would indicate a general need for educating parents on pre-linguistic development and the importance and relevance of this developmental phase of communication.

### **First word**

"The first word might appear as early as 8 months or as late as 16 months without necessarily signaling a serious concern" (McLaughlin, 1998, pg. 233). First words were spoken within this age period (8 months - 16 months) for 40% (n=20) of the children. 38% (n=19) were delayed at 17 months to 24 months, while 12% (n=6) were severely delayed and said their first word after their 2<sup>nd</sup> birthday. Four children, who said their first word around their first birthday, did not produce any more words after this first word, and one of these children regressed to babbling. Thus 40% of the children were within normal limits, while 60% were delayed in production of their first word. This finding of delay in first word acquisition is noted in the literature where children with language impairment are frequently late in using their first words and slow in acquiring additional words (Leonard, 1998; Reed, 2005). The mean age of first word production in this study was 18.3 months (n=45). A larger retrospective study of 71 children with specific language impairment based on parental report by Trauner, Wulfek, Tallal and Hesselink (1995) found an average age of first words of

almost 23 months, compared to a reported age of 11 months for normally developing children (cited in Leonard, 1998).

10% (n=5) of the parents did not complete this section of the questionnaire form. This number of incomplete answers is considerably lower than the number of parents who did not complete the babbling section. This may be attributed to the importance society places on first word production compared to the importance placed on babbling.

Unusual patterns of development and behaviour occurred within this population in both babbling and production of the first word. 14% (n=7) of the children had unusual babbling behaviour including squealing, babbling and then stopping, and not babbling at all. 8% (n=4) of the children did not progress beyond an initial first word level, while one of them regressed to babbling. Thus, 22% (n=11) exhibited unusual patterns with regard to their early communication development. It appears then that signs of language problems are evident at least from the point when communication is expected to take a verbal form (Leonard, 1998).

#### First sentence

The ability to order words together appears to emerge gradually out of trial and error (McLaughlin, 1998). Children "normally begin to combine words into two-word utterances around 18 months of age," and by 24 months of age, two-word combinations will be prevalent in toddlers speech (McLaughlin, 1998, pg. 247). Sentence production was produced within this time period (18 months – 24 months) for 22% (n=11) of the children. 34% (n=17) were delayed in producing sentences (25 months – 36 months), 24% (n=12) were severely delayed in sentence production (37 months – 48 months), while 8% (n=4) were older than 4 years of age and had not yet said their first sentence. The mean age of sentence production in this study was 24.3 months.

In a study by Trauner, Wulfeck, Tallal and Hesselink (1995), the average age of first sentence production was almost 37 months for language impaired children and 17 months for normally developing children (Leonard, 1998). According to Lahey (1988), the most outstanding feature of language impaired children is late and slow development of form (morphology and syntax) with better development of content (Reed, 2005). Difficulties with language form is particularly problematic for children with language impairments (Reed, 2005), so it does not come as a surprise that 78% of this sample of language impaired children were delayed in putting their first sentence together.

The number of children who babbled within the expected milestone (n=22) approximates the number of children whose first word was also within the expected time frame (n=20). However, the number of children whose sentence production was within the expected milestone is half this number (n=11). Thus, half the children who were developing within the expected time frame were delayed with regard to sentence production.

#### Medical issues

Medical issues relate to health, a condition of physical, mental and social well-being (Anderson et al., 1998). A medical history would include illnesses, injuries, allergies and conditions requiring medical care, diagnosis, treatments and general health information.

80% (n=40) of the children were reported as having a medically related condition. Detailed analysis of the data revealed the following: 20% (n=10) had a congenital anomaly (such as a crack in the hard palate, soft palate cleft, bowel condition, cortical asymmetry, heart condition, squint, dysmorphic features), of which 8% (n=4) were diagnosed with an actual syndrome. 20% (n=10) suffered from allergies, 18% (n=9) suffered from asthma and 12% (n=6) suffered from recurring upper respiratory infections. 10% (n=5) had a severe fall on their head resulting in concussion or a cracked skull. 14% (n=7) reportedly had low muscle tone and 4% (n=2) drooled. 14% (n=7) suffered from seizures and 10% (n=5) had an abnormal EEG. 18% (n=9) were diagnosed with either Aspergers Syndrome or had Pervasive Developmental Disorder tendencies. 16% (n=8) suffered from sensory integration problems diagnosed by neuro-developmentally trained occupational therapists, 8% (n=4) had visual

difficulties requiring correction or glasses. 20% (n=10) had other medical problems including hernias, eczema, cyst on the brain, cerebellar atrophy, frequent headaches, frequent high temperatures, breath holding, encephalitis, severe facial burn, croup, and ingestion of rat poison. These results are presented in Figure 2.

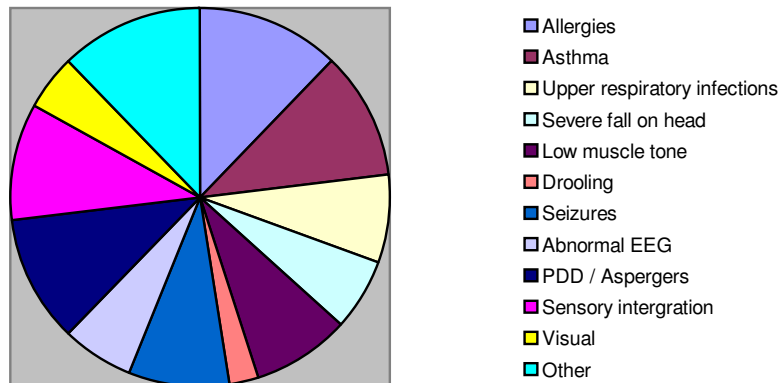


Figure 2: Percentage of children with reported medical conditions

Factors associated with the medical environment may contribute to language impairment if they are sufficiently severe to cause more general difficulties (Law, 1992). The results of this study are high, with 80% reporting a medically related difficulty. This result was higher than anticipated, however, not surprising as health risk factors associated with the medical environment have long been examined for their role in affecting communication outcomes (Ratokalau and Robb, 1993).

Epileptic seizures are evidence of cerebral dysfunction, originating from structural abnormalities of the brain (Lees and Urwin, 1994). A proportion of children with marked language impairment will have experienced epilepsy (Law, 1992; Lees and Urwin, 1994). For children with specific language difficulties, figures of 21% with definite seizures and a further 11% with a questionable history of seizures have been reported (Lees and Urwin, 1994). The figures were similar in this study with 14% (n=7) suffering from seizures and 10% (n=5) having an abnormal EEG.

Although genetic disorders are rare in the general population, collectively they make up a significant part of the population with developmental difficulties (Holm and Dinno, 2000). Language impaired children often present with comparatively subtle neuro-developmental problems (Law, 1992). These 'soft signs' are an indication of subtle neurological dysfunction (Reed, 2005). Studies of severe cases of children with language impairment usually find chromosomal abnormalities (Law, 1992). A study by Robinson in 1987 found that 3% to 5% of children in a school for the most severe cases of speech and language impairment had chromosomal abnormalities (Law, 1992). In this case, the percentage was slightly higher at 8%. Lockwood (1994) reports that birth defects including clefts, dysmorphic appearance and proven chromosomal syndromes are positive risk factors for communication delay (Rossetti, 2000).

### **Ear infections**

46% (n=23) of the children had one or more sets of grommets by the time they started at The Centre and 34% (n=17) were described by their parents as having moderate to severe middle ear infections. This is a high percentage of children with moderate to severe middle ear infections. Considering reports that there is a relationship between conductive hearing loss due to ear infection and language impairment (Law, 1992), however, it is not an unexpected finding. Surveys of middle ear pathology in children with learning disabilities

reported a 15.7% to 49% range (Long and Long, 1998). This figure correlates with the findings in this study.

The relationship and impact of otitis media on language impairment, however, remains disputed. In 1986, Bishop and Edmundson (cited in Leonard, 1998) found that children with specific language impairment were not more likely to suffer from otitis media than children without language problems. Population surveys have found that 30% to 40% of children suffer from three or more episodes of otitis media in the first few years of life (Bishop, 1992). Thus confirming Bishop and Edmundson's (1986) findings. Perhaps the effects of otitis media might vary depending on whether other risk factors for language impairment are present (Bishop, 1992). This notion was suggested by the finding of Bishop and Edmundson (1986) that in a language impaired sample, otitis media and perinatal hazard tended to co-occur, whereas they were independent in a control sample (Bishop, 1992). However, Haynes and Naidoo (1991) did not find any association between otitis media and perinatal risk factors in a sample of more severely language-impaired children (Bishop, 1992). In this study, 17 children were reported as having middle ear infections, and 17 children had peri-natal difficulties. Only 30% (n=5) had both ear infections and peri-natal difficulties, which is in line with Haynes and Naidoo's (1991) findings. Nevertheless, otitis media remains a prevailing feature in the language impaired population, but its impact on the impairment remains unclear.

### **Family issues**

70% (n=35) of the sample reported that someone in their family had similar speech related or medical difficulties. 40% (n=20) reported more than one relative with speech related and/or medical difficulties. The data was then divided according to relatives with pure speech, language and learning related difficulties and relatives with medical conditions. 46% (n=23) reported 33 family members had a speech, language, or learning disorder. In 1986, Bishop and Edmundson (cited in Spitz et al., 1997) examined the family history of 56 language impaired children and found 46% had at least one relative who reported having a speech, language or learning disorder. This figure correlates with the findings of this study. 32% (n=16) of the sample reported 36 relatives with a medical condition (such as AD/HD, epilepsy, schizophrenia, obsessive-compulsive disorder, Tourette syndrome, minimal brain dysfunction, alcoholism). 10% (n=5) of the relatives had both speech related and medical difficulties. Of the relatives with difficulties (n=64), 59% (n=38) were first degree relatives (eg. direct bloodline including grandfathers, grandmothers, mother, father and siblings), while 41% (n=26) were second degree relatives (eg. indirect bloodline including, uncles, aunts and cousins). Research indicates that genetic factors are likely to be directly responsible for language difficulties (Bartlett et al., 2002; Bishop, 1992; Spitz et al., 1997) and these results support the evidence for the strong familial association with language impairment.

A more detailed analysis of the related difficulties revealed the following: 28% (n=14) reported 18 relatives with delayed speech and language development, 14% (n=7) reported 8 relatives diagnosed as having AD/HD and 10% (n=5) reported having 7 relatives with learning difficulties. 16% (n=8) reported having a relative with some other related difficulty (eg. verbal apraxia, auditory perceptual problems, stuttering, dyslexia, semantic-pragmatic difficulties, family member at special needs school). 26% (n=13) reported 16 relatives suffering from clinical depression and 6% (n=3) reported mothers who suffered from post-natal depression.

Studies have consistently demonstrated that specific language impairment aggregates in families. It seems that individuals with language impairment may have some unique genetic component that influences language acquisition (Bartlett et al., 2002). However, some children's deficits are not the result of genetic factors (Leonard, 1998). Hayiou-Thomas, Bonamy and Plomin (2005) suggest that as families share environments as well as genes, it is very difficult to pull the two apart. Other authors propose that whether the child has problems in expressive language only or problems in both comprehension and expression might be related to whether the language impairment has a genetic basis (Leonard, 1998). Studies have found that receptive and expressive language impairment is related to a higher

rate of family members with a history of language problems, compared to those with expressive language impairment only (Leonard, 1998).

The findings for relatives suffering from depression (26%; n=13) and post-natal depression (6%; n=3) were surprisingly high, although it is interesting to note from the literature that depression in caregivers is considered a risk factor in language impairment (Bishop, 1997). Clinical depression is a prevalent disorder among women of childbearing age, affecting 10% of women between 25 and 44 years of age (Carter et al., 2001). In an unpublished study by Briggs-Gowan et al. (2000), nearly 16% of a sample of women with infants and toddlers, reported elevated depressive symptoms (Carter et al., 2001). Various studies have indicated that children of women with elevated depressive symptoms are at increased risk for difficulties in emotional regulation, less optimal interactions, insecure attachment, problem behaviours and delays in the acquisition of competencies (Carter, et al., 2001; Herbert, 2005). Studies of early problem behaviours suggest concurrent association with maternal depression and maternal reports of difficult infant-toddler behaviour (Carter et al., 2001).

### **Behavioural and emotional issues**

#### 1) Behaviour at previous school

47 of the 50 children attended a nursery school, crèche or play school before enrolling at The Centre. 43% (n=20) reportedly had problems in addition to their poor speech and language development. 65% (n=13) were reported to have poor social abilities, 10% (n=2) had behaviour problems, 10% (n=2) had poor independence, 10% (n=2) had separation anxiety, 10% (n=2) were intimidated by large groups, 5% (n=1) had severe tantrums at school, while 40% (n=8) had various other problems including poor concentration and attention, inconsistency of behaviour, wandering and being excessively needy of the teachers attention.

#### 2) Behaviour at home

80% (n=40) of the children reportedly had behavioural problems considered by the parents as more severe than normal. Problem behaviours included: severe temper tantrums (60% ; n=24), aggressive behaviour (35% ; n=14), destructive behaviour (15% ; n=6), excessive whining (30% ; n=12), screaming (25% ; n=10), separation anxiety (25% ; n=10), sleeplessness (23% ; n=9), sibling jealousy (20% ; n=8), excessive crying (18% ; n=7), head banging (18% ; n=7), excessive shyness (15% ; n=6), obsessive behaviour (10% ; n=4); thumb or dummy sucking after the age of 3 years (10% ; n=4), touching self in genital area (8% ; n=3), and other behavioural problems (23% ; n=9) such as inappropriate soiling and wetting, nagging, being oppositional, being uninhibited, hair plucking, very strong willed and requiring immediate attention or gratification. These behavioural problems are presented in Figure 3.

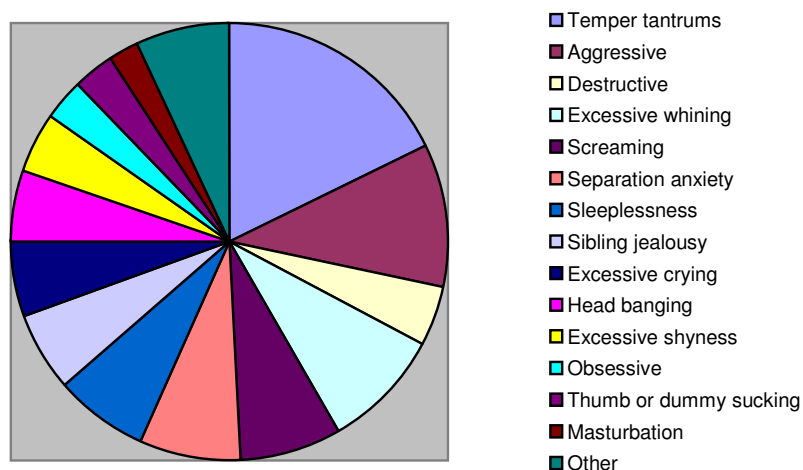


Figure 3: Percentage of children with reported behavioural problems

As early as 2 years of age, children with language impairments may show problems in the psychosocial domain (Reed, 2005). Approximately 10% to 15% of pre-school children have mild to moderate behavioural and emotional problems (Thomas and Guskin, 2001). This number is increased to approximately 50% to 70% when these children are language impaired (Law, 2002; Prizant, 1999). The percentage obtained in this study is higher, at 80%. This is more in line with a study by Baker and Cantwell (1982), who found that of 300 successive intakes of children to a community-based speech and language clinic, 95% of the children with expressive language problems had some form of psychosocial difficulty (cited in Reed, 2005). Prevalence rates in other studies have also varied depending on the placement of children sampled, the stringency of the criteria for determining language deficit, and the number of language measures used (Benner, Nelson and Epstein, 2002).

There have been numerous studies on behavioural factors and language disorders over the past decade and it is now acknowledged that for many children emotional and / or behavioural disorders occur along with communication disorders (Prizant, 1999). Various epidemiological and clinical studies have reported a strong co-occurrence of language problems and poor adaptations and psychopathology (Toppelberg et al., 2002). Studies have shown that language disorders predict greater severity and prevalence of attention-deficit/hyperactivity disorder and externalizing disorders (aggression), and internalizing disorders (depression and anxiety) (Toppelberg et al., 2002). Thus the main factors that are affected seem to be in the domains of anxiety, social relationships and attention-deficit problems (Rutter et al., 1992). Children with receptive language deficits have higher rates of behaviour problems than children with specific expressive language deficits (Benner, Nelson and Epstein, 2002). Also, it has been found that receptive delays are the strongest psychopathology predictors, particularly of aggressive, hyperactive and antisocial outcomes (Toppelberg et al., 2002). Despite the advances made in recent research, it remains difficult to determine which difficulty is the cause and which the consequence. Perhaps language difficulties result in emotional and behavioural disorders, or perhaps they are the result of an emotional or behavioural disorder (Donahue, Hartas and Cole, 1999). Nevertheless, it is now commonly accepted that the presence of an emotional and / or behavioural disorder is a concomitant problem for many children with language impairment (Prizant, 1999).

26% (n=13) of the children received play therapy to address emotional and/or behavioural issues during their attendance at The Centre. This figure is not as high as that of various studies which have found that the prevalence of language disorders among children referred for psychiatric services is very high, ranging between 30% and 75% (Toppelberg et al., 2002). This discrepancy may be a result of the fact that this figure (26%) is the number of children who actually received intervention and may not be a reflection on how many were referred for intervention but did not receive it. The number of referrals for intervention was not accessible in this study.

Longitudinal studies show that many early childhood behavioural and emotional difficulties persist into later childhood and adolescence. In fact, there is a 50% chance of these children having behavioural issues into early adolescence (Thomas and Guskin, 2001). Longitudinal studies report that not only do these problems persist, they actually increase as the children mature (Benner, Nelson and Epstein, 2002). Since language is a major tool for emotional, behavioural and cognitive self-regulation and for social communication (Toppelberg et al., 2002), early detection and intervention is critical in the long-term emotional health of these children (Rossetti, 2000).

### **Medication**

While they were at The Centre, medication was recommended and administered to 52% (n=26) of the children. 4% (n=2) were recommended medication (Ritalin), but the parents did not follow through with the recommendation. Of the children who were administered medication, 73% (n=19) took Ritalin for poor attention and concentration, 23% (n=6) were put on Tofranil for anxiety, 8% (n=2) required Epilum for seizures, and 38% (n=10) were given some other type of medication, such as, topomax, lymictin, cypromil, emdalin, risperdal, triptonil. 38% (n=10) were on a combination of medication for their difficulties.

Research estimates of the prevalence of drug therapy for children receiving special education, ranges from 7% to 33% (Tankersley and Balan, 1999). The figure in this study is much higher at 52% (n=26). Regardless of the actual prevalence, Tankersley and Balan (1999) state that it is clear that many children receive medication. Generalized anxiety disorder is among the most prevalent forms of psychopathology during childhood (Herbert, 2005). In childhood, 2% to 10% of children under 12 years of age experience a clinical anxiety condition (Herbert, 2005). There may be an increased incidence of an anxiety disorder or AD/HD in the children of adults with Major Depressive Disorder (DSM-IV, 2000). Considering the high percentage (26%; n=13) of children with familial depression (previously discussed under "family issues"), the prescriptions of Ritalin for AD/HD behaviour and Tofranil for anxiety are not surprising. Many researchers and therapists believe that a combination of cognitive-behaviour therapy and medication is the initial treatment of choice for most children diagnosed with anxiety disorders (Herbert, 2005). When AD/HD is diagnosed, the most common medication prescribed is Ritalin (generic name Methylphenidate) (Herbert, 2005). Tofranil (generic name Imipramine) is a slow-acting tricyclic antidepressant. It has been found to decrease parent and teacher ratings of inattention, hyperactivity and aggression in up to 70% of AD/HD children and is therefore a viable alternative to Ritalin (Dupaul and Barkley, 1990). Epilum is an anti-epileptic drug commonly prescribed for children to help prevent the onset of further seizures (Herbert, 2005). It works by restoring the normal electrical activity of the brain, and an estimated 70% of children experience symptom relief while on medication (Herbert, 2005).

### **Play**

34% (n=17) of the children reportedly had difficulties with play. 59% (n=10) had poor socialising with their peers, 41% (n=7) had non-imaginative play, 18% (n=3) were reportedly very wild and clumsy in their play, while 18% (n=3) were overly careful. 35% (n=6) exhibited other play difficulties such as repetitive play, obsessing over toys and being unaware of danger during physical play.

Language skills are closely related to play (Law, 1992; Patterson and Westby, 1998), and may even come from the same symbolic basis, thus the high number of children with reported difficulties in play in this study was not unexpected. Children with poor language development often have difficulty playing, particularly with pretend and symbolic play (Patterson and Westby, 1998). Thus the high percentage of children with non-imaginative play (41%; n=7) was anticipated. According to Lees and Urwin (1994), language impaired children often confine themselves to playing with the familiar and may perform the same stereotyped action repeatedly due to an inability to develop a sequence of actions. This behaviour is also evident in the findings of this study. The child's style of play may be affected and the child may be timid, inhibited, rigid, stereotyped, and repetitive in their behaviour.

### **Fine and gross motor factors**

24% (n=12) of the children reportedly had delayed motor milestones. 100% (n=12) of these children attended occupational therapy, while 83% (n=10) of them attended physiotherapy. Looking at the 50 children in the sample, 58% (n=29) of them received physiotherapy at some time before or during their attendance at The Centre. The average length of physiotherapy was 1.4 years, with a minimum of 1 year and a maximum of 7 years. 86% (n=43) of the children received occupational therapy at some time before or during their attendance at The Centre. The average length of occupational therapy was 2.3 years, with a minimum of 6 months and a maximum of 5 years. Of the 7 children who did not require occupational therapy, 5 of them also did not require physiotherapy.

Language impaired children rarely present without additional difficulties which means that a wide range of professionals is usually involved in their care (Bishop, 1999; Lees and Urwin, 1994). It seems that there are a variety of tasks which are not essentially linguistic but which language impaired children find difficult (Law, 1992). The professionals involved in gross and fine motor development of these children are the Physiotherapist and the Occupational

Therapist. Motor development arises from biological maturation of the nervous and skeletal muscle systems (McLaughlin, 1998). Studies have found that children with language impairment are more likely to exhibit clumsiness and slow motor performance with both hands (Law, 1992; Leonard, 1998). A child whose language is impaired is therefore inclined to have associated motor difficulties. Thus the high number of children attending physiotherapy and occupational therapy at The Centre was expected.

This study had a large number of children requiring physiotherapy and occupational therapy, reinforcing the concept of related difficulties. Leonard (1998) states that if below-age level standard scores on language measures do not change with increasing age, non-verbal IQ may show a decline. This reflects the negative effect that poor language can have on other cognitive processes. If standard scores on language measures improve, the decline in non-verbal IQ will not be seen (Leonard, 1998). Although more data is needed to validate this argument, it goes towards showing the impact that language impairment has on related non-linguistic domains.

### **Parental education level**

The minimum education level for both parents was Grade 12 (matriculation). 62% (n=31) of the mothers had higher education levels [20% ; n=10 had diplomas; 36% ; n=18 had a degree and 6% ; n=3 had post-graduate qualifications]. 66% (n=33) of the fathers had higher education levels [6% ; n=3 had diplomas; 48% ; n=24 had a degree and 14% ; n=7 had post-graduate qualifications].

There is a high level of parental education within this specific parental population. This is in contrast to the abundance of literature which predicts a low level of parental education as a risk factor of language disorders (Law, 1992; Reed, 2005; Rossetti, 2000). According to Leonard (1998), it is not difficult to find children with specific language impairment (SLI) whose parents are articulate and well-educated. A high level of education presumably means higher income levels. Thus, this finding may be explained by the need for a higher income bracket to cover the expensive private school fees and therapy fees, which go with attending this type of school. Much research has focused on parents in the low socio-economic bracket. This finding in this study serves to highlight the need for services with children and parents in the middle to high level of education and income bracket.

### **Referrals**

Once the children are ready to leave The Centre, they are referred to various schools in and around Gauteng according to the team's joint decision on their future educational requirements. Of the children taking part in this study, 14% (n=7) were referred to special education, 66% (n=33) were referred to remedial education while 20% (n=10) were referred to mainstream schools. Thus 1 in 4 children with language impairment who attended The Centre were ready for regular school placement.

Despite treatment, many children do not seem to reach a level of language ability that can be regarded as socially or educationally adequate (Leonard, 1998). Even when an acceleration is observed, the gains often fall short of levels assumed for normal functioning (Leonard, 1998). Padget (1988) found that 1 in 4 children with specific language impairment who received treatment in pre-school were ready for regular school placement (cited in Leonard, 1998). Although the children in this study are not purely children with SLI, the data correlates with Padget's (1988) data.



## 2) Test Results Data

This section describes the language results of the initial and final assessments. The initial assessment took place when the child first started at The Centre, before intensive therapy began, and the final assessments were performed half way through the year that the child left the school. A paired comparison t-test with a 95% (alpha = 0.05) level of confidence was used to determine whether the difference between the initial and final assessments was statistically significant.

It is important to document the therapeutic outcomes of children with language impairment to ensure that we provide them with optimal intervention, as well as to develop some predictive powers (Bishop, 1999). Developmental arrest, deterioration and plateau's are common features in the early lives of many language impaired children (Lees and Urwin, 1994). A child's progress over time can provide important information about the child in relation to his/her peer group, which is important when considering educational placement after pre-school (Lees and Urwin, 1994).

According to Rossetti (2000, pg. 34), "regardless of which population of established-risk or at-risk infants are followed, how long each is followed, which developmental domains are monitored, which assessment tools are utilized, and what biological risk factors are present, approximately 40% to 65% will display some form of developmental delay (not readily identified by standard IQ measures) into the school years." Accordingly, intervention programs for pre-school children should have a component that permits the tracking of those children who appeared to overcome their language difficulties (Leonard, 1998). This study looks at the progress that these language impaired children made while attending The Centre, and will provide data to begin tracking the academic outcomes of these children.

### a) **Receptive Vocabulary**

The receptive vocabulary of 72% (n=36) of the children was tested using the TACL-3 vocabulary subtest. 56% (n=20) of the children initially scored average or above average in this area while 44% (n=16) initially scored below average in this area. At their final assessment, 50% (n=18) of the children were average or above average in this area, while 50% (n=18) scored below average ability in understanding of vocabulary. Of the 56% (n=20) who were initially average or above average, 55% (n=11) remained average and above average, while the other 45% (n=9) deteriorated to below average scores. Of the 44% (n=16) children who were initially below average, 44% (n=7) improved to average and above average scores, while 56% (n=9) remained below average ability. Thus, some children who were initially above average, deteriorated in this area, while other children improved from below average to average and above. These results are presented in Figure 4. Of these 9 children whose scores remained below average, 5 improved within the below average scores, 2 remained the same and 2 got worse.

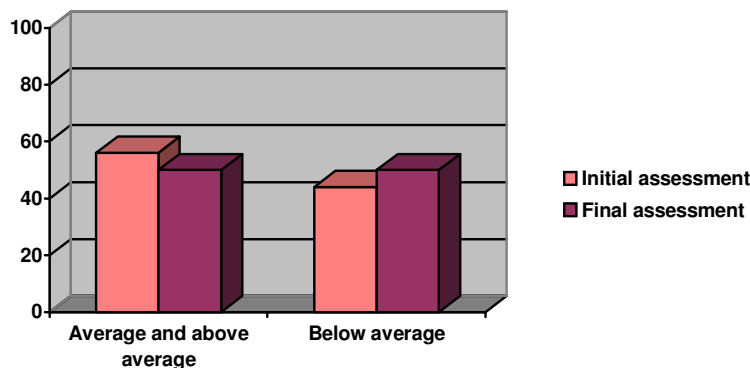


Figure 4: Percentage of children who scored average and above average or below average in receptive vocabulary at their initial and final assessments

The paired comparisons t-value was calculated to be 1.20, whereas the critical t-value is 2.025 for 37 degrees of freedom. The improvement in receptive vocabulary was therefore not statistically significant at the 5% level of significance. This drop in the standard scores of receptive vocabulary is an unexpected finding. However, a similar result was obtained from a study by Haynes and Naidoo (1991), when they examined the language test scores of children who were enrolled in a special school for children with specific language impairment (cited in Leonard, 1998). These children varied in the length of time they attended the school, the average being approximately 3 years between initial and final assessments. Results indicated that standard scores on vocabulary comprehension measures dropped from a mean of 86 at entry level to a mean of 80 at departure (Leonard, 1998).

It has been suggested that delays in expressive vocabulary acquisition may appear to resolve during the later pre-school years, and since receptive vocabulary is usually better than expressive vocabulary (Reed, 2005), it would seem reasonable that receptive vocabulary should also resolve towards the end of pre-school. However, this did not hold true in this study. Reed (2005) states that for some children, the semantic difficulties lie in the classes of words they acquire. Language impaired children may have trouble learning words which are abstract or figurative in nature (Reed, 2005). These children may appear to catch up in vocabulary size, but continue to have difficulty with abstract and figurative vocabulary. Thus words that are abstract and figurative in nature should become a focus of therapy. Assessment of this difficulty will depend on the depth of the measure. This may go towards explaining the poor performance results in this study, as the TACL-3 receptive vocabulary test includes several abstract and figurative words.

#### **b) Receptive Grammatical Morphology**

The receptive grammar of 78% (n=39) of the children was initially tested using the TACL-3 Grammatical Morphemes subtest. Initially, 41% (n=16) of the children scored average or above in this area, while 59% (n=23) scored below average in this area. 100% (n=16) of the children who were initially average or above, were also average and above average at their final assessment. Of the 59% (n=23) who were initially below average, 52% (n=12) improved to average and above average scores, while 48% (n=11) remained below average ability. Of the 28% (n=11) whose scores remained below average, 36% (n=4) improved within the below average scores, 45% (n=5) remained the same and 18% (n=2) got worse. Thus, in all, 72% (n=28) of the children scored average or above average by their last assessment at The Centre, while 28% (n=11) remained below average ability in this area. These results are presented in Figure 5.

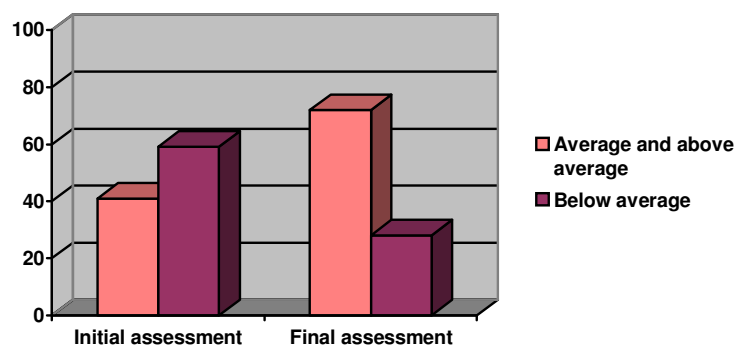


Figure 5: Percentage of children who scored average and above average or below average in receptive grammar at their initial and final assessments.

The paired comparisons t-value was calculated to be 5.080, whereas the critical t-value is 2.021 for 40 degrees of freedom. The improvement in receptive grammatical morphology was therefore found to be statistically significant at the 5% level of significance. It has been suggested that morphology is especially problematic for children with language impairment (Reed, 2005), however, these findings suggest statistically significant improvement over time

in understanding of grammatical morphemes. This is in contrast to Haynes and Naidoo's (1991) findings on grammatical comprehension (cited in Leonard, 1998). They found only a slight increase from 1 standard deviation below the mean to just under the mean (Leonard, 1998). The principal approach followed at The Centre is the developmental Language Assessment and Remediation profile suggested by Crystal (1982). Thus therapy specifically targets receptive grammatical morphemes, and this may be the reason that significant improvement occurs in this language area.

### c) Receptive Syntax

The receptive syntax of 78% (n=39) of the children was initially tested using the TACL-3 Elaborated Sentences and Phrases subtest. Initially, 38% (n=15) of the children scored average or above in this area, while 62% (n=24) children scored below average in this area. 93% (n=14) of the 15 children who were initially average or above, remained average and above average. 7% (n=1) fell to just below average by the final assessment. 50% (n=12) of the 24 children who were initially below average improved to average and above average scores, while 50% (n=12) remained below average ability. Of the 50% (n=12) whose scores remained below average, 67% (n=8) improved within the below average scores, 8% (n=1) remained the same and 25% (n=3) got worse. In all, 67% (n=26) of the children scored average or above average at their final assessment at The Centre, while 33% (n=13) of the children were below average in this area. These results are presented in Figure 6.

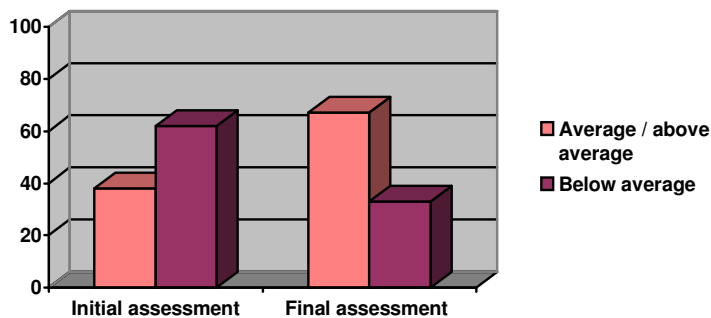


Figure 6: Percentage of children who scored average and above average or below average in receptive syntax at their initial and final assessments.

The paired comparisons t-value was calculated to be 5.70, whereas the critical t-value is 2.021 for 40 degrees of freedom. The improvement in receptive syntax was therefore found to be statistically significant at the 5% level of significance. This was a marked improvement in understanding of syntax. As therapy at The Centre specifically targets receptive syntax, this result was not surprising. According to Law (2005), there is little evidence available concerning the effectiveness of intervention for children with receptive language difficulties. The statistically significant improvement made by the language impaired children in this study, provides evidence that intervention for children with receptive language difficulties was effective.

### d) Expressive Vocabulary

Expressive vocabulary was assessed using two different tests: Expressive One Word Picture Vocabulary Test and Renfrew Word Finding Vocabulary Test.

#### Expressive One Word Picture Vocabulary Test

This test uses standard scores which was the measure used in this study. A standard score indicates the extent to which an individual's performance deviates from the average performance of those at the same age level (Brownell, 2000). Standard scores represent equal units of measurement and are comparable to standard scores from other tests, provided that the mean and standard deviation are the same and that the norm groups are similar (Brownell, 2000). When comparing scores of individuals or comparing performance across tests, standard scores are the preferred index of performance (Brownell, 2000).

#### Renfrew Word Finding Vocabulary Test

In this test, raw scores can be converted to age equivalents and middle 50% of range of scores (Renfrew, 1995). Age equivalent scores should not be used to measure change as all items are not equal. A child whose score has changed little may have made more progress than another child whose score has changed more (Owens, 2004). Thus, the measure of middle 50% of range of scores was deemed more appropriate for this study.

As the results of these two tests could not be combined for analysis, each test was analysed separately using the different scoring systems.

#### Expressive One Word Picture Vocabulary Test

The expressive vocabulary of 30% (n=15) of the children was tested using the Expressive One Word Picture Vocabulary Test. Results were computed into standard scores from 1 to 20, 10 being average. 33% (n=5) of the children were assessed using this test during their initial and final assessments, while 66% (n=10) of the children were assessed using this test during their intermediate and final assessments. The results are divided accordingly as follows:

##### 1) Initial and final test results:

100% (n=5) of the initial test results were below average in this area. At their final assessments, 40% (n=2) of the children had improved slightly but remained below average in this area. The other 60% (n=3) of the children improved steadily to average and above average by their final assessments. These results are presented in Figure 7.

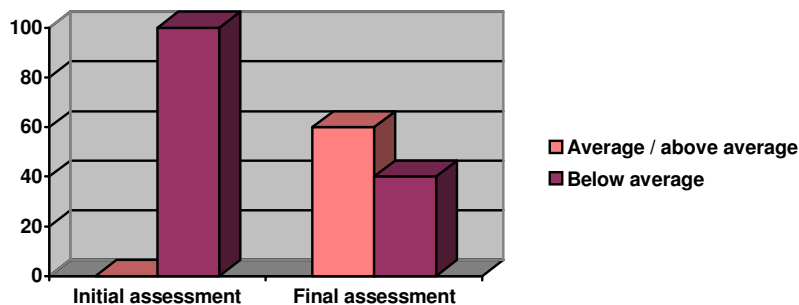


Figure 7: Percentage of children who scored average and above average or below average in expressive vocabulary at their initial and final assessments on the Expressive One Word Picture Vocabulary Test

The paired comparisons t-value was calculated to be 2.75, whereas the critical t-value is 2.45 for 6 degrees of freedom. The improvement in expressive vocabulary in this instance was therefore found to be statistically significant at the 5% level of significance. This finding was not surprising as Law (2005) found that speech and language therapy may be effective for children with expressive vocabulary difficulties.

##### 2) Intermediate and final test results:

50% (n=5) of the children scored average or above average in this area and remained average or above average when they were tested at their final assessment. The other 50% (n=5) of the children scored below average in this area. Only 20% (n=1) improved to an average / above average score in their final assessment. The other 80% (n=4) of the children remained the same or improved slightly, but remained below average. These results are presented in Figure 8.

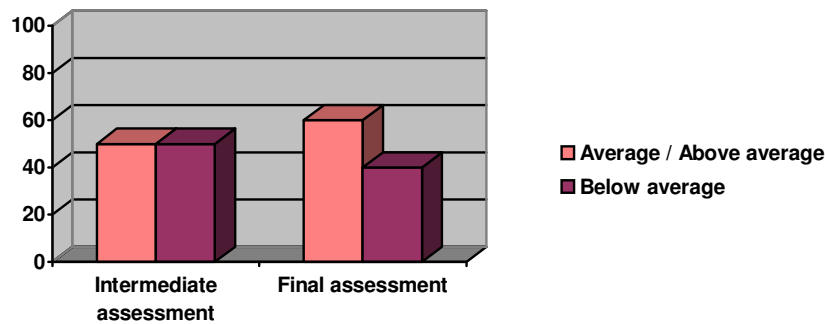


Figure 8: Percentage of children who scored average and above average or below average in expressive vocabulary at their intermediate and final assessments on the Expressive One Word Picture Vocabulary Test

The paired comparisons t-value was calculated to be 1.91, whereas the critical t-value is 2.20 for 11 degrees of freedom. The improvement in expressive vocabulary in this instance was therefore not statistically significant at the 5% level of significance. It appears that more improvement occurred between the initial and final assessment results than the intermediate and final assessment results. Thus it appears that most improvement occurs initially and may plateau over time. It has been suggested that delays in expressive vocabulary acquisition may appear to resolve during the later pre-school years (Reed, 2005). However, in this study, there was not as much improvement in expressive vocabulary as was anticipated. This is in keeping with the receptive vocabulary test results which also showed relatively little overall improvement. Children tend to acquire words in a certain pattern; initially nouns, verbs, and attributes are learnt, later they acquire words that express temporal, spatial, conditional and causal relationships (Reed, 2005). It may be that both these receptive and expressive vocabulary results are negatively affected by difficulty with concepts and abstract vocabulary which are acquired later than nouns, verbs and attributes. These results indicate that concepts and abstract vocabulary should be a focus in language intervention programmes and should be taught directly to language impaired children.

#### Renfrew Word Finding Vocabulary Test

The expressive vocabulary of 32% (n=16) of the children was tested using the Renfrew Word Finding Vocabulary Test. Results were analysed according to whether the scores fell into the middle 50% of range of scores, or whether the scores were above or below this range. All of the children (n=16) were assessed using this test during their initial and final assessments. The results are as follows:

#### Initial and final test results:

63% (n=10) of the initial test results were within the middle 50% range, while 38% (n=6) of the children scored below this range. Of the 63% (n=10) of the children who initially scored within the middle 50% range, 50% (n=5) improved to above their range, while the other 50% (n=5) remained within their range. Of the 38% (n=6) who scored below the range, 67% (n=4) improved to within the middle 50% range, while 33% (n=2) remained below their range. These results are presented in Figure 9.

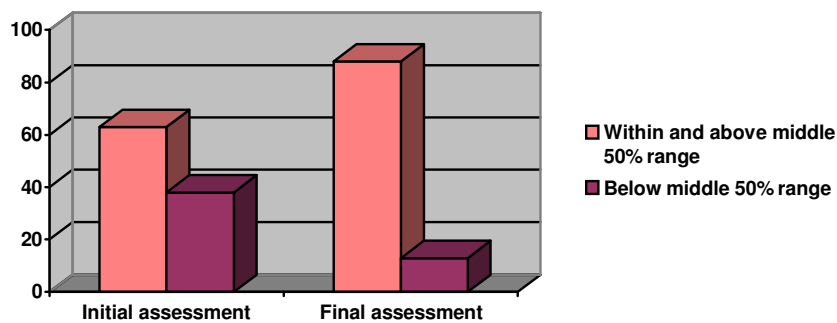


Figure 9: Percentage of children who scored average and above average or below average in expressive vocabulary at their initial and final assessments.

The paired comparisons t-value was calculated to be 4 whereas the critical t-value is 2.12 for 16 degrees of freedom. The improvement in expressive vocabulary in this instance was therefore statistically significant at the 5% level of significance.

These results from the Renfrew Word Finding Vocabulary Test are more in keeping with the suggestions that expressive vocabulary delays resolve during the later pre-school years. However, a quantitative analysis of this test suggests that the words assessed in this particular test are concrete in nature, while language impaired children tend to have difficulty with abstract meanings (Reed, 2005). Thus, these results indicate only that concrete vocabulary size has improved. Abstract meaning has not been assessed in this test, which, if it had, may have negatively affected the results, as it did in the Expressive One Word Picture Vocabulary Test. One can conclude from these results that both vocabulary assessment and intervention needs to include abstract vocabulary words.

#### e) Expressive Syntax

The expressive syntax of all 50 children was initially assessed using the Language Assessment, Remediation and Screening Procedure (LARSP). All of the children (100%; n=50) were delayed in their expressive syntax when they first started at The Centre. At their initial assessment 6% (n=3) of the children had a 1 stage deficit, 22% (n=11) had a 2 stage deficit, 38% (n=19) of the children had a 3 stage deficit, while 22% (n=11) had a 4 stage deficit and 12% (n=6) had a 5 stage deficit. By the time the children left The Centre, 32% (n=16) of the children were at the highest stage of development on the LARSP, and therefore, according to this measure, no longer had an expressive syntax problem. 12% (n=6) had a 1 stage deficit, 40% (n=20) had a 2 stage deficit, 12% (n=6) had a 3 stage deficit, and 4% (n=2) had a 4 stage deficit. These results are presented in Figure 10.

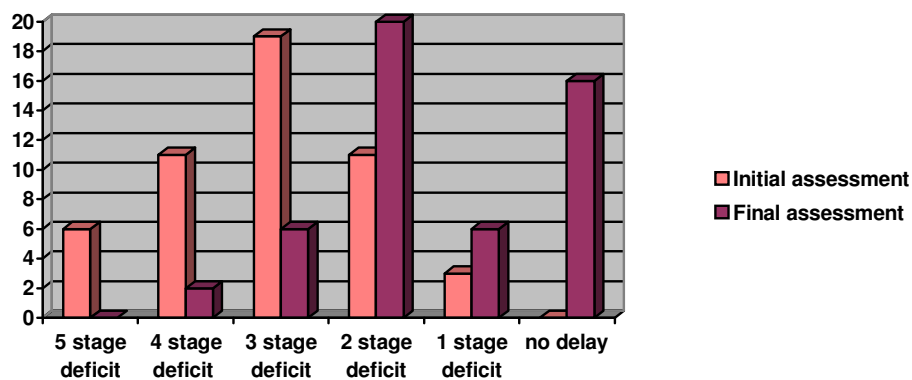


Figure 10: Number of children at the initial and final assessments showing the various stage of deficit of expressive syntax.

The paired comparisons t-value was calculated to be 13.59, whereas the critical t-value is 2.01 for 51 degrees of freedom. The improvement in expressive syntax was therefore found to be statistically significant at the 5% level of significance. Although there have been mixed reports regarding the effectiveness of language intervention for expressive syntax (Law, 2004), this result was not unexpected as therapy at The Centre specifically targets expressive syntax abilities. These significant findings support the notion that structured intensive therapy for expressive syntax was effective.

Although the children made significant progress and moved through the stages of the LARSP as seen above, it is important to determine the type of change that occurred over time. If the deficit gap was reduced, known as "catch-up growth," this would indicate faster than normal mastery of skill (Rossetti, 2000). However, if the degree of delay remains the same, known as "normal-abnormal development," then the child progressed as a result of intervention, but the rate of progress did not exceed developmentally appropriate transformation (Rossetti, 2000). 24% (n=12) of the children's deficit gap remained the same, therefore intervention did not close the deficit gap for these children. The other 76% (n=38) of the children exhibited catch-up growth. The deficit gap was closed by the following amount: 32% (n=16) of the children closed the gap by 1 stage, 20% (n=10) of the children closed the gap by 2 stages, 14% (n=7) of the children closed the gap by 3 stages, 4% (n=2) closed the gap by 4 stages, and 6% (n=3) of the children closed the gap by 5 stages. These results are presented in Figure 11. These are marked improvements in expressive syntax ability, and may reflect one or all of the following: efficacy of intervention that specifically targets expressive syntax, degree of caregiver involvement, health of the child, and the elimination of factors that tend to impede growth and development (Rossetti, 2000).

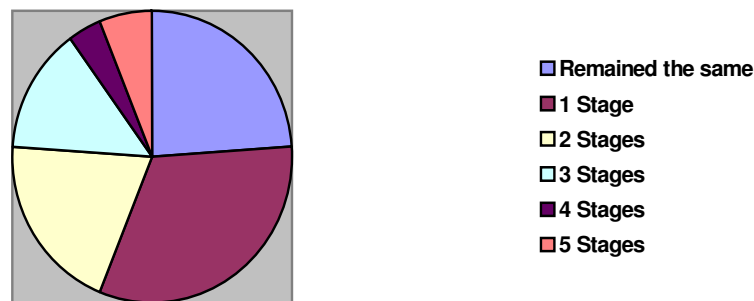


Figure 11: Number of stages of catch-up growth exhibited by the children during their attendance at The Centre

### **3) Type and Severity of the Language Impairment**

Children with language impairment are a heterogeneous group, not merely because of their varying demographic details, but also because of their variation in language performance (Reed, 2005). For instance, some children have difficulty with both receptive and expressive language, some children may have difficulty with expressive language but have relatively unimpaired receptive language, while still others have receptive problems in the absence of expressive language difficulties (Reed, 2005). These receptive and expressive language difficulties may also differ in their severity. This section describes these different language performances according to the type and severity of the language impairment.

The literature states that the profile of a child's language impairment may change over time, with or without intervention (Owens, 2004; Reed, 2005; Rossetti, 2000). Thus each child's profile was determined using initial assessment results, before intensive intervention at The Centre took place. Syntax was used as the measure of choice to profile the children because, out of all the areas included in this study, it was the principal area of difficulty for all of the

children in this sample. Of the 50 children, 100% (n=50) were profiled on the LARSP and therefore had initial expressive syntax scores. However, only 80% (n=40) had initial receptive syntax scores from the Elaborated Phrases and Sentences subtest of the TACL-3. The other 10 children were assessed using a different test, and as the scoring systems differed, they were not included in determining type and severity of impairment and were not included in the subgroups.

### **Severity of the Language Impairment**

#### Expressive language

Three levels of severity for expressive language were established: a) mild expressive language impairment; b) moderate expressive language impairment; and c) severe expressive language impairment. The children (n=40) were placed into a severity group depending on their expressive syntax abilities determined at their initial assessment on the LARSP. The children who had a 1 stage deficit on the LARSP were placed into the mild expressive language impaired group. The children who had a 2 or 3 stage deficit on the LARSP were placed into the moderate expressive language impaired group. And the children who had a 4 or 5 stage deficit on the LARSP were placed in the severe expressive language impaired group. Only 3% (n=1) had a mild expressive language impairment, while 65% (n=26) had a moderate expressive language impairment and 33% (n=13) had a severe expressive language impairment. This information is presented in Table 5. The high severity level of expressive language impairment was expected as The Centre specifically caters for children with language impairments requiring intensive intervention.

Table 5: Number of children according to the severity of their expressive syntax impairment

<b>Severity of expressive language impairment</b>	<b>Number of stage deficit (n=5)</b>	<b>Number of children (n=40)</b>
Mild expressive language impairment	1	1
Moderate expressive language impairment	2 and 3	26
Severe expressive language impairment	4 and 5	13

#### Receptive language

Three levels of severity for receptive language ability were established: a) average or above average receptive language; and b) below average receptive language; and c) could not be scored receptive language. The children (n=40) were placed into a severity group depending on their receptive syntax abilities determined at their initial assessment on the Elaborated Phrases and Sentences subtest of the TACL-3. 38% (n=15) had an average or above average receptive language impairment, while 33% (n=13) were below average ability in receptive language impairment and 30% (n=12) of the children fared so poorly that their receptive language could not be scored. This information is presented in Table 6.

Table 6: Number of children according to the severity of their receptive syntax impairment

<b>Severity of receptive language impairment</b>	<b>Number of children (n=40)</b>
Average or above average receptive language (no deficit)	15
Below average receptive language (moderate deficit)	13
Could not be scored receptive language (severe deficit)	12

### **Type of Language Impairment**

To determine the type of language impairment, the children were divided according to the receptive-expressive continuum (Lees and Urwin, 1994; Reed, 2005):

1. Set A: receptive and expressive language equally impaired
2. Set B: impaired expressive language only



### 3. Set C: impaired receptive language only

These sets were further subdivided according to the severity of each child's receptive and expressive language levels. The following 5 groups emerged:

#### Set A:

Group 1: Receptive and expressive language both moderately impaired (n=12)

Group 2: Receptive and expressive language both severely impaired (n=12)

#### Set B:

Group 3: Moderately impaired expressive language with normal receptive language (n=14)

Group 4: Severely impaired expressive language with normal receptive language (n=1)

#### Set C:

Group 5: Moderately impaired receptive language with near-normal expressive language (n=1)

The division of the 50 children according to the type and severity of their impairment is presented in Table 7.

Table 7: Division of sample according to type and severity of impairment

Set (n)	Type of impairment	Group	Severity of impairment	Percentage (n)	Expressive syntax	Receptive syntax
A n = 24	Receptive and expressive language equally impaired	1	Moderate	30% (n=12)	2 or 3 stage deficit	Below average
		2	Severe	30% (n=12)	4 or 5 stage deficit	Could not be tested
B n = 15	Impaired expressive language with normal receptive language	3	Moderate	35% (n=14)	2 or 3 stage deficit	Average or above average
		4	Severe	2.5% (n=1)	4 or 5 stage deficit	Average or above average
C n = 1	Impaired receptive language with near normal expressive language	5	Moderate	2.5% (n=1)	1 stage deficit	Below average

Only 2.5% (n=1) presented with impaired receptive language and normal expressive language [Group 5 (Set C)]. This was not surprising as this pattern of language impairment occurs less frequently than the other types of language impairment (Reed, 2005). Only 2.5% (n=1) presented with a severe expressive language impairment with normal receptive language [Group 4 (Set B)]. As both these groups consisted of only 1 child, they were not used in any further analysis in this study.

#### **4) Variables Associated with Type and Severity of the Language Impairment**

This section compares and highlights relevant demographic variables associated with these groups: Group 1 (receptive and expressive language both moderately impaired [n=12]), Group 2 (receptive and expressive language both severely impaired [n=12]), and Group 3 (moderately impaired expressive language with normal receptive language [n=14]). All the

information regarding the comparison of relevant demographic variables within the three groups is presented in Table 8 below.

Table 8: Comparison of relevant demographic factors associated with the 3 groups: Moderately impaired receptive and expressive language (Group 1), severely impaired receptive and expressive language (Group 2) and moderately impaired expressive language with normal receptive language (Group 3)

<b>Factor</b>	Moderately impaired receptive and expressive language <b>Group 1 (n=12)</b>	Severely impaired receptive and expressive language <b>Group 2 (n=12)</b>	Moderately impaired expressive language with normal receptive language <b>Group 3 (n=14)</b>
Gender:			
Male	83% (n=10)	67% (n=8)	79% (n=11)
Female	17% (n=2)	33% (n=4)	21% (n=3)
Average years at Centre	2.4 years	2.9 years	2.5 years
Average age at admission to Centre	3.10 years	4 years	3.8 years
Number of previous assessments	3	4	3
Pregnancy difficulties	17% (n=2)	33% (n=4)	29% (n=4)
Birth difficulties	25% (n=3)	42% (n=5)	29% (n=4)
Feeding difficulties	8% (n=1)	50% (n=6)	29% (n=4)
Communicative developmental milestones			
Babbling age	10 months (n=6)	8 months (n=6)	9 months (n=9)
Unusual babbling pattern	1	1	0
First word age	1.5 years (n=8)	1.5 years (n=12)	1.7 years (n=14)
Unusual first word pattern	0	3	0
First sentence age	3 years (n=10)	>3.2 years (n=10)	2.3 years (n=14)
Middle ear infections:			
Mild	67% (n=8)	58% (n=7)	71% (n=10)
Moderate	8% (n=1)	8% (n=1)	22% (n=3)
Severe	25% (n=3)	33% (n=4)	7% (n=1)
Family history of related difficulties:	42% (n=5)	100% (n=12)	79% (n=11)
Speech difficulties only	33% (n=4)	17% (n=2)	50% (n=7)
Medical difficulties only	0% (n=0)	83% (n=10)	21% (n=3)
Mixed difficulties	8% (n=1)	0% (n=0)	7% (n=1)
Medical problems	8% (n=1)	67% (n=8)	57% (n=8)
Seizures	8% (n=1)	33% (n=4)	7% (n=1)
Independence	92% (n=11)	58% (n=7)	100% (n=14)
Abnormal play	33% (n=4)	58% (n=7)	7% (n=1)
Motor delay	33% (n=4)	42% (n=5)	14% (n=2)
Physiotherapy	67% (n=8)	50% (n=6)	64% (n=9)
Occupational therapy	83% (n=10)	92% (n=11)	86% (n=12)
Play therapy	42% (n=5)	17% (n=2)	21% (n=3)
Behaviour problems	83% (n=10)	100% (n=12)	79% (n=11)
Medication	58% (n=7)	75% (n=9)	36% (n=5)
School placement referral:			
Mainstream	8% (n=1)	0% (n=0)	43% (n=6)
Remedial	67% (n=8)	75% (n=9)	57% (n=8)
Special	25% (n=3)	25% (n=3)	0% (n=0)
Average total number of factors	7.91	9.83	8.28

### **Average age at admission to The Centre**

On average, Group 1 (moderately impaired receptive and expressive language) (n=12) was admitted to The Centre at 3.10 years of age, Group 2 (receptive and expressive language both severely impaired) (n=12) was admitted at 4 years of age and Group 3 (moderately impaired expressive language with normal receptive language) (n=14) was admitted at 3.8 years of age.

Each group of children was admitted to The Centre within, on average, 4 months of each other. Although there appears to be no real difference between the age of admission to The Centre between each group, it is relevant to note that the most severely language impaired children (Group 2) started on average 4 months later than the other groups.

### **Average number of years at The Centre**

On average, Group 1 (moderately impaired receptive and expressive language) (n=12) remained at The Centre for 2.4 years, Group 2 (receptive and expressive language both severely impaired) (n=12) remained at The Centre for 2.9 years and Group 3 (moderately impaired expressive language with normal receptive language) (n=14) remained at The Centre for 2.5 years.

Each group of children remained at The Centre for, on average, between 2.4 years and 2.9 years. Although there appears to be no real difference between the length of time spent at The Centre between each group, it is relevant to note that the most severely language impaired children (Group 2) spent on average 4 months longer than the other groups. However, since Group 2 started 4 months later than the other groups, this appears to balance out length of time spent at The Centre.

### **Total number of related factors**

Literature suggests that in general, the more severe the language difficulty, the stronger the association of related variables (Law, 1992). Group 2 (n=12) presented with the most severe receptive and expressive language impairment, and it is therefore not surprising to note that this group also has the highest number of associated factors. These included problems during pregnancy (33%; n=4), birth difficulties (42%; n=5), feeding difficulties (55%; n=6), severe middle ear infections (33%; n=4), seizures (33%; n=4), medical problems (67%; n=8), behaviour problems (100%; n=12), developmental motor delay (42%; n=5), requiring occupational therapy (92%; n=11), requiring medication (75%; n=9), being the least independent (58%; n=7) and presenting with the most abnormal play behaviour (58%; n=7).

### **Communicative developmental milestones**

The average age of babbling for Group 1 (moderately impaired receptive and expressive language) (n=6) was 10 months, first word production for Group 1 (n=8) was 1.5 years and age of first sentence production for Group 1 (n=10) was 3 years. The average age of babbling for Group 2 (receptive and expressive language both severely impaired) (n=6) was 8 months, first word production for Group 2 (n=12) was 1.5 years and age of first sentence production for Group 2 (n=10) was greater than 3.2 years. The average age of babbling for Group 3 (moderately impaired expressive language with normal receptive language) (n=9) was 9 months, first word production for Group 3 (n=14) was 1.7 years, and age of first sentence production for Group 3 (n=14) was 2.3 years.

No real difference between the three groups was found in the average age of babbling and the average age of first word production. However, the average age of first sentence production of Group 3 is 9 to 11 months ahead of Group 1 and Group 2. As understanding comes before expression (McLaughlin, 1998), it is possible that, because of the normal receptive language ability in Group 3, they produced their first sentence much earlier than Group 1 and Group 2, both of which had moderate and severe receptive language impairments.

There is no real difference between the moderately receptive and expressive language impaired and severely receptive and expressive language impaired children (Group 1 and

Group 2) in development of babbling and first word production. However, the more severely affected children of Group 2 had 3 children with unusual first word patterns, while Group 1 had none. Group 1 and Group 2 also differ in the development in production of the first sentence. 80% of Group 2 (n=8) compared to 20% of Group 1 (n=2) produced their first sentence after 3.2 years of age. This would account for Group 1's moderate language impairment and Group 2's severe language impairment.

#### **Family history of related disorders**

42% of Group 1 (moderately impaired receptive and expressive language) (n=5) had a family history of related difficulties. 100% of Group 2 (severely impaired receptive and expressive language) (n=12) had a family history of related difficulties and 79% of Group 3 (moderately impaired expressive language with normal receptive language) (n=11) had a family history of related difficulties.

Several authors have proposed that whether the child has problems in expressive language only or problems in both comprehension and expression might be related to whether the language impairment has a genetic basis (Leonard, 1998). Studies have found that receptive and expressive language impairment is related to a higher rate of family members with a history of language problems, compared to those with expressive language impairment only (Leonard, 1998). This is in contradiction with the findings in this study where the impaired expressive language group (Group 3) has a higher family history of related difficulties compared to the moderate receptive and expressive language impaired Group 1. It is interesting to note that Group 2, the children with severe receptive and expressive language impairment, all have a family member with a related speech or medical condition. Although we now know that many cases of language impairment have a genetic basis (Reed, 2005), there is still much to learn about all of the genetic components involved in language impairment. 'Twin and adoption studies, along with advances in multivariate genetic analysis, behavioural genetics and molecular genetics are moving our knowledge rapidly ahead in this area, and will add considerably to our understanding' in the near future (Reed, 2005, pg. 92).

#### **Medical issues**

8% of Group 1 (moderately impaired receptive and expressive language) (n=1) had a history of medical problems, 67% of Group 2 (severely impaired receptive and expressive language) (n=8) had a history of medical problems and 57% of Group 3 (moderately impaired expressive language with normal receptive language) (n=8) had a history of medical problems.

Biological, physical and neurological conditions can place children at risk for potential language problems (Reed, 2005; Rossetti, 2000). Thus it comes as no surprise that Group 2, the children with severe receptive and expressive language impairment have the highest number of medically related problems. However, it is interesting to note that Group 3, the children with moderately impaired expressive language, also have a high number of medically related problems.

#### **School placement referrals**

25% of Group 1 (moderately impaired receptive and expressive language) (n=3) were referred for special education, 67% of Group 1 (n=8) were referred for remedial education and 8% of Group 1 (n=1) were referred for mainstream education when leaving The Centre. 25% of Group 2 (severely impaired receptive and expressive language) (n=3) were referred for special education, 75% of Group 2 (n=9) were referred for remedial education and 0% of Group 2 (n=0) were referred for mainstream education when leaving The Centre. 0% of Group 3 (moderately impaired expressive language with normal receptive language) (n=0) were referred for special education, 57% of Group 3 (n=8) were referred for remedial education and 43% of Group 3 (n=6) were referred for mainstream education when leaving The Centre.

Although no children in the most severe group, Group 2, mainstreamed when leaving The Centre, it is noteworthy that most of these children (75%; n=9) were referred to remedial

schools, and that the same number of children as Group 1 (25%; n=3) were referred to special schools. Many of the children from Group 3 (43%; n=6), who had moderate expressive language impairment only, mainstreamed when leaving The Centre. This is more than the other groups, and may be an indication of how having normal receptive language enables children to improve to such a degree. The majority of the children from all three groups required continued supportive education when leaving The Centre in the form of remedial education. Thus this research supports Rossetti (200, pg.34) in his statement that "regardless of which population of established-risk or at-risk infants are followed, how long each is followed, which developmental domains are monitored, which assessment tools are utilized, and what biological risk factors are present, approximately 40% to 65% will display some form of developmental delay (not readily identified by standard IQ measures) into the school years."

### **5) Variables Associated with Degree of Improvement in Language Areas**

Age, time and maturation are in the child's favour, thus with time children will change, even without intervention (Rossetti, 2000). A careful look at a child's change over time apart from maturation is therefore important to show therapy effectiveness, and in this particular study, effectiveness of an intensive therapeutic environment. The language intervention literature reveals that without treatment, many children with specific language impairment fall further behind their peers over time (Leonard, 1998).

This section examined therapy effectiveness by looking at each group's patterns of change over time (Rossetti, 2000) in the various language areas. Improvement or lack of improvement was determined according to whether there was a difference between the initial and final assessment scores, from "could not be tested", below average, average and above average ability. The amount of improvement was examined for each group in all language areas (receptive vocabulary, grammar and syntax, expressive vocabulary and syntax). Variables were then analysed to determine whether they could be associated with response to intensive intervention. The associated factors that were examined in this study included: number of associated factors (out of the following twenty-one possible associated factors: pregnancy difficulties; birth difficulties; low birth weight; feeding difficulties; delayed babbling; delayed first word; delayed first sentence; motor delay; medical condition; allergies; seizures; middle ear infections; family history of disorders; behavioural problems; emotional problems; play difficulties; problems at previous schools; receiving medication; receiving physiotherapy; receiving occupational therapy; and receiving play therapy), age at admission to The Centre and length of time spent at The Centre.

#### **Group 1: Moderately impaired receptive and expressive language (n=12)**

##### **Degree of improvement**

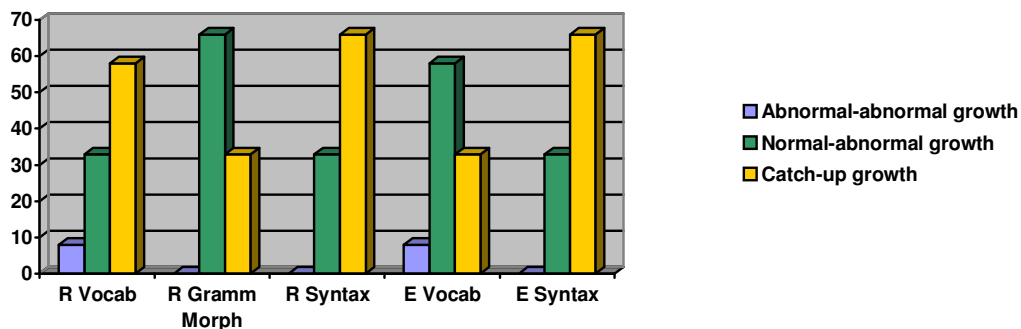


Figure 12: Percentage of children in Group 1 showing type of progress in all language areas

a) Receptive vocabulary

58% (n=7) of these children's receptive vocabulary showed catch-up growth, 33% (n=4) of the children showed normal-abnormal development and 8% (n=1) of the children showed abnormal-abnormal development (refer to Figure 12). More than half of these children with moderate receptive and expressive language impairment showed catch-up improvement in receptive vocabulary.

b) Receptive grammatical morphemes

33% (n=4) of these children's receptive grammatical morphology showed catch-up growth, while 66% (n=8) showed normal-abnormal development (refer to Figure 12). No children in this group exhibited abnormal-abnormal development in receptive grammatical morphology, while 66% of their scores remained the same, and 33% improved with catch-up growth.

c) Receptive syntax

66% (n=8) of these children's understanding of syntax showed catch-up growth while 33% (n=4) showed normal-abnormal development (refer to Figure 12). No children in this study exhibited abnormal-abnormal development in receptive syntax. More than half the children showed catch-up improvement in receptive syntax ability.

d) Expressive vocabulary

33% (n=4) of these children's expressive vocabulary showed catch-up growth, 58% (n=7) showed normal-abnormal development and 8% (n=1) showed abnormal-abnormal development (refer to Figure 12). 33% of these children showed catch-up improvement, 66% did not exceed developmentally appropriate improvement. One child showed abnormal-abnormal growth in expressive vocabulary development.

e) Expressive syntax

33% (n=4) of the children exhibited normal-abnormal development, while 66% (n=8) exhibited catch-up growth (refer to Figure 12). Of the children who had catch-up growth, 38% (n=3) of the children showed complete catch-up growth while 62% (n=5) exhibited partial catch-up growth (refer to Figure 13).

These results suggest that this population of children with moderate receptive and expressive language impairment showed considerable catch-up improvement in expressive syntax. In fact, 38% (n=3) of these children completely closed their deficit gap so that, according to the LARSP measure, they no longer had an expressive syntax impairment. The other 62% (n=5) were in the process of closing their deficit gap.

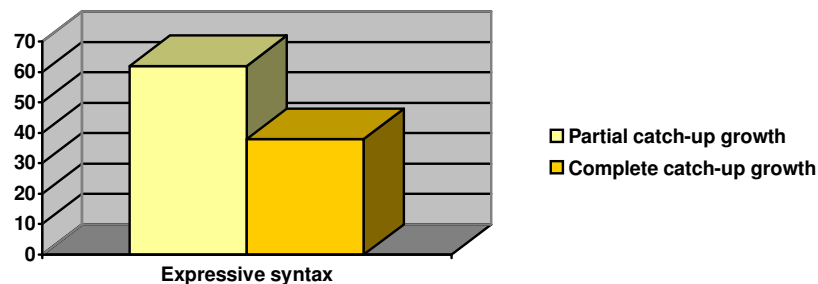


Figure 13: Percentage of children in Group 1 showing type of catch-up progress in expressive syntax

The results for Group 1 (moderate receptive and expressive language impairment) suggest that intervention for these children was effective for improving all areas of language ability, particularly receptive vocabulary, receptive syntax and expressive syntax ability.

## Associated variables

### a) Number of associated variables

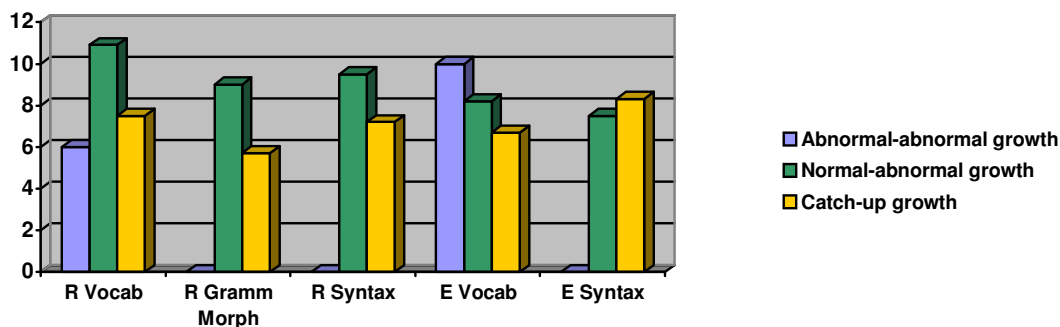


Figure 14: Number of variables in relation to type of growth in all language areas for Group 1

The children in Group 1 with moderate expressive and receptive language impairment, had an average of 7.91 associated factors per child. In all language areas, except expressive syntax, the children who had fewer associated factors fared better than those with a greater number of associated factors (refer to Figure 14). Thus there appears to be a relationship between number of associated factors and improvement in Group 1. However, in expressive syntax, the children who had catch-up growth had more associated factors than the children who stayed the same. The child who had abnormal-abnormal growth in expressive vocabulary, had a great number of associated factors ( $n=14$ ), however, as there was only one child in that group, the result may appear more significant than it is.

### b) Age at admission to The Centre

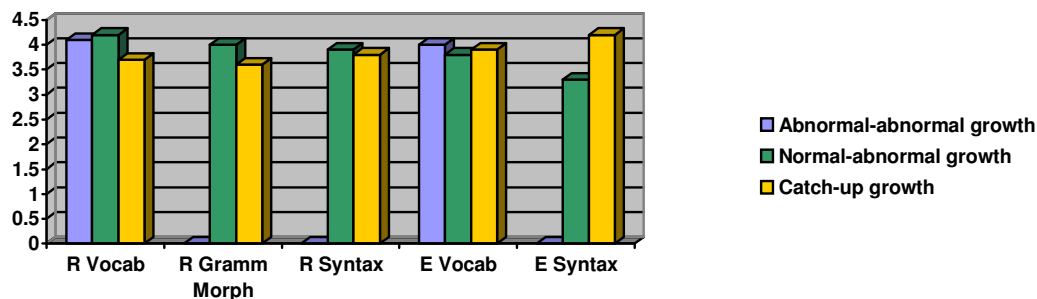


Figure 15: Age (in years) at admission to The Centre in relation to the type of growth in all of the language areas for Group 1

The children who had catch-up growth in their receptive vocabulary and receptive grammatical morphology, were all admitted to The Centre 6 months earlier than those with normal-abnormal and abnormal-abnormal growth (refer to Figure 15). Thus there is half a year difference between the children who showed catch-up growth and those who remained the same. It would seem therefore, that age of initiating intensive intervention is an important variable in determining the amount of improvement in these language areas.

The children who had catch-up growth in receptive syntax attended The Centre only 1 month earlier than those with normal-abnormal growth (refer to Figure 15). This small difference does not explain the marked improvement seen in receptive syntax (refer to Figure 12). Thus age does not appear to be relevant in the amount of improvement in receptive syntax for this language impaired group.

There is also no marked difference between age at admission to The Centre and the amount of improvement made by the children in expressive vocabulary (refer to Figure 15). Thus age does not appear to be relevant in the degree of improvement in expressive vocabulary for this language impaired group.

The children who exhibited catch-up growth in expressive syntax, were 10 months older than those with normal-abnormal growth (refer to Figure 15). Thus, starting intensive therapy at an earlier age does not appear to be associated with the amount of improvement that occurs in expressive syntax in this group.

### c) Length of stay at The Centre

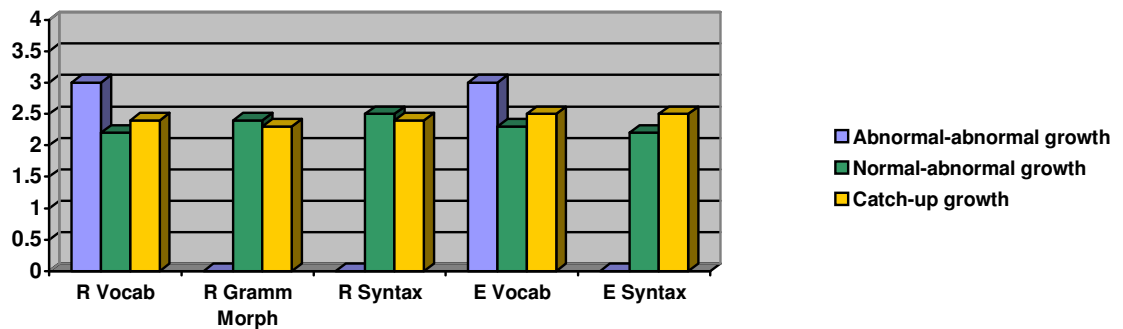


Figure 16: Number of years of attendance at The Centre in relation to the type of growth in all language areas for Group 1

For Group 1, there is at most only three months difference between the length of stay for those who had normal-abnormal growth and those who had catch-up growth in all language areas (refer to Figure 16). Thus there appears to be no obvious relation between length of time spent at The Centre and amount of improvement in any of these language areas. As stated in the 'degree of improvement' paragraph above, these children did markedly well in all language areas, particularly receptive vocabulary, receptive syntax, and expressive syntax. However, as length of time spent at The Centre was not found to be an important associated factor in relation to improvement, the marked improvement in these language areas cannot be related to amount of time spent in intensive intervention at The Centre.

The children ( $n=2$ ) who had abnormal-abnormal growth in receptive vocabulary ( $n=1$ ) and expressive vocabulary ( $n=1$ ), attended The Centre for 7 and 8 months longer than their peers (refer to Figure 16). Thus, although these children stayed for an extended period of time at The Centre and therefore received intensive therapy over this longer period, it did not appear to impact their improvement in receptive and expressive vocabulary.

### In summary

This group consisted of children with moderately impaired expressive and receptive language. There was catch-up improvement in all language areas, particularly receptive vocabulary, receptive syntax and expressive syntax. There appeared to be a relationship between a low number of associated factors and improvement in all language areas, except expressive syntax. For receptive vocabulary and receptive grammatical morphology, starting at a younger age appeared to be associated with catch-up growth. Time spent at The Centre appeared to be a positive factor for catch-up improvement in expressive syntax.



## **Group 2: Severely impaired receptive and expressive language (n=12)**

### **Degree of improvement**

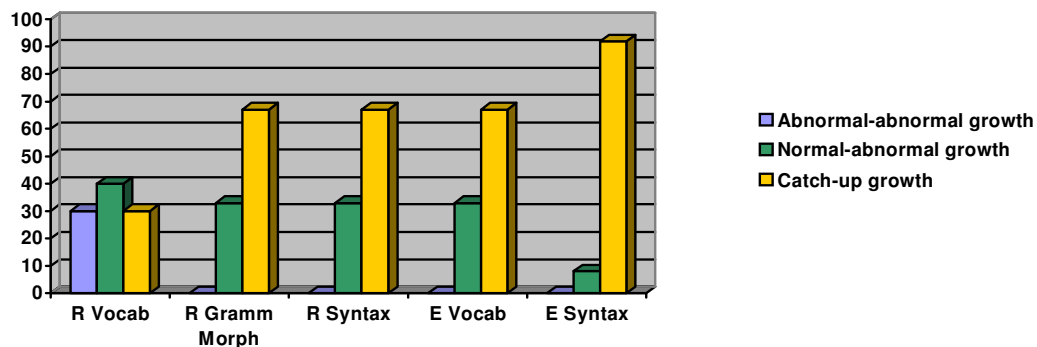


Figure 17: Percentage of children in Group 2 showing type of progress in all language areas

#### a) Receptive vocabulary

30% (n=3) of these children's receptive vocabulary showed catch-up growth, 40% (n=4) of the children showed normal-abnormal development and 30% (n=3) of the children showed abnormal-abnormal development. Although several children had abnormal-abnormal growth (30%; n=3), the majority of the children (70%; n=7) either remained the same (40%; n=4) or improved (30%; n=3) in receptive vocabulary (refer to Figure 17).

#### b) Receptive grammatical morphemes

67% (n=8) of these children's receptive grammatical morphology showed catch-up growth while 33% (n=4) showed normal-abnormal development. No children in this group exhibited abnormal-abnormal development in receptive grammatical morphology. Thus more than half (67%; n=8) the children in this group showed marked catch-up improvement in this language area (refer to Figure 17).

#### c) Receptive syntax

67% (n=8) of these children's understanding of syntax showed catch-up growth while 33% (n=4) showed normal-abnormal development. No children in this group exhibited abnormal-abnormal development in receptive syntax. More than half (67%; n=8) the children in this group showed marked catch-up improvement in this language area (refer to Figure 17).

#### d) Expressive vocabulary

67% (n=6) of these children's expressive vocabulary showed catch-up growth while 33% (n=3) showed normal-abnormal development. No children in this group exhibited abnormal-abnormal development in expressive vocabulary. More than half (67%; n=6) the children in this group showed marked catch-up improvement in this language area (refer to Figure 17).

#### e) Expressive syntax

Only 8% (n=1) had normal-abnormal growth, while 92% (n=11) showed catch-up growth. Of the children who had catch-up growth, 36% (n=4) showed complete catch-up growth, and 64% (n=7) of the children exhibited partial catch-up growth.

These children, who initially had severe receptive and expressive language impairment, showed remarkable catch-up improvement in expressive syntax. This information is depicted in Figure 17. The amount of catch-up growth was analysed further in terms of complete catch-up growth and partial catch-up growth (refer to Figure 18). These results suggest that this population of children with severe receptive and expressive language impairment showed considerable catch-up improvement in expressive syntax. In fact, 36% (n=4) of these children completely closed their deficit gap so that, according to the LARSP measure, they no

longer had an expressive syntax impairment. The other 64% (n=7) were in the process of closing the deficit gap.

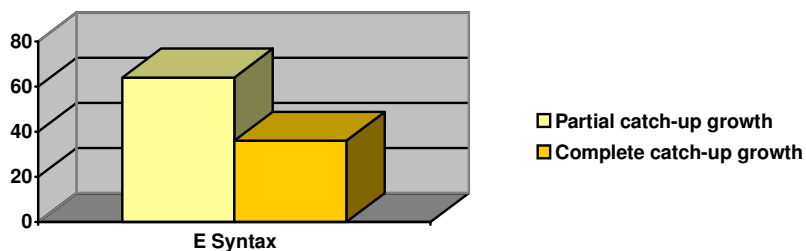


Figure 18: Percentage of children in Group 2 showing type of catch-up progress in expressive syntax

The results for Group 2 (severe receptive and expressive language impairment) suggest that intervention for these children was effective for improving all areas of language ability, particularly receptive grammatical morphology, receptive syntax, expressive vocabulary and expressive syntax ability.

### Associated variables

#### a) Number of associated variables

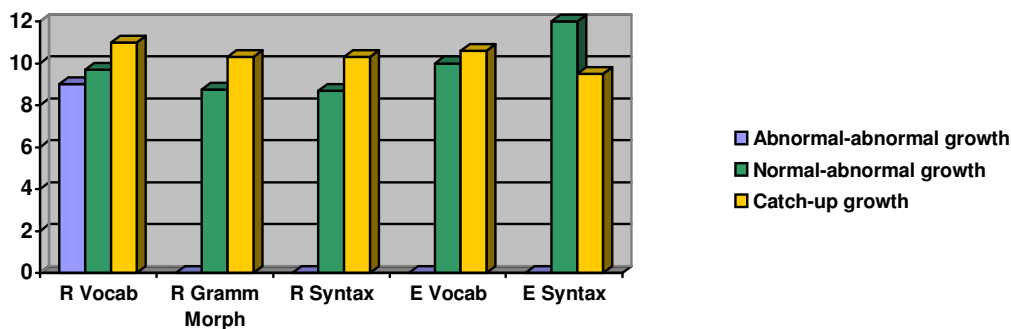


Figure 19: Number of variables in relation to the type of growth in all language areas for Group 2.

Group 2 consists of children with severe receptive and expressive language impairments. Overall, this group had a high number of associated demographic factors ranging from 9.8 to 12. Based on the continuum of risk (Rossetti, 2000), this was expected as they were the group who presented with the most severe language problems and one would therefore expect there to be more associated factors. However, it was interesting to note that in Group 2, the children who had catch-up growth in receptive vocabulary, receptive grammatical morphology, receptive syntax and expressive vocabulary, had the greatest number of associated factors, while the children who remained the same or whose gap actually widened with abnormal-abnormal growth, had fewer associated factors (refer to Figure 19). Thus the children with the most severe language impairment and with the most risk factors fared the best in these language areas while attending The Centre. For expressive syntax, the opposite is true: the more associated factors a child had, the less improvement occurred. However, only 1 child had normal-abnormal growth in this language area, therefore this figure may be exaggerated.

## b) Age at admission to The Centre

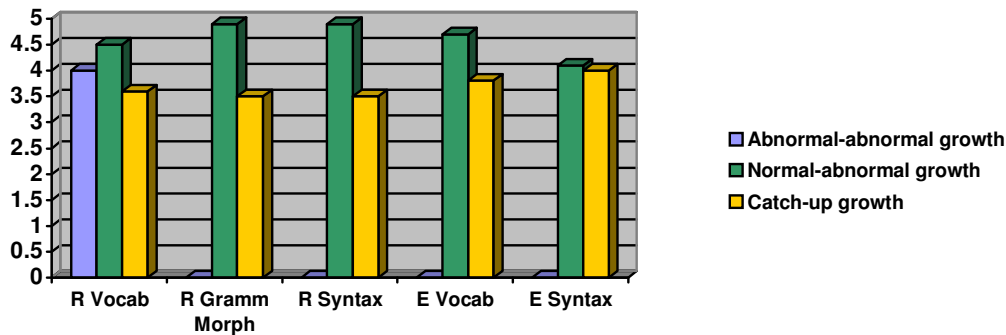


Figure 20: Age (in years) at admission to The Centre in relation to the type of growth in all of the language areas for Group 2

The children who had catch-up growth in receptive vocabulary, receptive grammatical morphology, receptive syntax and expressive vocabulary, were admitted to The Centre 6 to 16 months earlier than those with normal-abnormal and abnormal-abnormal growth. Thus there appears to be an association between age at admission to The Centre and amount of improvement that occurs in these areas. It would seem, that age of initiating intensive intervention is an important variable in determining the amount of improvement in this severely language impaired group. However, age of onset of intensive therapy does not appear to be an important variable in determining degree of improvement in expressive syntax ability. This information is depicted in Figure 20.

## c) Length of stay at The Centre

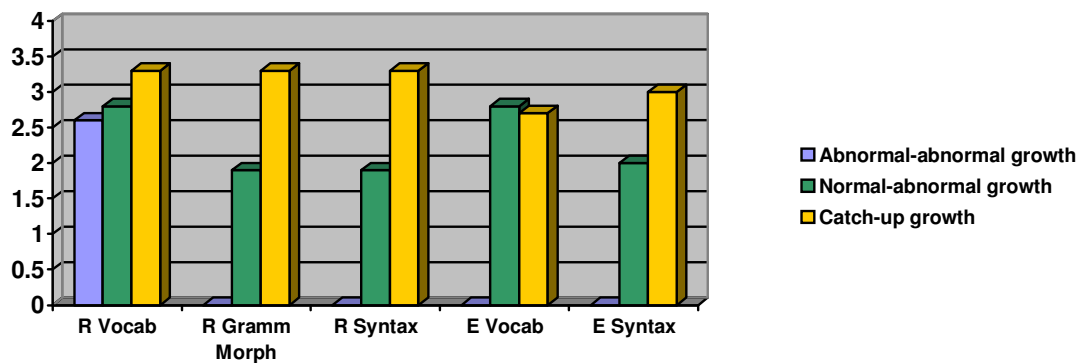


Figure 21: Number of years of attendance at The Centre in relation to the type of growth in all language areas for Group 2

The children who had catch-up growth in Group 2, attended The Centre for longer than those with normal-abnormal and abnormal-abnormal growth (refer to Figure 21). This group of children did particularly well in receptive grammatical morphology, receptive syntax and expressive syntax. Analysis of the number of years these children attended The Centre in relation to the improvement in these language areas reveals that for catch-up improvement to occur, these children had at least an average of 3 years of intensive language intervention. Thus there appears to be an association between the amount of time spent at The Centre and amount of improvement that occurs in all these language areas, except expressive vocabulary. There appears to be no relation between length of attendance at The Centre and type of improvement in expressive vocabulary.

### In summary

This group consisted of children with severely impaired expressive and receptive language. There was catch-up improvement in all language areas, particularly receptive grammatical morphology, receptive syntax, expressive vocabulary and expressive syntax. There appeared to be a relationship between fewer associated factors and improvement in expressive syntax only, while for receptive vocabulary, receptive grammatical morphology and receptive syntax, the children who had the most catch-up improvement all had a high number of associated factors. For catch-up improvement in receptive language in the severely impaired children, both age and length of time spent at The Centre were important variables. Age was positively linked to degree of improvement in expressive vocabulary, while length of time attending The Centre appeared to be a positive factor for catch-up improvement in expressive syntax.

### **Group 3: Moderately impaired expressive language with normal receptive language (n=14)**

#### Degree of improvement

At the initial assessment, this group of children obtained normal or near normal receptive language results. It would therefore be expected that they would not have much receptive catch-up growth, but would rather have normal-abnormal growth. Figure 22 depicts the type of growth that occurred in relation to the different language areas.

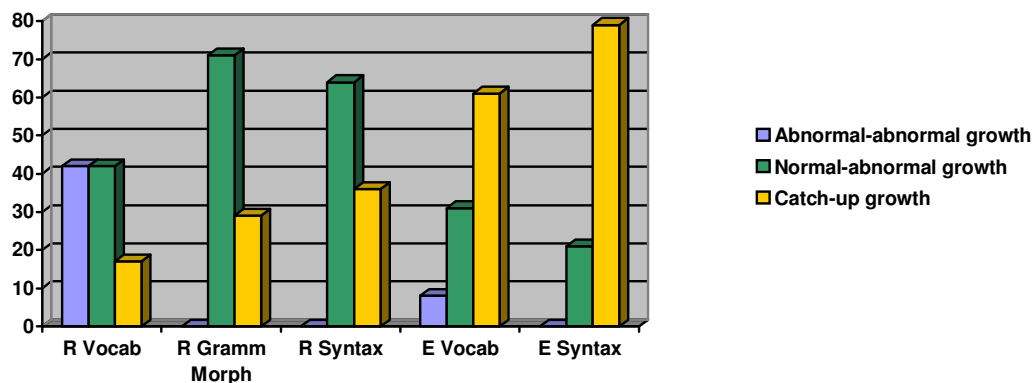


Figure 22: Percentage of children in Group 3 showing type of progress in all language areas

#### a) Receptive vocabulary

All of the children's (n=12) understanding of vocabulary was initially normal. 17% (n=2) of these children's receptive vocabulary showed catch-up growth, 42% (n=5) of the children showed normal-abnormal development and 42% (n=5) of the children showed abnormal-abnormal development (refer to Figure 22). The percentage of children with abnormal-abnormal development is surprisingly high (42%; n=5), indicating that although there was initial normal receptive vocabulary ability, there was a widening between age-appropriate skills and the child's level of functioning in receptive vocabulary over time.

#### b) Receptive grammatical morphemes

All of the children's (n=14) understanding of grammatical morphology was initially normal or near normal. 29% (n=4) of these children's receptive grammatical morphology showed catch-up growth while 71% (n=10) showed normal-abnormal development. No children in this study exhibited abnormal-abnormal development in receptive grammatical morphology. The majority of the children (71%; n=10) had normal-abnormal growth which was expected due to their normal initial receptive language scores, while, 29% (n=4) actually improved even further in their receptive grammatical morphology abilities (refer to Figure 22).

c) Receptive syntax

All of the children's (n=14) understanding of syntax was initially normal. 36% (n=5) of these children's understanding of syntax showed catch-up growth, while 64% (n=9) showed normal-abnormal development. No children in this study exhibited abnormal-abnormal development in receptive syntax. The children in this group had normal receptive syntax abilities at their initial assessments, yet, 36% (n=5) still showed catch-up improvement, indicating that intensive language therapy can improve receptive syntax scores beyond average ability. The majority of the children (64%; n=9) in this group, showed normal-abnormal growth, as was expected (refer to Figure 22).

d) Expressive vocabulary

61% (n=8) of these children's expressive vocabulary showed catch-up growth, 31% (n=4) showed normal-abnormal development and 8% (n=1) showed abnormal-abnormal development (refer to Figure 22). Most of the children in this group (61%; n=8) showed good catch-up improvement in expressive vocabulary development, indicating that they benefited from intensive intervention at The Centre in terms of expressive vocabulary development. Only one child showed abnormal-abnormal growth in expressive vocabulary development.

e) Expressive syntax

21% (n=3) of the children remained constant in their delay therefore exhibiting normal-abnormal growth. 79% (n=11) of the children exhibited catch-up growth. Of the children who had catch-up growth, 45% (n=5) showed complete catch up-growth, and 55% (n=6) exhibited partial catch-up growth (refer to Figure 22). No children exhibited abnormal-abnormal development in expressive syntax. The children in this group showed marked catch-up improvement in expressive syntax. Almost half of the children in this group (45%; n=5) had complete catch-up growth (refer to Figure 23). Perhaps this group's initial receptive language assists in obtaining the improvements made in expressive syntax.

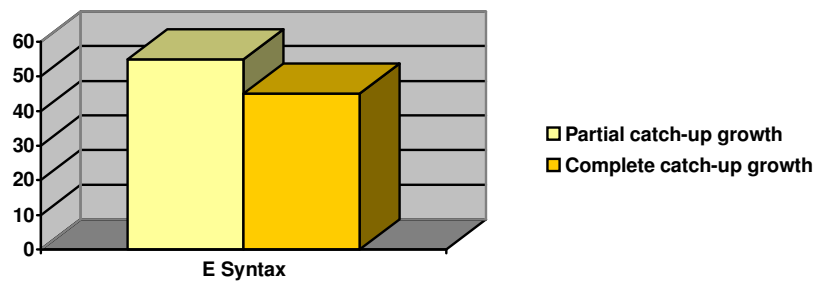


Figure 23: Percentage of children in Group 3 showing type of catch-up progress in expressive syntax

The improvement in all language areas suggests that intensive intervention for children with good initial receptive language was effective. Not only were there improvements in expressive vocabulary and syntax abilities, but there was also a positive impact on receptive abilities.

## Associated variables

### a) Number of associated variables

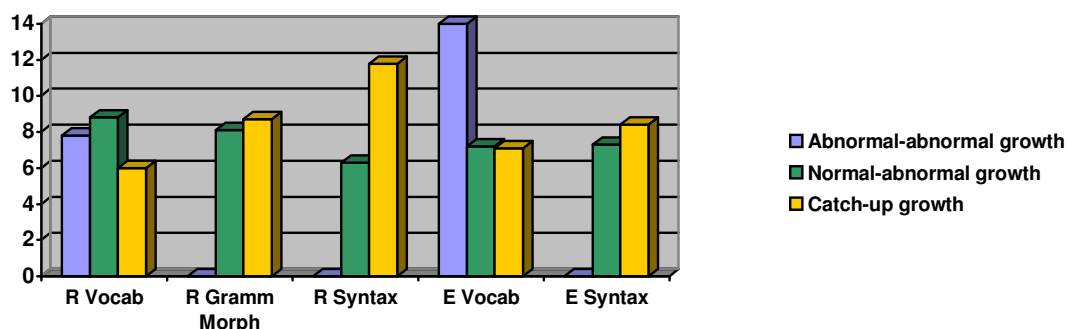


Figure 24: Number of variables in relation to the type of growth in all language areas for Group 3.

Group 3 had an average of 7.9 associated factors per child for all language areas. In all the language areas, except receptive vocabulary, the children who had catch-up growth had more than or an equal number of associated factors with the children with normal-abnormal growth (refer to Figure 24). Thus there does not appear to be a relationship between number of associated factors and type of response to intervention in children with moderate expressive language impairment.

The child (n=1) who had abnormal-abnormal growth in expressive vocabulary, had many associated demographic factors (n=14) (refer to Figure 24), however, as there was only one child in this group, the result may appear more significant than it is.

### b) Age at admission to The Centre

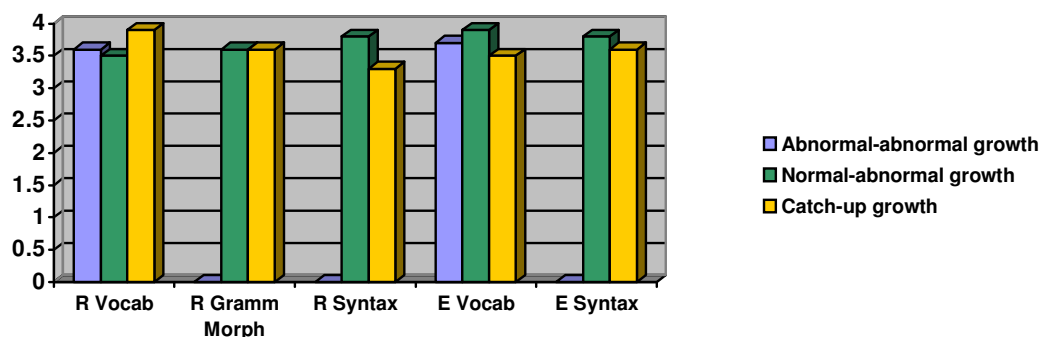


Figure 25: Age (in years) at admission to The Centre in relation to the type of growth in all language areas for Group 3.

The children who had catch-up growth in receptive syntax, expressive vocabulary and expressive syntax all attended The Centre from an earlier age (2 to 5 months earlier) than those with normal-abnormal growth. Although not striking, this difference in starting age may contribute towards the significant improvements made in expressive vocabulary and expressive syntax. There is no marked difference between age at admission to The Centre and amount of improvement in receptive grammatical morphology, while the children who showed catch-up growth in receptive vocabulary were admitted at an older age than those who had normal-abnormal growth (refer to Figure 25). Age does not appear to be an important factor in improvement in these language areas

## c) Length of stay at The Centre

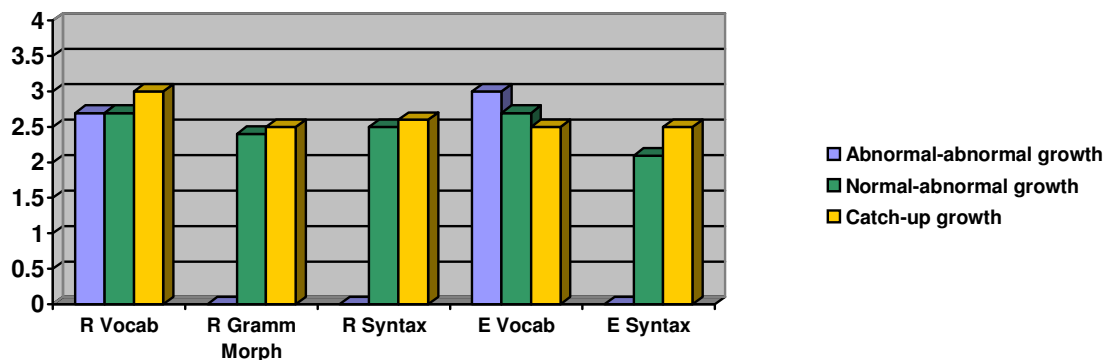


Figure 26: Number of years of attendance at The Centre in relation to degree of improvement in all language areas for Group 3

The children who had catch-up growth in receptive vocabulary and expressive syntax attended The Centre for 5 months longer than those with normal-abnormal and abnormal-abnormal growth. Thus there appears to be a relation between the amount of time spent at The Centre and amount of improvement that occurs in receptive vocabulary and expressive syntax in this group of children. There is no relationship between length of time spent at The Centre and degree of improvement in receptive grammatical morphology, receptive syntax and expressive vocabulary in this group of children (refer to Figure 26).

#### **In summary**

This group consisted of children with moderately impaired expressive language. Although there was catch-up improvement in all language areas, the improvements in expressive language (vocabulary and syntax) were particularly marked. There was no relationship between number of associated factors and type of response to intervention, except for receptive vocabulary, where the children who had catch-up growth also had a low number of associated factors. Age was an important factor in improvement in the expressive language areas. The amount of time spent at The Centre appeared to be related to amount of improvement in receptive vocabulary and expressive syntax in this group of children.

### **GENERAL DISCUSSION**

The findings of the demographic data analysis in this study were that certain factors manifested more frequently than others in the case history of this population of language impaired children. Behavioural problems, medical issues, a family history of related difficulties, and delay in first word and first sentence production were prominent factors in over 60% of the questionnaires. Factors appearing less frequently included pregnancy and birth difficulties, feeding problems, delayed babbling, frequent ear infections and associated motor delay. All of these children were found to have from as little as one, to as many as sixteen associated factors. In this study there appears to be a cumulative relationship between the number of associated factors and severity of language impairment. The more severe the language difficulty, the greater the number of associated factors that the child presented with.

One would expect that the higher the number of associated factors that a child presents with, the greater the impact these factors might have on the degree of improvement that takes place for that child. For instance, one would expect a child who presents with birth trauma, behavioural difficulties, feeding difficulties, a family history of related difficulties and frequent ear infections to fair worse in therapy than a child who presents with only behavioural issues and a family history of related difficulties. This assumption was affirmed with the moderate

receptive and expressive language impaired children. However, the findings in this study for the children with moderate expressive language impairment and the severely language impaired children, were that the children with the higher number of associated factors made more improvement than their counterparts. Thus it seems that multiple risk factors have a cumulative effect in determining severity of the impairment, but do not appear to affect progress in intervention.

In Law's (2004) recent review of early language intervention articles, he found that speech and language intervention had a significant effect for phonological and expressive vocabulary difficulties. He found mixed evidence concerning the effectiveness of intervention for children with expressive syntax difficulties and little, inconclusive evidence considering the effectiveness of intervention for children with receptive language difficulties. The findings in this study were that children with different types of language impairments made statistically significant improvements in receptive grammatical morphology, receptive syntax, expressive vocabulary (in the initial stages) and expressive syntax. Thus this study provides evidence that intensive structured intervention in a language rich environment, is a successful and effective approach for language impaired children.

Language competence is vital and it is important therefore that we gain a better understanding of how language acquisition proceeds in order to help language impaired children function effectively (Lees and Urwin, 1994). In this study, complete catch-up improvement occurred for between 29% to 34% of the children in all areas except receptive vocabulary. Although these figures seem low, they do not include the children who are showing catch-up improvement, but have not yet reached average or above average ability. Although therapy at The Centre is individualised, the principal approach follows the developmental Language Assessment and Remediation profile suggested by Crystal (1982). Thus therapy specifically targets receptive and expressive grammatical morphemes and syntax, and this may be the reason that significant improvement occurs in these language areas. Receptive vocabulary was the only area where no catch-up improvement was made. In fact results were 6% below their initial level. This result highlights the importance of assessing and specifically focussing on abstract vocabulary in language intervention programmes. The results of this study indicate then, that, if given appropriate and intensive intervention, it is possible for language impaired children to make excellent progress in their receptive and expressive communicative abilities. However, for almost all, some language impairment persists.

The severe receptive and expressive language impaired children showed substantial catch-up improvement in all areas except receptive vocabulary. Some may argue that because the severely language impaired children were initially so severe, they had the most scope for improvement. However, variables such as age at admission to The Centre and amount of time spent attending The Centre appear to be important influences in the catch-up improvement of the severely language impaired children's progress. If a child with severe expressive and receptive language impairment starts intensive therapy later than another child with severe expressive and receptive language impairment, he/she will not fair as well as the child who started earlier. Possibly, earlier identification of language impaired children facilitates language development so that their outcomes might be considerably better (Leonard, 1998). Research has clearly shown the importance of early structured intervention (Owens, 2004), however, according to Leonard (1998), a correlation between duration of treatment and post-treatment language ability has not yet been found. The findings from this study indicated that for catch-up growth to occur in expressive syntax, these children require on average more than 2 years of intensive intervention, regardless of their type and severity of impairment. Thus this study found of a relationship between duration of treatment and post-treatment language ability. The results of this study support and verify the success of earlier and long-term intensive intervention, especially for severely language impaired children.



## **LIMITATIONS**

This study relies on data from parental questionnaires and the assessment results reported by various therapists over several years. The parental questionnaire is self-report, and relies on the parents memory of their child's development and knowledge of family issues, thus accuracy of data may be unreliable. There was missing data in both the questionnaires and assessment results, which varied across the outcome measures, reducing sample size. This reduction in sample size can reduce the sensitivity to differences that may exist.

The risk factors looked at in this research are factors identifying children who show problems with language rather than children at risk for language problems (Reed, 2005). Although many factors were taken into account, it is likely that not all factors that are associated with language impairment were included in this study. Also, the interrelationships between factors have yet to be explained (Reed, 2005).

Grouping the children into severity and type of language impairment using receptive and expressive syntax ability, may have been too simplistic a measure, as it does not take phonological problems, which often co-occur with syntax difficulties (Reed, 2005) into account. Other areas of deficit which could be used to form groups include gesture and socialization (Reed, 2005). However, this study was limited to semantics and form of language and as these areas of language (phonology, gesture and pragmatics) were beyond the scope of the study, they were not included in the grouping of the sample.

In a study such as this, one cannot control for maturation, however, catch-up improvements in all areas of assessment were too large to account for maturation alone.

Although the general components of therapy at The Centre were outlined at the beginning of this study, it was not possible to document the particular type of treatment approach that was used with each child. There is therefore no account of the type of therapy each child received, however, the principal approach followed at The Centre is the developmental Language Assessment and Remediation profile suggested by Crystal (1982).

The intervention described in this study does not necessarily correspond to what children experience in terms of the level of intervention provided in South Africa generally. Also, this study dealt with children who were clearly experiencing severe problems and may not be representative of the language impaired population which would include a great many milder presentations (Law, 1992). However, this study provides information which allows one to assess the progress of a variety of language impaired children attending a therapeutic-intense language rich pre-school.

## **FUTURE RESEARCH**

The Centre is a data rich pre-school, which has been operating for 30 years. In storage at The Centre, are detailed files with case history information and assessment results for pre-school children with a large variety of language impairments. These would make for interesting single case studies. Three child profiles have been included (see Appendix 5) in this study as case study samples.

This study focused specifically on the language impaired children attending The Centre, however, hearing impaired children have also been in attendance at the school since its conception. Thus detailed files with case history information and assessment results for these hearing impaired pre-school children are also stored at The Centre, and as yet, have not been used in any research project.

As these files date back 30 years, a similar study on a larger scale of the case history details and therapeutic outcomes may be even more sensitive to differences that may exist of response to intervention in different children.

Language is multi-faceted and encompasses various components, including pragmatics and phonology of language, which were beyond the scope of this study. Future researchers could perform similar studies of the therapeutic outcomes in these areas of language.

It has been suggested that complex sentence usage in unstructured conversation and narrative skill be used with older pre-school children to tap their levels of language competence (Reed, 2005). Narratives and spontaneous conversations provide information regarding use of language once the structure of language has been mastered. Although narratives are assessed at The Centre, including this information was beyond the scope of this study. Narratives and spontaneous conversations may be incorporated in a future study with this population, which could examine use of language at a higher level of competence.

### **CONCLUSIONS**

According to Rossetti (2000), school failure does not begin when the child enters school and begins to struggle, rather, it begins much earlier and relates in large to established and at-risk factors. Therapists need to know and understand the relationship between these risk factors and how they interact and contribute to communication delay (Rossetti, 2000). Some children may appear to have problems with a single origin, whereas the vast majority of children appear to have various intrinsic and extrinsic factors that were or are present during initial assessment (Lees and Urwin, 1994). This suggests that there is an interaction effect of the factors in each individual case which leads to the particular clinical problem and response to intervention.

There is an incredible range and variation, in the individual features of language, and in their rate of change, in these children that make up our caseload (Lees and Urwin, 1994). The findings of treatment in this study as well as in the literature are both optimistic and concerning (Leonard, 1998). Structured individually focused treatment accelerates language learning, however, for some children this learning does not carry far enough to lead to normal language functioning. For these children, language impairment, although alleviated to some extent by this structured therapeutic approach, will remain an obstacle to their future social and academic success. It is almost a pity that these children leave The Centre at a time when they are showing catch-up growth in certain areas. Perhaps these children who show slower catch-up growth would benefit from further continued intervention along similar lines. There appears to be a need for therapists to work more closely and intensively with these children in the classroom, especially with the advent of inclusion in South Africa, to continue classroom based intervention into primary school. Perhaps then more of these children would get closer to good language functioning which would improve their future options.

Many studies reflect a narrowly based sample which is not representative of a clinical caseload. There is typical variation in a clinical caseload, and individualised therapy becomes a requirement rather than a hazard (Roulstone, 2000). Throughout the world, treatment approaches vary widely among professional and institutions, both in the procedures employed and in the areas of language receiving the greatest emphasis (Leonard, 1998). Although there is no single treatment approach, it would seem reasonable to presume that certain approaches are more effective than others, depending on the type of language structure targeted and the type of child in therapy (Leonard, 1998). Also, it is likely that any one approach is too limited to treat the range, the variation and all the factors involved in children's language disorders (Reed, 2005). As of yet, no specific approach has been fully validated in the literature (Reed, 2005). However, the statistically significant improvements made by the children in this study suggests that a structured focused therapy approach achieves improvements in both receptive and expressive language in a variety of language impaired children. The Centre is providing evidence based practice and is effective in it's approach to intervention. The study suggests that the existence of this type of pre-school intervention is important, that earlier intervention over an extended period of time obtains positive results which can positively impact these children's lives and potential to achieve.

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## **ACKNOWLEDGEMENTS**

The researcher would like to thank:

Mrs Heila Jordaan, Head of Department of Speech Pathology and Audiology, University of the Witwatersrand, for supervising this study, and for her constant availability, wisdom and direction

Mark Mulligan, for his patience and unending love and support

Mr and Mrs Austen, for their encouragement throughout the years

Aidan Mulligan, for arriving half-way through this study and for sleeping during the afternoons so that it could be completed

Staff at The Centre, for their interest and co-operation

**APPENDIX 1****DEMOGRAPHIC INFORMATION DATA COLLECTION SHEET**

<u>Child</u>	<b>C 105</b>	<b>C 205</b>	<b>C 305</b>	<b>C 405</b>
<b><u>Centre information</u></b>				
Enrolment date				
Discharge date				
Years at Centre				
Age at admission to Centre				
Referred to				
<b><u>Gender</u></b>				
<b><u>Date of birth</u></b>				
<b><u>Parental education level</u></b>				
Mother				
Father				
<b><u>Previous assessments</u></b>				
How many				
<b><u>Previous therapy</u></b>				
Had previous speech therapy				
Duration				
<b><u>Family history of disorders</u></b>				
Syndromes / disorders				
<b><u>Pregnancy history</u></b>				
Birth order of child				
Conditions				
<b><u>Birth history</u></b>				
Complications				
Birth weight				
<b><u>Feeding history</u></b>				
Difficulties				
<b><u>Developmental milestones</u></b>				
Motor delay				
Speech delay				
Bladder control delay				
Bowel control delay				
<b><u>Play</u></b>				
Normal				







**APPENDIX 3****GENERAL INFORMATION DATA COLLECTION SHEET**

<b>Child</b>	<b>Gender</b>	<b>Age at admission</b>	<b>Months at Centre</b>	<b>Previous assessments</b>	<b>Previous speech therapy</b>
C105					
C205					
C305					
C405					
C505					
C605					
C705					
C805					
C104					
C204					
C304					
C404					
C504					
C604					
C704					
C804					
C904					
C1004					
C103					
C203					
C303					
C403					
C503					
C603					
C703					
C803					
C903					
C1003					
C1103					
C1203					
C1303					
C1403					
C102					
C202					
C302					
C402					
C502					
C602					
C702					
C802					
C902					
C101					
C201					
C301					
C401					
C501					
C601					
C701					



<b>Child</b>	<b>1st Word</b>	<b>1st Sentence</b>	<b>ME infections</b>	<b>Grommits</b>	<b>Allergies</b>	<b>Seizures</b>	<b>Medical other</b>
C105							
C205							
C305							
C405							
C505							
C605							
C705							
C805							
C104							
C204							
C304							
C404							
C504							
C604							
C704							
C804							
C904							
C1004							
C103							
C203							
C303							
C403							
C503							
C603							
C703							
C803							
C903							
C1003							
C1103							
C1203							
C1303							
C1403							
C102							
C202							
C302							
C402							
C502							
C602							
C702							
C802							
C902							
C101							
C201							
C301							
C401							
C501							
C601							
C701							
C801							
C901							

<b>Child</b>	<b>School problems</b>	<b>Fears</b>	<b>Behaviour</b>	<b>Physiotherapy</b>	<b>OT</b>	<b>Play therapy</b>
C105						
C205						
C305						
C405						
C505						
C605						
C705						
C805						
C104						
C204						
C304						
C404						
C504						
C604						
C704						
C804						
C904						
C1004						
C103						
C203						
C303						
C403						
C503						
C603						
C703						
C803						
C903						
C1003						
C1103						
C1203						
C1303						
C1403						
C102						
C202						
C302						
C402						
C502						
C602						
C702						
C802						
C902						
C101						
C201						
C301						
C401						
C501						
C601						
C701						
C801						
C901						

<b>Child</b>	<b>Play normal</b>	<b>Medication</b>	<b>Referral</b>	<b>Medical diagnosis</b>		
C105						
C205						
C305						
C405						
C505						
C605						
C705						
C805						
C104						
C204						
C304						
C404						
C504						
C604						
C704						
C804						
C904						
C1004						
C103						
C203						
C303						
C403						
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C603						
C703						
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C903						
C1003						
C1103						
C1203						
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C301						
C401						
C501						
C601						
C701						
C801						
C901						

**APPENDIX 4****PARENTAL TELEPHONIC CONSENT FORM**

Hello Mrs/Mr X,

My name is Jennifer Mulligan, I am a speech therapist at The Centre for Language and Hearing Impaired Children. You may remember me from when X attended the school.

I am currently completing my Masters in Speech Pathology through Wits University and I am doing my research at The Centre. I will be looking through the files going back over the past 5 years, collecting information on how all the children progressed during their time at The Centre. I will be comparing the assessment results from when they first started at The Centre to the results just before they left. I am also going to be using the information in the files to see if there are any variables which could be linked to their progress. No one has ever documented the overall progress of the children who attend The Centre and the information will be most valuable to develop new ideas about communication impairment and the effectiveness of treatment.

I am contacting all the parents to get their permission to use the information in the files for my research. As X attended The Centre in the past 5 years, I would like to include his/her information as part of the study. All his/her information will be kept confidential and his/her name will not be used in any way. Do I have your consent to using the information in X's file for my research?

Thank-you very much for your time



## APPENDIX 5

### CHILD PROFILES

One child was selected from each Group. Their profiles follow below.

#### **Group 1: Moderately impaired receptive and expressive language**

##### Subject 1 (C405)

##### Description of Subject 1 (S1)

S1 lived at home with his parents and older sister. Both parents were working university graduates. There was no family history of related disorders. The pregnancy conditions were good and S1 was born naturally at 39 weeks weighing a healthy 3.4 kg's. S1 was not a content baby, showing signs of colic and lactose intolerance. He was asthmatic and allergic to certain food and environmental allergens. S1 had no feeding difficulties as an infant, however he grew up to be a picky eater. S1 suffered from recurrent severe ear infections and had 3 sets of grommets. S1 babbled and said his first word at about the same time at 18 months. He was also late with producing his first sentence at 3.6 years of age. S1 had one previous professional assessment and attended speech therapy for 7 months prior to attending The Centre. S1 was an independent child, and although there were no reported problems from his previous kindergarten, he played mostly on his own. S1's mother reported some behavioural problems that were more severe than normal including temper tantrums, whining and separation anxiety. He was still sucking his dummy at home when he enrolled at The Centre at 4 years of age.

S1 attended The Centre for 3 years. Ritalin was recommended for attention difficulties. S1 received Ritalin during the last few months of attending The Centre, thus all assessment results are medication free. S1 attended occupational therapy for 1.9 years and he also attended play therapy during his last year of attendance at The Centre. He was referred to a remedial school for Grade 1.

##### Test Results

	<b>INITIAL ASSESSMENT</b>	<b>INTERMEDIATE ASSESSMENT</b>	<b>FINAL ASSESSMENT</b>
<b>AGE</b>	4 Years	5.6 years	6.3 years
<b>TESTS</b>			
<b>Receptive Tests</b>			
Vocabulary(TACL-3)	SS 7	SS 9	SS 11
Grammatical Morphemes (TACL-3)	SS 9	SS 9	SS 9
Syntax (TACL-3)	SS 9	SS 7	SS 9
<b>Expressive Tests</b>			
Vocabulary (Renfrew Word Finding)	Below middle 50% of range of scores	/	/
Vocabulary (Expressive One Word Picture Vocabulary Test)	/	SS 11	SS 10
Syntax (LARSP)	Stage 3 Deficit of 3	Stage 4 Deficit of 3	Stage 7 Deficit of 0

## **Group 2: Severely impaired receptive and expressive language**

### Subject 2 (C801)

#### Description of Subject 2 (S2)

S2 lived at home with his parents and two older brothers. Both parents were working university graduates. There was no family history of related disorders. The pregnancy conditions were good and S2 was born naturally at fullterm. However, the cord was around his neck during birth and he had cephalo disproportion. He weighed a healthy 3.2 kg's. S2 battled to latch during feeding and positted frequently. S2 suffered from several mild ear infections which were treated with anti-biotics. S2 babbled at 7 months, but was delayed in producing his first word at 2 years and had not yet said his first sentence when he enrolled at The Centre at 3.4 years of age. S2 had five previous professional assessments and attended speech therapy for 6 months prior to attending The Centre. Although there were no reported problems from his previous kindergarten, his mother reported that he was not an independent child, that he had no imaginative play, was aggressive and displayed inappropriate head-banging.

S2 attended The Centre for 3 years. During this time S2 was diagnosed with ADHD and PDD. Ritalin was recommended for attention difficulties. S2 received Ritalin during the last few months of attending The Centre, thus all assessment results are medication free. S2 attended occupational therapy for 2.6 years. He was referred to a remedial school for Grade 1.

#### Test Results

	<b>INITIAL ASSESSMENT</b>	<b>INTERMEDIATE ASSESSMENT</b>	<b>FINAL ASSESSMENT</b>
<b>AGE</b>	3.8 Years	4.10 years	5.7 years
<b>TESTS</b>			
<b>Receptive Tests</b>			
Vocabulary(TACL-3)	SS 10	SS 9	SS 10
Grammatical Morphemes (TACL-3)	Could not test	SS 7	SS 8
Syntax (TACL-3)	Could not test	SS 9	SS 12
<b>Expressive Tests</b>			
Vocabulary (Renfrew Word Finding)	Within middle 50% of range of scores	Within middle 50% of range of scores	Above middle 50% of range of scores
Vocabulary (Expressive One Word Picture Vocabulary Test)	/	/	/
Syntax (LARSP)	Stage 2 Deficit of 4	Stage 4 Deficit of 3	Stage 5 Deficit of 2

**Group 3: Moderately impaired expressive language with normal or near normal receptive language**

Subject 3 (C603)

Description of Subject 3 (S3)

S3 lived at home with his parents and older sister. Both parents were working Grade 12 matriculants. There was a family history of related difficulties, the father had dyslexia and the grandfather suffered from clinical depression. Pregnancy conditions were good and S3 was born naturally at fullterm, weighing a healthy 3.25 kg's. S3 was a content baby and had no feeding difficulties as an infant. He suffered from several mild ear infections which were treated with anti-biotics. Although S3 was an independent child, his mother reported aggressive and destructive behaviour at home. Concentration problems were reported at his previous kindergarten. S3 babbled at 9 months, said his first word at 18 months and his first sentence at 2.6 years of age. S3 had four previous professional assessments and attended speech therapy for 1 year prior to attending The Centre at 3.5 years of age.

S3 attended The Centre for 3 years. Initially Risperal and then Ritalin was taken for attention difficulties. Thus all assessment results are results while on medication. S3 attended occupational therapy for 3 years and physiotherapy for 2 years. He was referred to a remedial school for Grade 0.

Test Results

	<b>INITIAL ASSESSMENT</b>	<b>INTERMEDIATE ASSESSMENT</b>	<b>FINAL ASSESSMENT</b>
<b>AGE</b>	3.5 Years	4.8 years	5.5 years
<b>TESTS</b>			
<b>Receptive Tests</b>			
Vocabulary(TACL-3)	SS 12	SS 12	SS 11
Grammatical Morphemes (TACL-3)	SS 11	SS 7	SS 13
Syntax (TACL-3)	SS 10	SS 12	SS 12
<b>Expressive Tests</b>			
Vocabulary (Renfrew Word Finding)	Within middle 50% of range of scores	Within middle 50% of range of scores	/
Vocabulary (Expressive One Word Picture Vocabulary Test)	/	/	SS 12
Syntax (LARSP)	Stage 3 Deficit of 2	Stage 5 Deficit of 2	Stage 7 Deficit of 0

