

**THE PHONOLOGICAL AWARENESS, WRITTEN  
SPELLING AND ORAL READING OF LEARNERS IN AN  
INCLUSIVE ENGLISH-MEDIUM EDUCATION  
SETTING**

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**ABSTRACT**

**TITLE:** The phonological awareness, written spelling and oral reading of learners in an inclusive English-medium setting.

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There is a need for information regarding the relationship of phonological awareness to reading and spelling in the multilingual learner in South Africa. The speech-language therapist has a role to play as part of the collaborative team assessing and treating the learner with reading and spelling difficulties. The aim of the study was to examine the relationships that exist between phonological awareness, written spelling and oral reading abilities in four groups of school-aged learners. A quantitative research design was employed in the form of a descriptive survey.

Twenty test subjects were selected randomly from Grade 2 classes at an English-medium inclusive school in Pretoria, South Africa. Their class teachers on their final school report of the year had rated the learners as having good or poor literacy ability. They were organized into four research groups which differed with respect to their home language (English or English as Additional Language) and with respect to their literacy ability as judged by their teachers (Good or Poor literacy ability).

A questionnaire was designed to ascertain parental perspectives pertaining to the learners' case history and literacy development. A test battery composed of the Goldman-Fristoe Test of Articulation (Goldman & Fristoe, 1986), the Phonological Assessment Battery (Frederickson, Reason & Frith, 1997), the ESSI Reading and the ESSI Spelling Test (Esterhuysen & Beukes, 1997), and the TOLD-P: 2 (Newcomer &

Hammill, 1991), as well as a Class Spelling List and a Reading Comprehension Task developed by the researcher, was administered to all test subjects.

Findings of subjects' performance in this study supported international findings regarding the strong relationship between phonological awareness ability and performance on reading and spelling measures. In addition, multilingual learners in this study were found to have delays in language development that negatively impacted on their literacy rating. The language development of the English-speakers with poor literacy ability in this study also negatively affected their reading and spelling performance. The test battery used in this study, with the exception of the Reading Comprehension Task, proved useful in differentiating subjects with good and poor literacy abilities and appears to be applicable for use in the South African situation.

The results provide useful insights for the assessment and treatment of these learners. Furthermore, relevant research topics in the field of literacy development in an inclusive education setting were presented.

**KEY WORDS:** Phonological Awareness; Reading; Spelling; Literacy; Multilingualism; English as Additional Language (EAL); English as Language of Learning and Teaching (EL.LT); Inclusive Education; Collaborative Team Approach

**OPSOMMING**

<b>TITEL:</b>	The phonological awareness, written spelling and oral reading of learners in an inclusive English-medium setting.
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Daar is 'n behoefte aan inligting oor die verband tussen fonologiese bewustheid en lees en spel vermoëns in die multilinguistiese leerder in Suid Afrika. Die spraak-taal terapeut het 'n belangrike rol as spanlid van die span wat leerders met lees en spel probleme evalueer en behandel. Die doel van die studie was om die verband wat bestaan tussen die fonologiese bewustheid, geskrewe spel en mondelingse lees vermoëns in vier groepe leerders te bepaal. 'n Kwantitiewe navorsingsontwerp in die vorm van 'n beskrywende opname studie is gebruik.

Proefpersone is uit Graad 2 leerders by 'n Engels-medium inklusiewe laërskool in Pretoria, Suid Afrika geselekteer nadat hulle deur hulle onderwysers beoordeel is om leerders met goeie of swak geletterdheidsvaardighede op hulle finale skoolrapport vir die jaar te bepaal. Vier navorsingsgroepe wat verskil het in terme van hulle huistaal (Engels of Engels as Addisionele Taal) en hulle geletterdheidsvermoëns (swak of goed) is benut.

'n Vraelys is opgestel om ouermenings in verband met die leerders se geskiedenis en geletterdheidsontwikkeling te peil. 'n Toetsbattery wat uit die "Goldman-Fristoe Test of Articulation" (Goldman & Fristoe, 1986), die "Phonological Assessment Battery" (Frederickson, Reason & Frith, 1997), die "ESSI Reading Test" en die "ESSI Spelling Test" (Esterhuyse & Beukes, 1997), en die "TOLD-P: 2" (Newcomer & Hammill,

1991), asook die “Class Spelling List” en ‘n “Reading Comprehension Task” wat deur die navorser opgestel was op al die proefpersone toegepas.

Resultate het internasionale bevindings bevestig met betrekking tot die sterk verhouding wat bestaan tussen fonologiese bewustheidsvermoëns en hulle resultate op lees en speltoetse. Multilinguistiese leerders in die studie is bevind om agterstande in hulle taalontwikkeling te toon wat hulle geletterdheidsvermoëns negatief beïnvloed het. Die taalontwikkeling van die Engels-sprekende leerders met swak geletterdheidsvermoëns het ook hulle lees en spelprestasie negatief beïnvloed. Die toetsbattery wat in hierdie studie gebruik is, met uitsondering van die ‘Reading Comprehension Task’, het suksesvol tussen leerders met goeie en leerders met swak geletterdheidsvermoëns onderskei en blyk om toepaslik te wees vir gebruik in die Suid Afrikaanse opset.

Die studie het belangrike insae verskaf vir die evaluering en behandeling van leerders. Relevante navorsingsmoontlikhede ten opsigte van geletterdheidsontwikkeling in ‘n inklusiewe opvoedingsopset is voorgestel.

**SLEUTELWOORDE:** Fonologiese Bewustheid; Lees en Spel vermoëns; Geletterdheid; Multilinguïste leerders; Engels as Addisionele Taal ; Engels as Taal van Leer en Opvoeding ; Inklusiewe Onderwys; Kollaboratiewe Spanbenadering

## **LIST OF TERMINOLOGY AND ABBREVIATIONS**

### **TERMINOLOGY**

1. ***Phonological Awareness***: “The ability to recognize that a spoken word consists of smaller components such as syllables or phonemes and that these units can be manipulated” (Lombardino, Bedford, Fortier, Carter & Brandi, 1997 p. 333).
2. ***Inclusive Education***: Policy whereby disabled learners should be included in all aspects of life including education (Macleod, 1995).
3. ***Literacy***: Involves the integration of speaking, listening and critical thinking with reading and writing (Winch, Johnston, Holliday, Ljungdahl & March, 2001).
4. ***Specific Reading Disability/ Specific Reading Impairment***: Formerly dyslexia. A disorder manifested by variable difficulty with different forms of language, including reading and spelling (Orton Dyslexia Society of USA, 1994).
5. ***Reading***: A complex behaviour requiring the acquisition of numerous perceptual, cognitive and linguistic abilities (Catts & Kamhi, 1987).
6. ***Spelling***: Involves the integration of several skills including knowledge of phonological representations, grammatical and semantic knowledge, as well as the formulation of analogies with words in visual memory and the knowledge of orthographic rules and conventions (Bradley & Bryant, 1985; Wagner & Torgesen, 1987).
7. ***Multilingual***: Having more than one language.
8. ***English as Additional Language***: When English is not the individual’s mother tongue (Naude, 2003).
9. ***English as Language of Learning and Teaching***: Where English is the language in which an individual is taught, but where English is not the mother tongue (Naude, 2003).
10. ***Foundation Phase***: Grades 1 to 3 in the Outcomes Based Education System (Naicker, 1999b).
11. ***Collaborative Team***: A team of professionals co-operating in the assessment and treatment of an individual.

**ABBREVIATIONS**

1. ***EAL***: English as Additional Language
2. ***EL.LT***: English as Language of Learning and Teaching
3. ***IQ***: Intelligence Quotient
4. ***SLI***: Specific Language Impairment
5. ***TOPA***: Test of Phonological Awareness (Torgesen & Bryant, 1998)
6. ***PALS***: Phonological Awareness Screening Battery (Invernizzi, Meier, Swank & Juel, 1999)
7. ***PHAB***: Phonological Assessment Battery (Frederickson et al., 1997)
8. ***TOLD-P: 2***: Test of Oral Language Development- Primary (second edition) (Newcomer & Hammill, 1991)
9. ***dB***: decibels
10. ***Hz***: Hertz



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## **1. INTRODUCTION**

“Of all the things children have to learn when they get to school, reading and writing (spelling) are the most basic, the most central and the most essential” (Bryant & Bradley, 1985, p.1). Pumfrey (1991) adds that not being able to read in our society is to be disempowered, impoverished, marginalised and frequently demeaned, and to be cut off from major resources of knowledge, insights and speculations. A clear link has been proven to exist between academic success and reading skills in normally developing learners, as well as learners with language delays (Kamhi & Catts, 1991). The attainment of literacy or the ability to read and spell is central to education. Once basic literacy has been acquired, further learning is made possible.

Upon entering school, most learners learn to read without great difficulty. However, each year a portion of children experience significant problems learning to read (Catts, Fey, Tomblin & Zhang, 2002).

As a result of the transformation of education in South Africa, schools that formerly accommodated learners from certain homogeneous groups, have undergone major changes in their learner population. These schools now accommodate learners who are not mother-tongue learners (De Witt, Lessing & Dicker, 1998). In South Africa there are eleven official languages and therefore a large percentage of learners are in fact multilingual speakers and do not have English as their first language. The term currently used to refer to these learners is English as Additional Language (EAL) speakers. English then becomes the Language of Learning and Teaching (EL.LT) for EAL learners who attend formerly advantaged schools under the previous political dispensation where English is the language of instruction. While first language instruction remains the ideal, it rarely occurs and the provision of schooling, psychological services and special education, remains basically disparate (Macleod, 1998). Many non-mother tongue learners have been found to experience difficulty in all areas of reading (De Witt et al., 1998) and this has major implications in the South African education system.

Educators in South African public schools are concerned that many learners are not learning to read and spell adequately, and it is feared that this will result in a general demise of the reading and spelling standards in the average public school. The present policy followed in public schools is Outcomes Based Education which advocates that all learners, including those with barriers to learning, can be accommodated in one education system (Naicker, 1999 a). Within this system it is not considered appropriate to test learners on standardised assessment measures in the Foundation phase (Grade 1 to 3) but rather to focus on critical outcomes (Naicker, 1999a). While the ideal of a learner-centred system is a very attractive one, the child with poor literacy does not appear to thrive in this learner-driven system. The unfortunate outcome of these policies may result in a number of learners in the higher grades that cannot read or spell adequately.

Fey, Catts and Larrivee (1995) and Catts, Fey, Zhang & Tomblin (2001) maintain that the speech-language therapist working with learners of all ages needs to play a more active role in the prevention, identification and remediation of reading (and spelling) disabilities in these learners. There is a need for speech-language therapists and educators in South Africa to obtain a good understanding of the prerequisites for the attainment of reading and spelling, and how these relate to the level of receptive and expressive language development in South Africa's multilingual society, in order to offer a better service to learners who are struggling to attain literacy. There is also a need to develop appropriate, effective and valid assessments that will identify learners in the public schools who are at risk for reading (and spelling) difficulties (Gilbertson & Bramlett, 1998).

The **South African** education context is a unique one, in that the political change and resulting change of policies, while it has solved many problems in education such as discrepancies in school curricula, has also created others. The problem of English as L.LT but not as home language has been discussed but other complications have arisen.

A policy of inclusion has been practised in South Africa since 1994 (Engelbrecht, Green, Naicker & Engelbrecht, 1999). This policy advocates that disabled learners should be included in all aspects of life including education (Macleod, 1995). This



means that any learner, regardless of their special educational needs, may be enrolled as a learner in the school of the parents' choice. This has resulted in many learners, who may benefit from specialised education, being taught in the mainstream environment (Kriegler & Farman, 1994). While this is a highly desirable situation in many developed countries (Henderson, 1989), it presents challenges in South Africa. Engelbrecht et al. (1999) state that to be effective in such a system, educators need to be prepared and to be supported. In general educators have not been trained to deal with special learning needs and the number of learners per class, which can be as high as 40, precludes individual attention. In addition, speech- language therapists are not employed in public schools and there is therefore a paucity of therapists involved at such schools. This is despite recommendations from researchers such as Kriegler and Farman (1994) that support teams consisting of speech-language and reading specialists and psychologists should be available to provide support and assistance to regular educators.

One of the main concerns is that the development of literacy may be impeded by the inclusion of learners with various learning capabilities within the average school. Internationally, research on phonological awareness has focussed mainly on learners with an existing diagnosis of learning disability or specific reading disability. Researchers such as Catts et al. (2002) have levelled the criticism that only the extreme cases in the general population are tested when researching reading and spelling difficulties. The South African situation presents us with learners who have no formal diagnosis of specific reading or spelling disability but are, nevertheless, failing to develop literacy. Macleod (1995) suggests that there are, in fact, a large number of learners in South Africa whose learning problems have been extrinsically rather than intrinsically generated. Naicker (1999b) suggests that as many as 50 to 60 percent of all South African learners are currently learning disabled, due to social, cultural, economic factors or causes other than physical or mental disability. This suggests that appropriate assessment and early intervention may alleviate a large proportion of the learning difficulties evident in South African schools as many of the learning difficulties experienced are concerned with the attainment of literacy.

**Literacy** involves the integration of speaking, listening and critical thinking with reading and writing (Williams & Snipper, 1990; Winch, Johnston, Holliday, Ljungdahl & March, 2001).

The development of literacy includes the ability to read different texts in various circumstances and for a wide range of purposes and also to comprehend what is read, as well as the ability to spell well enough to make written communication legible to the reader. ‘Emergent literacy’ is the term used to refer to the wealth of knowledge pre-schoolers can gain about print before formal reading actually begins (Van Kleeck, 1990). Unfortunately, many South African learners do not receive a solid pre-school basis for developing literacy. Recently a Grade R year (prior to Grade 1) was introduced but financial constraints still preclude many learners from attending a formalised pre-school (Feldman, 2003). There is currently no developed curriculum for a pre-school pre-literacy program routinely in use in public schools in South Africa. In addition, learners begin their primary schooling in their seventh year, which means that they are only exposed to formal literacy at a relatively late stage.

The manner in which the acquisition of reading and spelling has been viewed, has changed radically in the past two decades. In the past, a reading disorder was referred to as ‘dyslexia’. Whilst this term is still in use in the United Kingdom, many South African and American speech-language therapists working in the field, prefer the term ‘Specific Reading Disability’ or ‘Specific Reading Impairment’ (Louw & Campbell, 2003).

‘Developmental dyslexia’ was first described as early as 1896. According to Hinshelwood in 1917, it was caused by a type of ‘word blindness’ (cited by Snowling, 2000). The disorder remained the preserve of the medical specialist until 1968, when the World Federation of Neurology offered another definition of dyslexia (Critchley, 1970 cited by Snowling, 2000). According to this definition, dyslexia is a disorder of difficulty learning to read despite conventional instruction, adequate intelligence and socio-cultural opportunity. However, many of the terms in this definition were not well defined and it excluded causes rather than specified causes. Therefore it is not very useful.

Many educators were never satisfied with this definition but most attributed the cause of reading problems to a deficit in the visual domain. Early research on reading disorders focussed in the area of visual processing difficulties (Mann, Corwin & Schoenheimer, 1989). Little support for a visual processing cause was found, even for the reversal errors, once considered a hallmark of dyslexia (Mann et al., 1989). Gradually educators became more involved in research and attention shifted to verbal language abilities of learners and then specifically to phonological awareness skills. This is a research area that has received increasing attention over the past two decades and continues to remain a focus of current research.

A more recent definition is that dyslexia (or specific reading disability) is one of several distinct learning disabilities (International Dyslexia Association, 1994). It is a specific language-based disorder characterised by difficulties in single word decoding, usually reflecting insufficient phonological processing abilities. These difficulties are not the result of generalised developmental or sensory impairment. Dyslexia (or specific reading disability) is manifested by variable difficulty with different forms of language, including reading, spelling and writing (Snowling, 2000).

This definition includes the importance of decoding in reading and spelling and therefore the value of phonological processing as a precursor to the development of literacy. Another definition offered by the Health Council of the Netherlands in 1997, reiterated the failure of phonological (processing) skills as a risk factor for the development of a specific reading disorder. Early intervention in the area of phonological processing was suggested to greatly reduce the incidence of severe spelling and reading problems (Gersons-Wolfenberger & Ruijsenaars, 1997).

**Phonological awareness** is the aspect of phonological processing that has received the most attention in the literature to date. There is some confusion of terminology in the literature and certain terms appear to be used interchangeably. In an attempt to avoid such confusion, the following definitions have been utilised for the purposes of this study. Phonological awareness refers to “the ability to recognise that a spoken word consists of smaller components such as syllables or phonemes and that these units can be manipulated” (Lombardino, Bedford, Fortier, Carter & Brandi, 1997, p.

333). Phonemic awareness is another term used in the literature (Norris & Hoffman, 2002). This term usually refers to the awareness of words as sequences of discrete phonemes but is often used in place of the term phonological awareness (Norris & Hoffman, 2002). Phonological processing is an ‘umbrella’ term, referring to various linguistic operations that make use of information about the phonological structure of language (Catts, 1991). The term phonological awareness is most widely accepted and will be used in the current study. Phonological awareness is a form of metalinguistic ability (Ball, 1993) but there appears to be weak evidence to link it to other metalinguistic abilities (Tunmer & Rohl, 1991).

Bradley and Bryant (1985) were among the first authors to link reading to underlying phonological awareness difficulties. They suggested that skills such as rhyming and alliteration were poor in learners with reading difficulties. Since then there have been many studies linking children’s phonological awareness skills to the ease with which they learn to read and spell. Various researchers have supported a robust association between phonological awareness deficits and reading disability (Hurford & Sanders, 1990; Catts, 1991; Rack, Snowling & Olson, 1992; Rack, Hulme, Snowling & Wightman, 1994; Bird, Bishop & Freeman, 1995).

Researchers such as Van Kleeck and Schuele (Van Kleeck & Schuele, 1987) suggested that it was necessary to practise phonological awareness skills, together with other linguistic skills with language-impaired learners in order to facilitate later literacy development. The exact nature of the relationship between phonological awareness and reading is a debated issue, but few would deny the value of phonological awareness as a crucial factor in an alphabetic writing system such as English (Van Kleeck, 1990). Studies from countries such as Scandinavia, where phonological awareness is not formally taught, confirm that phonological awareness is a pre-requisite for literacy (Schneider, Ennemoser, Roth & Kuspert, 1999).

The usefulness of phonological awareness as a predictor of later reading ability has been well documented (Wimmer, Landerl, Linortner & Hummer, 1991; Catts, 1991; Mann, 1993). A number of studies have explored developing phonological awareness skills in order to affect a change in reading ability (Parkinson & Gorrie,

1995; Torgesen & Davis, 1996). A link between phonological processing and reading achievement in learners selected from an average school population has also been shown (Torgesen, Wagner & Rashotte, 1994; Catts et al., 2001). Most of the research into the area of phonological awareness and reading (and spelling) has, however, been conducted on learners for whom the education program was developed or for the majority of learners, (Craig, Connor & Washington, 2003) and findings may not be applicable to the larger learner population.

Reading is considered to be a complex behaviour requiring the acquisition of numerous perceptual, cognitive and linguistic abilities (Catts & Kamhi, 1987). However, it can be conceptualised as consisting of two primary components: decoding and comprehension. The decoding aspect relates to phonological awareness ability (Swank, 1994; Swank & Catts, 1994, Winch et al., 2001). Decoding requires an understanding of the association between sounds in words and the orthographic symbols that represent these sounds (Beck & Juel, 1992). Phonological awareness is essential to this association (Swank & Catts, 1994). Phonological awareness is also thought to influence reading comprehension indirectly through phonological decoding ability (Tunmer & Rohl, 1991). Catts and Kamhi (1999) observed that second grade readers with poor reading skills were four to five times more likely to have difficulties in the area of phonological awareness.

The process of becoming a fluent reader produces spin-off skills that provide the basis for further growth in reading, such as vocabulary, syntax, general knowledge, metalinguistic abilities and verbal processing. It has been suggested that some of these spin-off skills may be necessary to perform more difficult phonological awareness tasks (Tunmer & Rohl, 1991). Rack et al. (1994) state that it is almost universally acknowledged that there is an intimate, probably causal relationship between early phonological skills and the process of learning to read. Ball (1993) supports the idea that the relationship between reading and phonological development is most likely a reciprocal one.

There are many studies showing a relationship between learners' phonological skills and the ease with which they learn to read and to spell (Muter, Hulme, Snowling &

Taylor, 1998; Stackhouse, Wells, Pascoe & Rees, 2002). According to Kamhi and Hinton (2000), there are two basic views regarding the relationship between reading and spelling. The first focuses on dissociations between the two and the second focuses on similarities between the two. This is currently the more popular view. Kamhi and Hinton (2000) assert that if reading and spelling relied on different mechanisms, one would expect a weaker relationship between reading and spelling to be evident. Ehri (2000) supports this view.

Spelling is essentially a linguistic skill (Ehri, 2000) and in essence it requires the developing speller to reflect on the linguistic factors that contribute to the spelling of a word (Moats, 2000). Although reading initially was the area most researched, spelling has now received considerable attention in its own right, also because of the way it relates to reading development (Brown & Ellis, 1991). Until the 1960's the writing system of English was considered to be complex and illogical, leading to the idea that spelling is just rote memorisation or serial learning. Slowly, as linguists and cognitive psychologists have become involved, views of spelling have altered. The idea has emerged that although the sound-spelling correspondences of English are not completely regular, knowledge of these, together with visual memorisation can aid spelling development (Treiman & Bourassa, 2000). The dual-route model of spelling asserts that there are two different mechanisms by which spelling of a word can be produced. These are a lexical route whereby known words are accessed directly and a non-lexical route that encodes information about sound patterns and spelling patterns. It is this non-lexical route that utilises phonological awareness (Brown & Ellis, 1991; Sampson, Van Allen & Sampson, 1991). It is generally agreed that the integration of phonological and orthographic knowledge is necessary for good spelling. All theories of spelling include a dominant role for phonology (Kamhi & Hinton, 2000).

Learning to spell involves the integration of several skills. These include knowledge of phonological representations, grammatical and semantic knowledge, as well as the formulation of analogies with words in visual memory and the knowledge of orthographic rules and conventions (Bradley & Bryant, 1985; Wagner & Torgesen, 1987).

From the earliest stages of learning to spell, learners who have difficulty reflecting on the sound structure of words will be disadvantaged. Without sound phonological awareness skills, their acquisition of orthographic knowledge will be compromised (Snowling, 2000). One of the very significant and persisting consequences of a phonological awareness deficit is a difficulty with spelling (Bruck & Treiman, 1990). Phonological awareness is particularly important in the early years of developing spelling skills (Winch et al., 2001) and it involves a developmental process, like other areas of language development (Masterson & Apel, 2000).

Until recently the role of the speech-language therapist in spelling assessment and intervention was not routinely acknowledged (Moats, 2000; Masterson & Apel, 2000). Given the linguistic nature of spelling development, the speech-language therapist's involvement, is however, appropriate and important. Orton, as early as 1931, suggested that problems might occur in written, but not in oral spelling (Snowling, 2000). A similar discrepancy may occur between passing a weekly spelling test and using the same words in written text (Scott, 2000). Learners may spend hours filling out spelling workbooks only to find that the learner still makes spelling errors in his or her writing (Klein & Millar, 1990).

Masterson and Apel (2000) advocate collecting a sufficiently large sample of a learner's spelling in order to evaluate spelling problems fully. This is a challenging task due to the extensive domain of English spelling and most therapists resort to a standardised test. Many spelling tests are available worldwide but few have been standardised on the South African population. The ESSI Spelling Test (Esterhuyse & Beukes, 1997) is one of the few spelling assessment measures that has been developed for, and standardised on English-speaking South African learners.

Over the past two decades there has been considerable speculation regarding the complex inter-relationship between reading and spelling. Problems in one area could reasonably impact on the other (Willows & Scott, 1994). Frith (1985, cited in Goulandris, 1994) proposed that phonic knowledge obtained through spelling is later transferred to reading. This has been confirmed by several studies (Goulandris, 1994). Ehri (2000) states that that researchers have been divided into those who

focus on either reading, or spelling, or both. She asserts that both reading and spelling unfamiliar words require phonological awareness skills. Reading requires blending skills to assemble a unified pronunciation from the separately decoded parts while spelling requires segmentation skills in order to separate out the phonemes in a pronunciation, so that the correct graphemes can be selected. Ehri (2000) also cites a number of studies that suggest a high correlation between reading and spelling skills when assessed using word reading and word spelling tests.

Waters (1985, cited by Willows & Scott, 1994) found that third graders used similar processes for reading and spelling. In addition the ‘Matthew effect’, whereby ‘the rich get richer’ and ‘the poor get poorer’ (Stanovich, 1986) is well recognised. Therefore an early delay in spelling and reading which is not addressed may result in more severe delays later as reading and spelling skills remain under-utilised. There appear to be complex interrelationships between reading and spelling (Willows & Scott, 1994) and there is increasing evidence that the relationship is, in fact, a reciprocal one (Goulandris, 1994; Ehri, 2000).

Reading and spelling have been recognised as language skills over the years as the study of language development has broadened (Catts & Kamhi, 1999). Learners, who display significant limitations in language abilities, in the absence of accompanying hearing impairment, low non-verbal IQ scores or neurological damage, are described as specifically language impaired (SLI) (Leonard, 1998 cited in Friel-Patti, 1999). Many SLI learners are said to have an accompanying ‘auditory processing disorder’ according to Friel-Patti (1999) but diagnostic criteria for that label appear to be even more elusive than for SLI.

Language development has, however, been intimately related to the concept of phonological awareness. Although phonological awareness is generally considered to be a meta-linguistic concept (Kamhi, Lee & Nelson, 1985; Caravolas & Bruck, 1993), its relationship to receptive and expressive language development has been stated repeatedly in the literature. Bryant and Bradley (1985) suggested that there were good reasons to suspect that a learner’s linguistic abilities may be closely linked to his or her progress in learning to read and write. Catts and Kamhi, as early



as 1986, suggested that because reading and oral language share knowledge and processes, breakdowns at one or more levels of linguistic processing could be responsible for some developmental reading disorders (Catts & Kamhi, 1986). Later, Catts and Kamhi (1987) stated that research has demonstrated that language deficits and not visual perceptual problems underlie most reading disabilities. Therefore, they provide a strong motivation for the involvement of speech-language therapists in the treatment of reading disabilities. There is now a growing body of research documenting a relationship between oral and written language impairments (Catts & Kamhi, 1999).

In addition, research has indicated that children with developmental language impairments are at high risk for academic failure (Aram, Ekleman & Nation, 1984). Catts et al. (2002) suggest that the nature of the relationship between language and reading has not yet been clearly defined. Stothard, Snowling, Bishop, Chipcase and Kaplan (1998) found that many children diagnosed with early language impairment, were not classified as SLI at 8.6 years. They also had no reading problems at that stage but nevertheless presented with severe reading problems and some aspects of language delay at 15 years of age. This suggests that oral and written language problems may emerge later as linguistic complexity increases (Catts et al., 2002). The speech-language therapist is therefore an important member of the team charged with the early identification of reading (and spelling) problems as oral language problems can be successfully identified and treated in the pre-school phase (Catts et al., 2001).

The difficulties language-impaired children experience in learning to read appear to be due, at least in part, to poorly developed phonological awareness skills (Catts, 1991). Studies have consistently indicated that children with language impairment perform less well in tasks involving phonological awareness than their normally developing peers (Kamhi, Catts, Mauer, Apel & Gentry, 1988). There is also evidence to indicate that poor reading skills contribute to the extent of the language impairment in such learners (Talay-Ongan, 1996).

Language problems are not apparent in all learners with a reading delay but many may have subtle deficits (Catts & Kamhi, 1986). Most of the research to date has been on language-disordered children (Van Kleeck & Schuele, 1987). Various aspects of language are differentially affected, with some aspects appearing to be more important for the development of phonological awareness than others. It has been suggested that if there is good language comprehension and syntax, then there will also be good phonological awareness (Magnusson & Naucler, 1993).

As previously stated, South Africa is a multilingual society with many learners receiving their education in a language other than their home language (EAL) or in English as the language of learning and teaching (EL.LT). In order to acquire his or her native language, a learner must learn the words of this language and extract the phonological characteristics of those words. This complex task is made more difficult if the learner is acquiring more than one language (Yavas & Goldstein, 1998). Williams and Snipper (1990) suggest that numerous factors can influence the degree of multilingualism developed by a learner, but the language in which the learner is taught to read and write, will dominate. The skills should be transferred to the other language. There is limited research regarding what levels of proficiency actually constitute multilingualism (Gutierrez-Clellen, 1999). Clinical management of such learners is a difficult task because of the limited information on both the acquisition of phonology in languages other than English, and also the unavailability of appropriate assessment techniques and intervention methods in these languages (Yavas & Goldstein, 1998).

“ There is a dearth of studies that have explored the relationship between phonological awareness and reading in bilingual children” (Muter & Diethelm, 2001, p. 199). Becker (2001) is one of the few who has attempted to examine the effects of dual language exposure in learning impaired learners in South Africa. The Minister of Education in South Africa launched the ‘Language in Education Policy’ in 1998 to promote multilingualism in education. The governing body of each school is required to state the school policy on language and how it will promote multilingualism in the school (Squelch & Squelch, 1998-1999). South Africa, with

its multilingual learners, clearly presents a serious challenge for both educator and therapist when assessing and treating these learners.

While there has been extensive research in the area of phonological awareness, the tasks used to assess phonological awareness and the procedures used when administering them, vary greatly (Tunmer & Rohl, 1991). McBride-Chang (1995) states that generally, stimuli used in one study of phonological awareness are not used in subsequent studies but each task has in common the following functions: to perceive a speech segment, to hold it in memory long enough to perform an operation on it, to carry out the appropriate operation and finally to communicate the usually oral result, to the examiner. This has resulted in differing estimates of what level of phonological awareness can be expected for learners at each age level. Although the component skills required to perform the tasks vary greatly, factor analyses of commonly used tasks suggest that they, for the most part, are measures of a single underlying construct (Yopp, 1988). The ideal measure would include a minimum of extraneous operations and would not require any component skills that depend on or are greatly influenced by spin-off skills of reading achievements (Tunmer & Rohl, 1991).

Most of the recent research has used portions of tests or has combined different single tests in one research design. Examples include: rhyming syllable, syllable-tapping task, onset-rime judgement tasks (Hulme, Muter & Snowling, 1998; Nittrouer, 1999). There is still controversy regarding which of the phonological awareness skills is the most important in the development of spelling and reading. Some maintain that rhyming and segmentation predict different areas of the spelling process (Muter et al., 1998). Others suggest that rhyming is definitely the most predictive (Bryant, 1998). More research in this area is therefore indicated. Ball (1993) presents some interesting ideas on which of the phonological skills may be considered to be emerging, simple or complex in nature. Norris and Hoffman (2002) offer sources of phonological awareness.

Some tests have been developed which consist of various subtests assessing phonological awareness. These include: The Test of Phonological Awareness

(TOPA) (Torgesen & Bryant, 1998), the Phonological Awareness Screening Battery (PALS) (Invernizzi, Meier, Swank & Juel, 1999) and the Phonological Assessment Battery (PHAB) (Frederickson, Reason & Frith, 1997).

The TOPA (Torgesen & Bryant, 1998) consists of four subtests: initial sound same, initial sound different, ending sound same and ending sound different. This assessment does provide information regarding the alliteration aspect of phonological awareness but is narrow in its application.

The PALS (Invernizzi et al., 1998) is a useful test including subtests for rhyme awareness, beginning sound awareness, alphabet knowledge, letter sound knowledge, word concept and word recognition for pre-school and first graders. It is, however, intended as a screening test at the pre-school to first grade level.

The PHAB (Frederickson et al, 1997) has subtests including alliteration, picture and digit naming speed, rhyme, spoonerisms, fluency and non-word reading. The developers of this test claim that the PHAB (Frederickson et al., 1997) is more influential in predicting reading performance than the British Assessment Scales. Factor analyses conducted by the developers of the test, suggested that the PHAB (Frederickson et al., 1997) assesses many different aspects of phonological awareness. Standardised scores are available across the age range of 6.0 to 14.11 years for most of the subtests. It also offers a training item prior to the test items, thereby offering opportunity for a subject to apply the phonological awareness technique, if he or she has developed it.

The role of the speech-language therapist in the treatment of reading and spelling difficulties in South Africa has not been a central one. This is due, in part, to the fact that phonological awareness was not part of the syllabus in South African universities until the last decade. Therefore, many speech-language therapists and educators have not been exposed to these concepts. In addition, while learners have on occasion been referred to occupational therapists, very few have been referred to speech-language therapists, due to lack of information as to the role of the speech-language therapist in the assessment and treatment of reading and spelling disorders.

In South Africa, speech-language therapists have been fortunate to qualify as both a speech therapist and an audiologist but most choose to work in one field or the other. Some therapists in the field of audiology have been involved through assessing and treating auditory processing disorders but have not continued treating those learners who develop reading and spelling problems. Katz and Wilde (1994) claimed that reading and spelling are the skills most closely associated with auditory processing deficits in the educational context. Kamhi and Beasley (1985) suggested, however, that it is difficult to establish causal connections between auditory processing and linguistic and academic performance. Cacace and McFarland (1998) stated that an auditory processing disability is defined by symptoms that are not unique, but do in fact overlap with other disorders of language, reading and attention. McBride-Chang (1995) went as far as to suggest that a large portion of phonological awareness is simple speech perception. Many therapists have, however, failed to continue the auditory processing therapy beyond the pre-school level to the more extensive phonological processing required in the primary school phase.

Some researchers, such as Graz (1998), have attempted to look at the areas of auditory perception and spelling difficulties, but her study was confined to the learning-disabled population of South Africa. By the same token, many speech-language therapists have also worked most effectively on oral language development, but have failed to continue this to the level of written language (Catts, 1991). A major problem in South Africa is the lack of tests specifically developed and standardised in South Africa since there remain inherent limitations in using tests developed in England and America.

Yavas and Goldstein (1998) maintain that by taking linguistic patterns, cultural and sociolinguistic factors into account and by modifying assessment procedures, speech-language therapists can assess and treat phonological disorders (and similarly phonological awareness disorders) in multilingual learners. Where speech-language therapists have become involved in the assessment and treatment of reading and spelling disorders in South Africa, there is a need for an integrated understanding of the relationship between phonological awareness, reading, spelling and language

development, as well as a reliable means of assessing them in the school-aged learner.

Some schools are utilising phonological awareness techniques under the guise of ‘phonics instruction’ but most seem to be under-utilising this important aspect. Thus, it is the role of the speech-language therapist to emphasise its value, as well as the value of promoting language development in the classroom. The classroom is a potentially rich language-learning environment offering a range of audiences, settings and purposes for language use (Dudley-Marling, 1987). Literate classrooms immerse children in a ‘bath’ of written and oral language (Lindfors, 1980 cited by Dudley- Marling, 1987). Therefore, literate classrooms support the development of literacy on a daily basis (Snow, Midkiff-Borunda, Small & Proctor, 1984). This may explain why many speech-language therapists have ventured into the school milieu (Dudley-Marling, 1987).

Any intervention with the learner experiencing reading or spelling difficulties should take the form of a collaborative or team approach. The team approach is considered to be the most effective method of intervention. Within this approach, team members assess and treat learners within their own area of expertise but collaborate in order to decide on an effective treatment program for the learner.

In this way a more integrated treatment approach is made possible. The speech-language therapist can obtain greater insight into the needs of the learner within the class setting. Likewise, the educator can obtain information regarding phonological awareness and linguistic enrichment that can be applied within the class setting and incorporated into the curriculum. Parents are also important members of this team because they are responsible for practising the strategies at home and supporting the learner. Other team members may include, for example, occupational therapists, psychologists and remedial teachers. Unfortunately in South Africa, we are still far from the ideal of a full team approach in the school environment (Kriegler & Farman, 1994).

Given the unique educational situation in South Africa and the general lack of expertise in the area of phonological awareness and multilingual language development, the role of facilitator in these areas, falls squarely to the speech-language therapist working with the school-aged learner, in the inclusive educational setting, especially in the foundation phase (Grade 1 to Grade 3).

Based on the literature review the research question was formulated: *Do relationships exist between learners' performance on phonological awareness tasks and their oral reading and written spelling performance?*

This study aims to examine the relationships that exist between phonological awareness, written spelling and oral reading abilities in four groups of Grade 2 learners in an inclusive English- medium educational setting in Pretoria, South Africa. Information regarding these relationships would assist speech-language therapists in understanding how phonological awareness can affect spelling and reading performance in learners and more specifically their relationship in the multilingual learner. The test battery used in this study may prove useful in the assessment of learners experiencing reading and spelling difficulties.

## 2. METHODOLOGY

There is a great need for more information regarding the relationship between literacy development and phonological awareness ability in South Africa's multilingual learner community. This is especially necessary due to the changes in the education system. Speech-language therapists and educators require more information regarding the relationship between phonological awareness and literacy development, particularly reading and spelling, based on research conducted in South Africa on multilingual learners in the inclusive education setting, in order to lead to informed clinical practice.

### 2.1 RESEARCH AIMS

The **main** aim of this study is to examine the relationships that exist between phonological awareness, written spelling and oral reading abilities in four groups of school-aged learners in an inclusive English-medium education setting. For the purposes of this study, and in order to represent the inclusive education setting and the multilingualism of the learners, subjects are divided into **four** research groups, which are represented in Table 1.

**Table 1: Research groups**

<b>Research group</b>	<b>Literacy ability as reported by teachers</b>	<b>Home language</b>
Research Group 1	Good	English
Research Group 2	Good	Language other than English
Research Group 3	Poor	English
Research Group 4	Poor	Language other than English



In order to realise the main aim, the following **sub-aims** were formulated.

- To determine the phonological awareness, written spelling and oral reading abilities of each of the four groups of research subjects.
- To compare the intra-group tendencies of the phonological awareness, written spelling and oral reading abilities of each group of research subjects.
- To compare the inter-group tendencies of the phonological awareness, written spelling and oral reading abilities of the four groups of research subjects.

## 2.2 RESEARCH DESIGN

The research design used in this study is a *quantitative, descriptive survey*. In planning a research design, it is very important to select a viable research problem but also to consider the kind of data required and a feasible means of collecting and interpreting such data (Leedy & Ormrod, 2001). The research design provides the overall structure for the procedures that the researcher follows, the data that the researcher collects, and the analyses that the researcher conducts (Leedy & Ormrod, 2001). The research design is therefore a plan according to which data will be collected in order to investigate a hypothesis in the most economical manner (Huisamen, 1994). The data obtained will also dictate the nature of the research design (Leedy & Ormrod, 2001).

**Quantitative** research is used to answer questions about relationships among measured variables, with the purpose of explaining, predicting and controlling some phenomena. In contrast, **qualitative** research is used to answer questions about complex issues with the purpose of describing them from the participants' point of view (Leedy & Ormrod, 2001). Quantitative research usually starts with a specific hypothesis. Variables to be studied are isolated, extraneous variables are controlled for, standardised procedures are used to collect numerical data and statistical procedures are used to analyse and draw conclusions from the data. A quantitative study usually ends with a confirmation or disconfirmation of the tested

hypothesis (Leedy & Ormrod, 2001). The researcher is not a participant in the study except to record scores (Van der Merwe, 1996).

This study's research design, by nature of its stated aims, will be a quantitative one. However, due to the nature of research in this area and the small groups of subjects that are available, some elements of a qualitative design will be included.

According to Van der Merwe (1996), three types of research goals may be identified, namely: *exploratory*, *explanatory* and *descriptive*. *Exploratory* studies aim to obtain new insights into a phenomenon and determine priorities for future research. Their methods include: surveys among people with a specific problem, reviews of literature and analyses to promote understanding. Elements such as literature review and indications for further research are applicable to the current study in order to investigate the assessment measures currently being used, and to evaluate their usefulness in the inclusive education setting.

*Explanatory* studies attempt to demonstrate causality between variables and a direction of causality is also indicated (Van der Merwe, 1996). This study is indirectly interested in causality, in that phonological awareness is accepted as a predictor of reading and spelling performance in countries such as the United States of America and the United Kingdom (Catts, 1993).

*Descriptive* studies attempt to describe what exists as accurately and clearly as possible. An example is a correlation study, which demonstrates relationships between variables (Van der Merwe, 1996). The current study is aimed at measuring and describing the spelling, reading and phonological awareness abilities of the subjects, and then determining any relationship that may exist between them for each subject. The main goal of this research is therefore clearly descriptive. In order to ascertain whether a relationship exists between phonological awareness performance, and reading and spelling performance, the *descriptive* and to a lesser extent, the *exploratory* and *explanatory* research goals will be applied. According to Van der Merwe (1996), a research project usually

includes elements of two, or three of these goals, thus this project satisfies this accepted format.

There are three basic research designs: *experiments*, *surveys* and *fieldwork* (Van der Merwe, 1996). Experiments are usually conducted in a laboratory setting where a very high level of control can be obtained but naturalness is lost. *Fieldwork* is normally longitudinal, takes place in a natural environment, is mostly exploratory and cannot be effectively controlled. *Surveys* are usually descriptive or explanatory and are representative and either longitudinal or cross-sectional. The subject groups are statistically composed by means of sampling (Van der Merwe, 1996). This study by its nature will employ a **survey** design, as it is representative and descriptive or exploratory in design. This will also be a cross-sectional study as phenomena (score on each of the tests used) will be observed at a given moment or in this case, within a fixed time period (Van der Merwe, 1996).

Thus the research design dictated by the aims of this study will be a **quantitative, descriptive survey**. The implication is that one may assume that whatever is observed at any one time, can conceivably be observed again in the future. The **descriptive survey** method demands that a sample population is selected from the general population that will be logically and statistically defensible. This type of design is particularly vulnerable to distortion due to bias in the research design and every attempt must be made to safeguard against this by means of carefully controlled variables (Leedy & Ormrod, 2001).

### **2.2.1 Reliability and validity**

**Reliability** refers to “the consistency with which a measuring instrument yields a certain result when the entity being measured hasn’t changed.” (Leedy & Ormrod, 2001 p. 31)

Using established tests, which were used according to the prescribed test procedure in the test manual, ensured the reliability of the majority of assessment measures in this test. These tests have proved clinically useful although they have not been

standardised on the South African population. The assessment measures designed by the examiner, the Class Spelling List and the Reading Comprehension, were administered in an identical manner for each subject thereby making every effort to ensure the reliability of these measures. In addition, only the researcher was responsible for administering the assessment measures in order to further increase reliability.

No matter what research design is used, the **validity** of the research approach must be considered. “The internal validity of the research study is the extent to which its design and the data that it yields allow the researcher to draw accurate conclusions about cause-and-effect and other relationships within the data.” (Leedy & Ormrod, 2001 pp. 103-104)

Other possible explanations of the results observed, have to be eliminated. Internal validity is of great importance in experimental designs, where the specific intent is to identify cause-and-effect relationships. The researcher must be confident that any conclusions drawn are warranted by the data collected (Leedy & Ormrod, 2001). In this study subjects were randomly selected from the four research pools. The order in which they were tested was randomly assigned. The subjects were unaware of the purpose of the study and the test subjects were all evaluated individually in the same setting using the same order of assessment measures and the same instructions.

“The external validity of a research study is the extent to which . . . . .conclusions drawn can be generalized to other contexts.” (Leedy & Ormrod, 2001, p. 105). A real-life setting, a representational sample, or replication in a different context can enhance external validity. In this study every effort was made to obtain a representational sample by using a battery of assessment tools. The methodology has been carefully described in order to allow for future researchers to replicate the present study exactly. Thus, both internal and external validity were considered during the formulation of this research design.

### **2.2.2 Ethical implications**

Within the social sciences, human subjects are often used in research, and therefore ethical implications must be considered (Leedy & Ormrod, 2001). Most ethical issues fall into one of four categories (Leedy & Ormrod, 2001). These were considered in the following manner in this research study:

- Protection from harm. The participants in this study were in no danger from participation in the research.
- Informed consent. Consent for this study was obtained from the principal and governing body of the school in which this study was conducted. Consent for participation in the study was obtained from the parents of each subject. Each child was verbally informed that participation in the study was optional. If any subject had declined to participate, he or she would have been excused.
- Right to privacy. Confidentiality was guaranteed and numbers were used to refer to subjects.
- Honesty with professional colleagues. The reporting of the findings in this study is offered without misrepresentation or fabrication.

Approval of appropriate ethical procedures in the current study was obtained from the Research Ethics Committee of the Faculty of Humanities, University of Pretoria (See Appendix A).

### **2.3 SUBJECTS**

In the section that follows, the subject selection criteria and procedures will be discussed separately in order to facilitate presentation of the data. A description of the subjects selected to participate in the study will then be presented, to clarify the population sample used in the study.

### 2.3.1 Subject selection criteria

All the subjects were required to meet the following criteria:

- **English–medium inclusive educational setting**

The subjects were required to attend the same English-medium inclusive educational setting, as assessment measures in the test battery were in English. The inclusive setting was required in order to represent the current education policy in South Africa (Naicker, 1999 b).

- **Final term of Grade 2**

Subjects had to be in the final term of Grade 2 and therefore aged between 7.11 and 8.11 years of age. This ensured that the learners were well known to their class teachers and evaluations were those reflected on the end of year school reports being compiled at that time.

Grade 2 children were selected as this represents the second year of formal education in which attention is directed to spelling and reading. In Grade 1 there are still variations in children's literacy abilities but by 8 to 9 years of age, a significant sight vocabulary should have developed and meaning should be easily derived from text (Kamhi & Catts, 1991).

- **Medical history**

The subjects were required to have no medical history of neurological dysfunction or symptoms such as epilepsy because such disabilities may affect language and other test results (Keith, 1988).

- **Hearing and middle ear functioning**

The subjects had to have normal peripheral hearing (air conduction thresholds at or below 15dB for frequencies 125 to 8000 Hz) (Barrett, 1994) and normal middle ear functioning (type A tympanogram with a middle ear pressure of between –100 and +30 dPa and a static compliance of between 0.3 and 1.75 cm<sup>3</sup>) at the time of testing (Barrett, 1994). This

criterion was included to ensure normal middle ear functioning at the time of the data collection (Barrett, 1994).

- **Cognitive abilities**

Subjects were required to have average to above average cognitive abilities according to school records. This criterion was included to provide a more homogeneous population for testing and because impaired cognitive abilities may affect interpretation of test instructions (Kleinman & Prizant, 2000). In addition, the verbal intelligence quotient is thought to be strongly correlated with reading skill in the normal population (Snowling, 2000).

- **Home language**

Subjects in Groups 1 and 3 were required to have *English* as their home language. Subjects in groups 2 and 4 were required to have a *language other than English* as their home language. This was to include the factor of multilingualism that is common in South Africa (McLeod, 1995).

- **Literacy abilities**

The subjects in Groups 1 and 2 were required to have *good* literacy abilities as judged by their class teachers on a scale of 1 to 5 (as discussed under 2.3.2), and as reflected by their score on the end of year school report. Subjects in groups 3 and 4 were required to have *poor* literacy abilities as judged by their class teachers and as reflected by their score on the end of year report.

### **2.3.2 Subject selection procedure**

The following procedure was followed in the final selection of subjects to participate in this study:

- The principal of an English-medium public school was approached regarding participation in this study, as he had been amenable to cooperating with the Department of Communication Pathology, University of Pretoria, South Africa on previous occasions.

- A written preliminary research protocol (See Appendix B) was made available to the board of governors of the school and permission was obtained to conduct the study.
- Testing was undertaken during the month of November, when the school syllabus was completed for the year and end of year school reports were being compiled. This ensured that the teachers had a clear idea of the learner's literacy ability.
- Each of the four Grade 2 teachers at the school where this study was conducted was requested to rate the overall literacy ability of the learners in her class on a scale of 1 to 5. The score reflected the score each learner was to receive on the end of year school report being compiled at that time.
- The learners who received a score of 1 (excellent) or 1-2 (very good) were then placed in one preliminary pool (n=26). Learners who received a score of 4 (weak) or 5 (very weak) were placed in another preliminary pool (n=16).
- Questionnaires (See Appendix C) were then sent to the parents of all 42 of these learners who met the selection criteria and permission was requested for their possible inclusion in the study. Forty (97.5%) of the questionnaires were completed and returned to the school by the parents. Of the forty returned, one learner in the poor literacy group chose not to participate despite parental permission. Thus 92.86% of the learners were still available for the next selection procedure. There were 24 learners in the pool with *good* literacy and 15 learners in the pool with *poor* literacy.
- The 24 learners in the *good* literacy pool were then further divided into two smaller pools. One pool had learners with *English* as their home language (n=13) and the other had a *language other than English* as their home



language (n=11). Six possible subjects were then selected from each of these two smaller pools by random selection.

- The 15 learners in the *poor* literacy pool were similarly divided into two smaller pools. As before one had learners with *English* as their home language (n=6) and the other had a *language other than English* as their home language (n=9). Six possible subjects were then selected from each of these two smaller pools by random selection.

Five subjects in each of the four research groups were required for this research. A sixth possible subject was retained in case of a subject withdrawing, but was not required.

- The subjects in research groups 1 to 4 and reserves (n=24) were then screened using the portable audiometer, in order to ensure normal pure tone hearing levels and normal middle ear functioning. All subjects tested within normal limits and could thus be utilised in the research. The first five subjects in each research group were then tested using the test battery. This is represented graphically in Figure 1. Results were recorded on a form developed for the purpose (See Appendix D).

The four groups of subjects that were thus used in this study, can be summarised as follows:

- **Research Group 1** comprised Grade 2 learners with *English* as their home language and who were judged by their class teachers to have *good* literacy ability.
- **Research Group 2** comprised Grade 2 learners with a *language other than English* as their home language and who were judged by their class teachers to have *good* literacy ability.

- **Research Group 3** comprised Grade 2 learners with *English* as their home language and who were judged by their class teacher to have *poor* literacy ability.
- **Research Group 4** comprised Grade 2 learners with a *language other than English* as their home language and who were judged by their class teacher to have *poor* literacy ability.

These four groups were included in order to reflect the government policy to promote inclusive education in South Africa implemented since 1996 (Naicker, 1999 b). Implicit in this policy, is that any learner (regardless of possible disability) has the right to attend a public school (Naicker, 1999 b). The school used in this study is situated in a suburb of Pretoria and is attended by learners of various population and language groups, with the majority from middle class backgrounds.

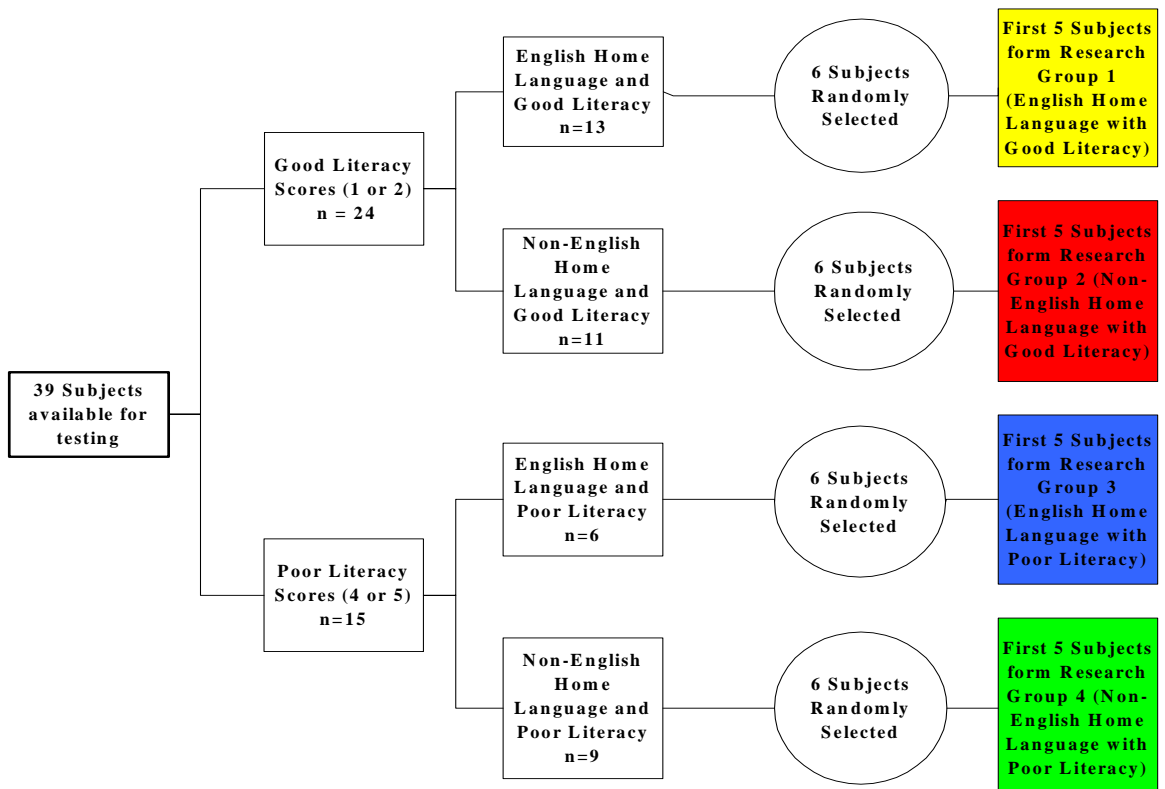


Figure 1. Subject selection procedure

**2.3.3 Description of the subjects**

The characteristics of the research subjects in each research group are described in Table 2.

**Table 2. Characteristics of subjects in the research groups**

RESEARCH GROUP	SUBJECT	AGE	GENDER	HOME LANGUAGE	PREVIOUS THERAPY	HISTORY OTITIS MEDIA
1	1	8.8	F	ENGLISH	NO	NO
1	2	7.11	F	ENGLISH	NO	NO
1	3	8.7	F	ENGLISH	NO	NO
1	4	8.8	M	ENGLISH	YES – SPEECH THERAPY (ARTICULATION DISORDER)	YES (ONCE)
1	5	8.4	M	ENGLISH	NO	NO
2	6	8.6	F	CHINESE	NO	NO
2	7	8.2	F	ARABIC	NO	YES (3-4 TIMES)
2	8	8.4	F	SETSWANA	NO	NO
2	9	8.9	F	AFRIKAANS	YES – OCCUPATIONAL THERAPY (MUSCLE TONE)	NO
2	10	8.8	M	NORTHERN SOTHO	NO	NO
3	11	8.8	M	ENGLISH	YES – OCCUPATIONAL THERAPY (FINE MOTOR DEVELOPMENT) MEDICATION	NO
3	12	8.2	M	ENGLISH	YES – OCCUPATIONAL THERAPY (VISUAL SPATIAL)	NO
3	13	8.6	M	ENGLISH	YES – OCCUPATIONAL THERAPY (GROSS MOTOR DEVELOPMENT/CONCENTRATION)	YES (UNTIL GROMMETS AT 18 MONTHS)
3	14	8.7	F	ENGLISH	YES – OCCUPATIONAL THERAPY (NO DETAILS)	YES (TWICE)
3	15	7.11	M	ENGLISH	YES – SPEECH THERAPY OCCUPATIONAL THERAPY AND REMEDIAL THERAPY	NO
4	16	8.3	M	NORTHERN SOTHO	NO	NO
4	17	8.10	M	TSWANA	YES – OCCUPATIONAL THERAPY	NO
4	18	8.0	M	FRENCH	YES – OCCUPATIONAL THERAPY	NO
4	19	8.6	M	SOTHO	NO	NO
4	20	8.0	F	TSWANA	NO	NO

*Group 1* was comprised of three female and two male subjects. The age range of the subjects was 7.11 to 8.8 years. All had English as their home language and only one had been exposed to therapy for an articulation disorder affecting s. One subject had a single incidence of otitis media where the others had no history of middle-ear infections.

*Group 2* was comprised of four female and one male subjects. Their ages ranged from 8.2 to 8.9 years. All five had different home language backgrounds including South African indigenous languages, Chinese and Arabic. A single subject in this group had received occupational therapy for muscle tone. One subject had suffered three to four bouts of otitis media previously but the other subjects had no history of middle-ear problems.

*Group 3* was comprised of four male and one female subjects. The age range was from 7.11 to 8.8 years. All subjects had English as their home language. All subjects had received occupational therapy previously and one had received speech and language therapy and remedial therapy. One of the subjects was medicated with Ritalin and while it would have been preferable to exclude this subject, due to the limited subject pool, it was decided to include the subject. The subject was tested without medication to reduce the possible effect on results. Two of the subjects had a history of previous middle-ear infections.

*Group 4* was comprised of four males and one female with an age range of between 8.0 and 8.10 years. Four had an indigenous African language as their home language and one had French as his home language. Two of the subjects had received occupational therapy and none had a history of otitis media.

## **2.4 MATERIAL AND APPARATUS**

In the interests of clarity the materials and apparatus used in this study are divided into

- Materials and apparatus used for subject selection
- Materials and apparatus used for data collection

### ***2.4.1 Materials and apparatus used for subject selection***

The following materials and apparatus were utilised in order to select the research subjects.

- *Evaluation of literacy ability by teachers:* A rating scale of 1 to 5 was used by each of the four Grade 2 teachers at the school where this study was conducted, in order to rate the literacy ability of the learners in her class. The learners had been rated on this scale for report purposes just prior to this study and these rating scores were reflective of the score each learner would obtain on his or her most recent year-end school report.  
(1- excellent    2-good    3-average    4-poor    5-very poor)
- *Parental questionnaire:* A questionnaire was compiled for completion by the parents of each of the learners in the two subject pools who had been identified by the teachers' literacy evaluations (See Appendix C). The questionnaire contained 14 questions designed to elicit background information that might be relevant in data interpretation and was designed by the researcher.
- *Hearing and immitance screening evaluation:* Hearing of all subjects in the four research groups and of the reserve subject in each group were screened in order to establish normal hearing and middle ear functioning (Barrett, 1994).
  - A calibrated Maico MA 25 Portable Audiometer (Calibrated in January of the year of testing in accordance with SABS requirements) was used to screen hearing from 125 to 8000Hz at 15dB above ambient noise level (Barrett, 1994).
  - A calibrated GSI 28A Autotymp Middle Ear Analyzer (Calibrated in January of the year of testing in accordance with SABS requirements) was used to screen middle ear functioning. A type A tympanogram, with a middle ear pressure of between -100 and + 30dBPA and a static compliance of between 0.3 and 1.75cm<sup>3</sup> was required before data collection could continue (Barrett, 1994).

- Results were recorded on a form compiled for the purpose by the researcher (See Appendix D).

#### ***2.4.2 Materials and apparatus used for data collection***

Whilst the main aim and sub-aims of this study are concerned with the measurement of phonological awareness, oral reading and written spelling, it was considered necessary to include a *measure of articulation* in order to ascertain whether subjects with reading and or spelling difficulties also had articulation problems. It has been suggested that learners with misarticulations may make more spelling or reading errors (Catts, 1989; Clarke-Klein, 1994). The Test of Oral Language Development- Primary: 2<sup>nd</sup> edition (TOLD-P:2) (Newcomer & Hammill, 1991) was also included in order to examine subjects' language development in relation to their reading and spelling abilities, as language has recently been related to such performance and due to the inclusion of bilingual learners in this study.

The following materials and apparatus were used in order to collect data from the research subjects.

- *Goldman-Fristoe Test of Articulation* (Goldman & Fristoe, 1986) was used to test the articulation abilities of the research subjects because it is a widely used and freely available test. Although this is an American test, it is widely used and clinically relevant in South Africa. Articulation assessment was included because there is considerable interest in the literature regarding the relationship between sounds misarticulated and possible phonological awareness difficulties (Catts, 1989). While the researcher realized that the nature and severity of a phonological disorder is not evident on a typical articulation test such as this (Larrivee & Catts, 1999), numerous articulation errors would alert one to a problem in the area of phonology.

- The *ESSI Reading Test* (Esterhuyse & Beukes, 1997) (See Appendix E) was used to assess the formal oral reading abilities of the research subjects. This test utilises single word reading and was originally developed for South African children from former model C schools (inclusive educational settings). A list of 20 to 25 single words is provided for each grade from grade 1 to grade 7. The R2 list is specifically for Grade 2 learners. The school at which the current research was conducted uses no formal test to assess reading ability and it was questioned whether the teachers' subjective evaluations of literacy ability would be accurate. Reading assessment occurs informally in the classroom usually in the continuous reading of a passage. The researcher wanted to investigate whether there would be a difference in performance between the learner reading single words aloud as opposed to the learner reading a passage aloud. Research has mainly been directed at single word reading (Tunmer & Chapman, 1998) or at reading comprehension (Catts et al., 2001) but not at both. Oral reading rather than silent reading was selected, as errors may escape notice when reading silently to oneself (Winch et al., 2001).
- The *ESSI Spelling Test* (Esterhuyse & Beukes, 1997) (See Appendix F) was used to assess the written spelling abilities of the research subjects. The test, as mentioned earlier, was developed for use with the learner population in South African schools. A spelling list of 20 to 25 words is again provided for each grade. The S2 list is developed specifically for Grade 2 learners. It was decided to use written rather than verbal responses, as this is how spelling is assessed each week in the school in which the current study was conducted. In addition, a permanent record would then be available for quantitative and qualitative analysis. Researchers such as Clarke-Klein (1994) have utilised written spelling measures in their test battery. Spelling assessment was included in the current assessment protocol because there is clear evidence that phonological awareness and spelling performance is linked (Clarke-Klein, 1994).

- The *Phonological Assessment Battery* (PHAB) (Frederickson et al., 1997) was used to assess the subjects' phonological awareness ability. The relationship of phonological awareness to reading and spelling has been repeatedly proven in the literature (Schneider et al., 1999). While many assessment measures are available, for example, Test of Phonological Awareness (TOPA) (Torgesen & Bryant, 1998) and Phonological Awareness Screening Battery (PALS) (Invernizzi et al., 1998), no phonological awareness battery has been standardised in South Africa, despite attempts by Van Staden (1996) and Haarhof (2001). The PHAB (Frederickson et al., 1997) was selected as it is purported to be suitable for this age group and it includes a variety of phonological tasks. This test has been used in some research in South Africa and appears to be the most suitable of the available tests for use in this study. Early indications suggest that it might lend itself to adaptation for use among speakers of other languages in South Africa. Johns (1999) has suggested some preliminary modifications but as these are untested, the modifications were not utilised in this study.

Many of the phonological awareness areas covered by the PHAB (Frederickson et al., 1997) have been assessed in previous research although not in this particular format. Alliteration and rhyming assessments are often used in research (Bryant & Bradley, 1985). Spoonerisms are not often included in research in the area of phonological awareness but have been suggested as difficult for learners with phonological processing problems (Perin, 1983 cited by Goulandris, 1994). Naming speed and non-word reading is also reported to be poor in such learners (Goulandris, 1994). The PHAB (Frederickson et al., 1997) therefore incorporates a representation of many of the areas considered valuable in the assessment of phonological awareness abilities. A practice item is included for each subtest so a possible lack of exposure to this type of item can be eliminated. The PHAB (Frederickson et al., 1997) has been used in limited research in South Africa (Johns, 1999).



However, good validity and reliability is reported in the UK and it takes only 45 minutes to administer (Frederickson et al., 1997) making it a suitable choice for inclusion in a test battery.

- A *Class (Informal) Spelling List* of 25 words was compiled by the researcher (Appendix E). A word was randomly taken from each of the 25 lists covered in the classes during the year. The words represented a variety of spelling rules and were considered representative of familiar spelling words. This list was included in order to compare the results to those of the formal ESSI spelling assessment (Esterhuyse & Beukes, 1997). It was desirable to get as broad a representation of spelling status as possible within the confines of this study in order to obtain as representative a result as possible. No formal spelling assessment tool was used during the school year in the school used in this study. A class spelling list consisting of 50 of the spelling words learned during the year, was however, written at the end of the school year in order to assess spelling (Repton, 1999). This measure was therefore included to provide an assessment which may be used in future within the school and the results of which could be compared to scores on the formal ESSI Spelling Test (Esterhuyse & Beukes, 1997).
  
- The researcher developed a *Reading Comprehension Task*, as none of the available tests were applicable as they were group tests. (See Appendix H). The comprehension task that was developed consisted of a 157 word passage taken from a reader (Munroe & O'Donnell, 1973) used in the class and considered by the Grade 2 teachers at this school to be a reader that all learners should have mastered by the end of the academic year (Morton, 2000). Eight multiple-choice questions, each with four possible answers, based on the text, were developed. A Reading Comprehension Task was included because reading comprehension implies understanding of what has been read and involves a number of skills (Blachowicz & Ogle, 2001). It was desirable to include both a single word reading (decoding) task and a reading comprehension task, as these

are the two primary components of reading (Gilbertson & Bramlett, 1998). Prior to the administration of the test battery to the subjects, this reading comprehension task was administered to a learner judged as having average literacy skills, and who was not included as a subject in the current study. This ‘average’ learner completed the task within a ten-minute period. A fifteen-minute period was therefore allowed for completion of this test when it was included in the test battery.

- *The Test of Oral Language Development- Primary: 2nd edition* (TOLD-P: 2) (Newcomer & Hammill, 1991) was used to assess receptive and expressive language development in the current study. A test of language development was included to interpret results obtained from the research groups on the other assessment measures as it has been suggested that children with reading problems often have concomitant oral language deficits (Catts & Kamhi, 1999).

This is a commonly used measure of language in international research studies. It is appropriate for this age level and is relatively quick to administer (30 minutes). A number of profiles, including receptive and expressive language and grammar, are revealed by the scores obtained and these will offer a score to correlate with other data. Although this test is not standardised for use on the South African population, it is routinely used by speech-language therapists in South Africa and has proved reliable and valid in the USA (Newcomer & Hammill, 1991).

## **2.5 DATA COLLECTION PROCEDURES**

The data collection procedures were identical for each of the five research subjects in each of the four research groups in order to control for testing variables. When test variables are identical for all subjects, comparisons and the nature of relationships between scores achieved by subjects can be investigated (Leedy & Ormrod, 2001).

Each subject was tested individually in two sessions of approximately 45 to 60 minutes in length. The test sessions occurred on consecutive schooldays and the testing of all subjects was completed within two weeks. Testing was conducted in a quiet room in the school. The subject was seated to the researcher's left at a table. Testing occurred during lesson time with the permission of the principal and teacher. Subjects were informed that they were assisting the researcher gather information that would help other learners.

The *first test session* for each subject consisted of four tasks:

- The **Goldman-Fristoe Test of Articulation** (Goldman & Fristoe, 1986) was administered according to the instruction manual. Articulation errors were recorded on the appropriate score sheet.
- The **ESSI R2 Reading List** (Esterhuysen & Beukes, 1997) was placed in front of the subject. The subject was requested to read each word and was instructed to guess if uncertain. Responses were recorded on the appropriate response sheet (See Appendix I), and later tallied.
- The **ESSI S2 Spelling List** (Esterhuysen & Beukes, 1997) was then administered orally. Subjects were requested to write their answer on the appropriate answer sheet (See Appendix J), given to them. They were requested to attempt an answer each time.
- The **PHAB** (Frederickson et al., 1997) was administered according to the test manual. The Supplementary Test of Alliteration was omitted, as the children were old enough to use the basic Test of Alliteration. The developers of the test suggest that one of the two be utilised. All responses were noted on the score sheets.

The *second test session* was comprised of three tasks:

- The **Informal Spelling List** developed by the researcher was administered orally. Each subject was requested to write his or her

answer on the response sheet provided (See Appendix K). The subject was again instructed to attempt to spell every word.

- The **Reading Comprehension Task** (See Appendix L) developed by the researcher was placed in front of the subject who was requested to read the passage aloud. No assistance was provided, other than support and encouragement to complete the task. The number of words read incorrectly was noted. The subject was then instructed to read aloud the questions and circle the correct option. Once the scores had been recorded on the appropriate sheet, the researcher then read aloud the questions and multiple-choice options to the subjects who scored poorly. This was done in order to give subjects the opportunity to show their comprehension rather than the mechanics of the reading process. Any change in answer was noted for later interpretation of data. A total of fifteen minutes was allowed for this task.
- The **TOLD-P: 2** (Newcomer & Hammill, 1991) was administered according to the instructions outlined in the test manual. Responses were recorded on the record form.

All subjects received a thank you note and sticker token on completion of the testing.

## 2.6 DATA RECORDING

The researcher carefully recorded the data obtained on the subtests during the testing period, using specified formats, for later analysis. A separate form was utilised for each individual subject on each individual assessment measure. The following formats were used:

- The responses given by each subject on the sounds-in-words portion of the Goldman- Fristoe Test of Articulation (Goldman-Fristoe, 1986) was

recorded using phonetic script on the form supplied in the test manual. If no error was noted, the relevant square was left blank.

- Responses to the ESSI R2 reading list (Esterhuyse & Beukes, 1997) were noted on the record form supplied in the test manual (See Appendix I). Recording of responses was conducted as suggested by the test manual and a note was made of the word that was read. The researcher later calculated the subject's score out of twenty.
- Subjects recorded their responses, in pencil, to the items in the ESSI 2 spelling list on the record form supplied in the test manual (Esterhuyse & Beukes, 1997) (See Appendix J). The researcher later calculated the subject's score out of twenty.
- Responses given by the subjects to the items in the PHAB (Frederickson et al., 1997) were recorded as specified in the manual on a photocopied facsimile of the record form supplied in the test manual. In order to determine the phonological awareness of subjects in the four research groups, the raw scores on the nine subtests of the PHAB (Frederickson et al., 1997) were calculated. The standardised score was then obtained from the test manual for each of the subtests, and recorded on the profile supplied on the record form. The number of highlighted scores was then also recorded on the record form.
- In the case of the Class Spelling List devised by the researcher, subjects wrote their responses in pencil on the 25 item record sheet, which was developed by the researcher for this purpose (See Appendix K). The researcher later calculated the subject's score out of twenty-five.
- For the Reading Comprehension task, subjects circled responses on the reading comprehension answer sheet designed by the researcher. The subject circled an answer (a), (b), (c) or (d) to each of the eight questions posed (See Appendix L). During the assessment, the researcher noted the

number of words read incorrectly at the top of the record form. The researcher later calculated the subject's score out of eight. If the subject scored better when the questions were read to him or her, this score was noted. It was not used in the statistical analyses but was retained for later qualitative interpretation.

- Responses offered by subjects on the TOLD-P: 2 (Newcomer & Hammill, 1991) were recorded on the record form, in the manner suggested in the test manual. The raw score was calculated for each of the subtests and recorded on the form. The standard scores were then obtained from the test manual and added to the form. The composite scores were then calculated and again looked up in the test manual, and recorded on the form. The quotients obtained were also recorded on the form. All standard scores and quotients were then recorded on the Profile of Scores for each subject.

## **2.7 DATA ANALYSES**

In order to determine the phonological awareness, written spelling and oral reading ability of each of the four groups of research subjects, the following analyses were undertaken.

### ***2.7.1 Qualitative analysis***

- Responses from parental questionnaires received from all subjects were organised into a table, so that parental observations regarding birth weight, pre-school attendance, enjoyment of reading and whether the subject read for pleasure, could be described qualitatively and be made available for later explanation of findings.

### ***2.7.2 Quantitative analysis***

- All subtest scores from the assessment measures in the test battery obtained by each subject, were categorized. *Average* and *above average* scores were

recorded in blue, and *below average* scores were recorded in red, in order to clearly differentiate performance. In the case of the reading comprehension and the spelling measure developed by the researcher, a cut-off of 50 percent, or 4 and 12.5 respectively, was taken. A standard score of less than 4.5 was taken to represent below average performance on the ESSI Reading (Esterhuyse & Beukes, 1997) and ESSI Spelling tests (Esterhuyse & Beukes, 1997). This score represents a percentile score of 50 percent. In the case of the TOLD-P: 2 (Newcomer & Hammill, 1991), the profile provides a standard score value for below average of less than 8 and this value was utilised. In the case of the PHAB (Frederickson et al., 1997), a standardised score of less than 86 constitutes a below average score, and this value was used.

- The mean and standard deviation values were calculated for each of the four research groups for all the reading and spelling measures. These values and the probability values (p) were obtained when the Kruskal-Wallis test was applied. This test was used due to the small number of subjects and the fact that scores were not normally distributed. This dictated the use of a non-parametric test such as the Kruskal-Wallis test (Steyn, Smit, Du Toit & Strasheim, 1994). Statistically significant differences ( $p \leq 0.05$ ) are highlighted. The B.M.D.P Statistical Software, Inc (1993) computer program was used.
  
- The mean and standard deviation values were calculated for each of the four research groups for the subtests of the TOLD-P: 2 (Newcomer & Hammill, 1991). These values and the probability values (p) were obtained when the Kruskal-Wallis test was applied. This test was used due to the small number of subjects and the fact that scores were not normally distributed. This again dictated the use of a non-parametric test such as the Kruskal-Wallis test (Steyn, et al., 1994). Statistically significant values ( $p \leq 0.05$ ) are highlighted. The B.M.D.P Statistical Software, Inc (1993) computer program was used.

- The mean and standard deviation values were calculated for each of the four research groups for the quotients of the TOLD-P: 2 (Newcomer & Hammill, 1991). These values and the probability values (p) were obtained when the Kruskal-Wallis test was applied. This test was used due to the small number of subjects and the fact that scores were not normally distributed. This again dictated the use of a non-parametric test such as the Kruskal-Wallis test (Steyn, et al., 1994). Statistically significant values ( $p \leq 0.05$ ) are highlighted. The B.M.D.P Statistical Software, Inc (1993) computer program was used.
  
- The mean and standard deviation values were calculated for each of the four research groups for the subtests of the PHAB (Frederickson et al., 1997). These values and the probability values (p) were obtained when the Kruskal-Wallis test was applied. This test was used due to the small number of subjects and the fact that scores were not normally distributed. As before this dictated the use of a non-parametric test such as the Kruskal-Wallis test (Steyn et al., 1994). Statistically significant values ( $p \leq 0.05$ ) are highlighted. The B.M.D.P Statistical Software, Inc (1993) computer program was used.
  
- The results obtained by the subjects judged to have good literacy ability and the results of those subjects judged to have poor literacy were then tallied for the following items in the test battery: Reading comprehension, ESSI Reading (Esterhuyse & Beukes, 1997), ESSI Spelling (Esterhuyse & Beukes, 1997) and Class (informal) Spelling tasks as well as the number of reading errors made, the TOLD-P: 2 (Newcomer & Hammill, 1991) and the PHAB (Frederickson et al., 1997). The Kruskal-Wallis test was then applied to determine whether there were significant differences between the two groups. The B.M.D.P Statistical Software, Inc (1993) computer program was used.
  
- The scores obtained by all twenty subjects on the nine subtests of the PHAB (Frederickson et al., 1997) were calculated. Similarly the scores



achieved by all twenty subjects on the thirteen subtests of the TOLD-P: 2 (Newcomer & Hammill, 1991) were calculated. Due to the larger number of subjects, the Spearman correlation coefficients between the subtests of the two assessment measures could be calculated. The Spearman correlation coefficient is employed with ordered or ranked data (Steyn et al., 1994).

- Similarly, the scores obtained by all twenty subjects were calculated for ESSI Reading (Esterhuyse & Beukes, 1997), Reading Comprehension Task, ESSI Spelling (Esterhuyse & Beukes, 1997), Class Spelling List and number of reading errors made during the Reading Comprehension. These scores were then correlated against the total scores of all twenty subjects on the thirteen subtests of the TOLD-P: 2 (Newcomer & Hammill, 1991) and the nine subtests of the PHAB (Frederickson et al., 1997). The Spearman correlation coefficient was used as this is ordered or ranked data (Steyn et al., 1994).

### **3. RESULTS AND DISCUSSION**

#### **3.1 INTRODUCTION**

Many researchers have asserted that phonological awareness and language development are intimately linked with the development of reading and spelling (Bruck & Treiman, 1990; Ball, 1997; Bernthal & Bankson, 1998; Masterson & Apel, 2000; Norris & Hoffman, 2002). To date no study, as far as could be determined, has compared English-speakers and non-English or English as Additional Language (EAL) speakers on measures of phonological awareness within the same study. It is important to understand how these various aspects interrelate to affect reading and spelling. It is hoped that this research may provide insight into their interrelation and that it may offer useful assessment procedures for use by speech-language therapists working with such learners in South Africa.

The parents' responses to the questionnaire and the results obtained by the subjects in the four research groups on the test battery utilised in this study, are presented forthwith.

#### **3.2 PARENTAL PERSPECTIVES**

The parents of each subject received a questionnaire (See Appendix B) prior to the commencement of testing. The questions covered case history details and also areas such as birth weight, pre-school attendance, whether the subject enjoyed reading and whether he or she read for pleasure. Table 3 represents a summary of the parents' answers to the questions posed in the questionnaire.

**Table 3. Answers to parental questionnaires**

Group	Subject	Gender	Birth weight > 2.5kg	Attended pre-school	Enjoys reading	Reads for pleasure
1	1	F	YES	YES	YES	YES
	2	F	YES	YES	YES	YES
	3	F	NO (2.2kg)	YES	YES	YES
	4	M	YES	YES	YES	YES
	5	M	YES	YES	YES	SOMETIMES
2	6	F	YES	YES	YES	SOMETIMES
	7	F	YES	YES	YES	YES
	8	F	NO (2.49kg)	YES	YES	YES
	9	F	YES	YES	YES	YES
	10	M	YES	YES	YES	YES
3	11	M	YES (4.6kg)	YES	SOMETIMES	NO
	12	M	YES	YES	SOMETIMES	SOMETIMES
	13	M	YES (4.1kg)	In African language	Read to	NO
	14	F	YES	NO	YES	YES
	15	M	YES	YES	SOMETIMES	NO
4	16	M	YES	YES	SOMETIMES	SOMETIMES
	17	M	YES	YES	SOMETIMES	NO
	18	M	UNKNOWN	YES	YES	NO
	19	M	UNKNOWN	YES	YES	NO
	20	F	NO (2.43kg)	YES	YES	YES

According to Table 3 there were two subjects with a below average birth weight in the good literacy groups (Group 1 and Group 2) and only one in the poor literacy groups (Group 3 and Group 4). There were, however, two parents who could not recall birth weight and interestingly, two subjects with a birth weight of more than 4 kg in the poor literacy groups. It has been suggested that low birth weight contributes to a myriad of developmental delays (March of Dimes Birth Defect Foundation, 2003), but on the basis of these results, no comment can be made.

As can be seen from Table 3, almost all subjects attended pre-school whether they were in the poor literacy groups (Group 3 and Group 4) or in the good literacy groups (Group 1 and Group 2). Researchers such as Lombardino et al. (1997) and Catts et al. (2001) have suggested that phonological awareness training at the pre-school level will have a beneficial influence on later reading performance. It was not possible to investigate the presence or absence of such training within the confines of this study. It would be interesting to note whether the subjects with better performance on the language measure and the phonological awareness

measure used in this study, irrespective of their mother tongue, in fact received more exposure to English and/or to phonological awareness training in their pre-schools.

Whilst all the subjects in the two good literacy groups (Group 1 and Group 2) enjoyed reading, only four of the subjects in the poor literacy groups (Group 3 and Group 4) enjoyed reading. Five of the subjects in these groups did, however, sometimes enjoy reading. Bearing in mind that the development of reading and phonological awareness is claimed to be reciprocal (Goulandris, 1994), reading should be encouraged in the poor literacy group at a level appropriate for them. The speech-language therapist plays a vital role in this regard.

It is interesting to note that even within the good literacy groups (Group 1 and Group 2) there were two subjects who only sometimes read for pleasure. Not surprisingly, six of the ten subjects in the poor literacy groups (Group 3 and Group 4) did not read for pleasure. In addition two subjects in these groups only sometimes read for pleasure. This lack of enjoyment of reading is typical in poor readers but will have a negative effect on further literacy development (Ball, 1993). This is an aspect that requires input from speech-language therapists who can advise parents and educators regarding reading material at a level appropriate for the individual learner.

The parental questionnaires yielded some interesting information regarding the subjects' reading habits, much of which could be explained by the literature. It is suggested that poor readers read very little and therefore remain poor readers and spellers.

### **3.3 THE INTRA-GROUP RELATIONSHIPS BETWEEN PHONOLOGICAL AWARENESS, WRITTEN SPELLING AND ORAL READING ABILITY SCORES OF SUBJECTS IN THE FOUR RESEARCH GROUPS**

The results obtained from each of the subjects in the four research groups are presented in Tables 4 to 7 and in Figures 2 to 6. The results obtained will be discussed broadly according to the sub-aims of this study.

#### ***3.3.1 The phonological awareness, written spelling and oral reading performance of each group of research subjects***

The results of each group of research subjects on the assessment measures are discussed group by group and individual subject's scores are commented upon. These results are presented in order to contribute to the first and second sub-aims of this study. The phonological awareness, written spelling, oral reading scores and scores on the language measure for each of the subjects in the four research groups are presented in Table 4.

Table 4. Subjects' scores on tests in test battery

		SUBJECTS																			
		GROUP 1				GROUP 2				GROUP 3				GROUP 4							
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
READING	Essi Reading	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue
	Reading Comprehension	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue
SPELLING	Essi Spelling	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue
	Class Spelling	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue
TESTS	TOLD-P:2	Picture Vocabulary	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue
		Oral Vocabulary	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue
		Grammatical Understanding	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue
		Sentence Imitation	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue
		Grammatical Completion	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue
		Word Discrimination	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue
		Word Articulation	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue
	PHAB	Spoken Language Quotient	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue
		Listening Quotient	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue
		Speaking Quotient	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue
		Semantic Quotient	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue
		Syntactic Quotient	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue
		Phonological Quotient	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue
		Alliteration	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue
Rhyme	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue		
Spoonerisms	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue		
Non Word Reading	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue		
Picture Naming	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue		
Digit Naming	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue		
Alliteration Fluency	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue		
Rhyme Fluency	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue		
Semantic Fluency	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue		

▪ Performance of subjects in Research Group 1

The subjects in Research Group 1 had English as their home language and had good literacy ability as assessed by their teachers. As seen in Table 4, all the subjects in this research group obtained good results on all of the measures used in the test battery as was expected. All subjects in Research Group 1 obtained average to above average scores on the PHAB (Frederickson et al., 1997) and the TOLD-P: 2 (Newcomer & Hammill, 1991). This finding concurs with literature findings as the subjects all had English as their home language and were judged by their teachers to have good literacy ability (Snowling, 2000). They should therefore show average

to above average performance on a test of English language ability such as the TOLD-P: 2 (Newcomer & Hammill, 1991). In addition, such subjects were expected to have normal phonological awareness development (Swank & Catts, 1994).

Given the normal scores on the above-mentioned measures, reading and spelling measures were expected to fall in the average to above average category. As expected, the subjects in Research Group 1 did achieve average to above average results on the ESSI Reading Test (Esterhuyse & Beukes, 1997), the ESSI Spelling Test (Esterhuyse & Beukes, 1997), the Class Spelling List and the Reading Comprehension Task.

The average to above average performance of the subjects in Group 1 on the test of phonological awareness is important and confirms the positive relationship between good reading and spelling performance and phonological awareness ability which is described in the literature (Hatcher & Hulme, 1999).

- **Performance of subjects in Research Group 2**

Whilst the results obtained by Group 1 were predictable, the results achieved by **Group 2** are of more interest, because these research subjects also had good literacy ability as assessed by their teachers, but had a language other than English as their home language (EAL). Not surprisingly the entire group scored well on both the reading and both the spelling measures. However, the results of the language test (TOLD-P: 2, Newcomer & Hammill, 1991) indicate that each subject in the group presented with at least one score below average.

According to Table 4 these clustered in the area of Grammatical Understanding where four of the five subjects scored below average and Listening Quotient where four of the five subjects in Group 2 again scored below average. Three of the subjects in this group also struggled with the

Picture Vocabulary task but none received below average scores for the Oral Vocabulary task. This suggests that the subjects in Group 2 were generally fluent speakers and used the English language relatively well in the classroom situation. Certain underlying difficulties did exist but other factors may have resulted in their good literacy performance and subsequent good assessment by their teachers. This may have been due to various possibilities, for example a high IQ or cognitive ability, they may have been verbally stronger than other candidates, they may have had a better relationship with the teacher or they may have received more stimulation and support at home (Mann, 1993; Craig et al, 2003).

According to Table 4, subject 10 in Group 2 scored particularly poorly on almost all subtests of the language test and assessment profiles. Only the Oral Vocabulary and Spoken Language Quotient scores were average to above average for this subject. The subject's strengths in these areas suggest that he was coping well at the Grade 2 level of this type of reading and spelling assessment. His teacher judged him to have good literacy based on this ability. The results on the language measure suggest, however, this subject may well experience difficulty on literacy tasks later in school as the level of linguistic complexity in the curriculum increases (Fey et al., 1995).

Only two subjects in Group 2 scored below average on the phonological awareness measures. If a subject scores below average on three of the PHAB (Frederickson et al., 1997) subtests, they are considered to have severe phonological awareness problems (Frederickson et al., 1997). According to Table 4, none of the subjects in Group 2 had major difficulty in this area. It would have been preferable to see no errors occurring in this area by subjects in Group 2, but a clear relationship still appears to be operating between phonological awareness ability and performance on reading and spelling measures. Based on the results obtained by this group, phonological awareness ability does not appear to be negatively influenced by language development of the subjects in general, although researchers



have pointed out that some of the difficulties faced by multilingual children in learning to read (and spell) occur because context and syntactic cues are not readily available to them (Graham & Kelly, 2000). Yavas and Goldstein (1998) concluded that the complexity of tasks is increased when the subject is learning more than one language.

While all subjects in Group 2 were judged to have good literacy ability by their teachers, and this was confirmed by their scores on the reading and spelling measures and their relatively good scores on the phonological awareness measure, their scattered performance on the language measure indicates underlying language difficulties which may later impact on their literacy.

▪ **Performance of subjects in Research Group 3**

According to Table 4, the results of Group 3 indicate a pattern of performance emerging. Group 3 consisted of subjects who had English as their home language but were judged to have poor literacy skills by their teachers. As reflected in Table 4, all these subjects struggled on the reading and spelling measures. In fact, three of the five subjects struggled with all the reading and spelling measures and generally performed more poorly than Group 4 subjects especially on the ESSI Reading (Esterhuyse & Beukes, 1997) and ESSI Spelling Test (Esterhuyse & Beukes, 1997) scores. All subjects in this group also achieved below average results on the ESSI Reading Test (Esterhuyse & Beukes, 1997). All but one achieved below average results on the reading comprehension task and all subjects scored below average on the ESSI Spelling Test (Esterhuyse & Beukes, 1997) whilst three of the five subjects in this group scored below average on the Class Spelling List. The ESSI Spelling Test (Esterhuyse & Beukes, 1997) appeared to differentiate reliably between Groups with good and poor literacy skills in the subjects with English as home language, whereas the Class Spelling List did not. The finding that spelling lists may be spelled correctly by learners, whereas general spelling words may not, is well

supported in the literature and rote learning of spelling is not generally considered to be a useful technique for providing long term retention of words (Winch et al., 2001).

Only one subject in Group 3 performed at a level considered average on the language measure, and one had only one score below average on the language measure according to Table 4. Three subjects had below average scores on a total of ten, four and six of the language subtests or quotients respectively. The subjects experienced the most difficulties in the areas of Sentence Imitation, Grammatical Completion and Syntactic Quotient on the language measure. All of the above subtests are related to the correct recall and use of sentence construction, suggesting problems in the area of short-term memory or perhaps auditory memory, and use of syntactic structures. This represents an area of difficulty that would require therapeutic intervention in order to improve level of language development and aid writing and reading performance. None of the learners in Group 3 were receiving language therapy at the time of this study. This confirms Stothard et al.'s (1998) findings that suggest that subtle language deficits may exist which will influence the acquisition of reading and spelling skills.

When one examines the subjects in Group 3's performance on the phonological awareness measure, only one subject scored below average on three or more of the subtests. This subject also scored poorly in all areas assessed in the test battery. It is interesting to note that this subject gradually experienced increasing learning difficulties and was later transferred to special education. No other subject showed severe phonological awareness difficulties but all subjects showed some difficulties in the area of phonological awareness. This finding supports the literature which suggests that children experiencing phonological awareness difficulties will experience difficulties learning to read and spell (Mody, Studdert-Kennedy & Brady, 1997).

- **Performance of subjects in Research Group 4**

Group 4 consists of subjects who were assessed by teachers to have poor literacy ability but had a home language other than English (EAL). They showed a more scattered performance profile. All but one scored below average on the ESSI Spelling Test (Esterhuyse & Beukes, 1997), while only two scored below average on the Class Spelling List. This again supports the suggestion derived from the literature that learned spelling ability differs from general spelling ability. One of the subjects (subject 16) scored average to above average on all the measures of reading and spelling, and yet had a poor literacy score from the teachers. On examining the language scores for this particular subject as presented in Table 4, one notes that the subject scored poorly on Vocabulary (receptive and expressive) and Grammatical Understanding as well as Listening and Semantic Quotient. The poor literacy score awarded by the teacher may therefore be due to the processing of linguistic content and comprehension rather than the actual mechanics of reading or spelling. Almost certainly the relatively poor language scores of this subject contributed to the teacher's perception of his literacy ability. This subject, a Northern Sotho speaker, had not yet developed his English to a level where he could use his literacy ability to the full (Williams & Snipper, 1990).

As is evident in Table 4, subject 18 scored well on the reading and spelling measures as well as on Class spelling but scored below average on the ESSI Spelling Test. This subject scored below average on only three of the language subtests. This would possibly explain how the teacher perceived the subject to have poor literacy because the subject may struggle with a more linguistically complex reading passage. Becoming a skilled reader depends on more than just phonological awareness ability (Nation & Snowling, 1998). It may also possibly be due to the home language of this subject being French rather than an ethnic South African language such as Sotho or Tswana for example. His accent when reading would be less familiar to the teacher and word order and treatment of verbs and nouns is

very different in French when compared with English and ethnic African languages which do not use masculine and feminine forms.

### **3.4 COMPARING THE INTER-GROUP TENDENCIES OF THE PHONOLOGICAL AWARENESS, WRITTEN SPELLING AND ORAL READING ABILITIES OF THE FOUR GROUPS OF RESEARCH SUBJECTS**

#### **3.4.1 *General Comparison***

The collective performance of the subjects in the research groups was investigated. As seen in Table 4, the findings across the four research groups show that Groups 3 and 4 (both with poor literacy skills) evidenced below average performance on a variety of skills. They experienced difficulty across a variety of the areas assessed, namely oral reading, written spelling, phonological awareness and language development. Some authors have defined dyslexia as a developmental language disorder that manifests itself in difficulties of both written and spoken language development (Catts, 1989). Groups 1 and 2 (both with good literacy skills) generally showed notably fewer below average scores across the areas assessed.

As can be seen in Table 4, Group 4 generally scored more poorly than Group 3 on the language test but interestingly enough, scored generally better on the literacy tests. This may suggest that the teachers are being influenced by the subjects' linguistic ability when assessing their literacy ability. These multilingual subjects' English may not be good enough to express what they have read or to answer comprehension questions accurately. Group 4's scores on the comprehension measure used in this study appear to support this assertion. Alternatively it may suggest that the tests used (single words and multiple choice) are not sufficiently complex

to tap the differences between these groups. Table 4 also reveals that Group 4 also performed generally more poorly than Group 3 on the phonological awareness measure as all but one subject in Group 4 scored three or more subtests below average, indicating a severe phonological awareness difficulty. This may also contribute to the judgment by the teachers of these subjects as having poor literacy. Recent research by Catts et al. (2001) suggests that subjects with reading problems often have concomitant oral language deficits. Children who performed very poorly on tests of phonological awareness in many cases were found to have reading and spelling difficulties (Bird et al., 1995). Children who have difficulty acquiring oral language proficiency are at risk for delayed attainment of the requisite early literacy skills (Justice, Invernizzi & Meier, 2002). The finding that many of the subjects with poor reading and spelling abilities in the current study also presented with developmental language delays and phonological awareness, would appear to confirm the literature findings.

The researcher wished to ascertain which specific subtests of the assessment measures in the test battery differentiated significantly between the research groups. The limited number of subjects in this study made the examination of inter-group tendencies difficult. The Kruskal – Wallis Test was applied (Steyn et al., 1994).

The means and standard deviations and probability (p) values for each research group on each of the measures in the test battery are represented in four tables (See Appendix M). A p value of  $\leq 0.05$  was considered to be statistically significant and is highlighted. These representations proved very complicated to process and for ease of reference, four figures (Figures 2,3,4 and 5) were designed.

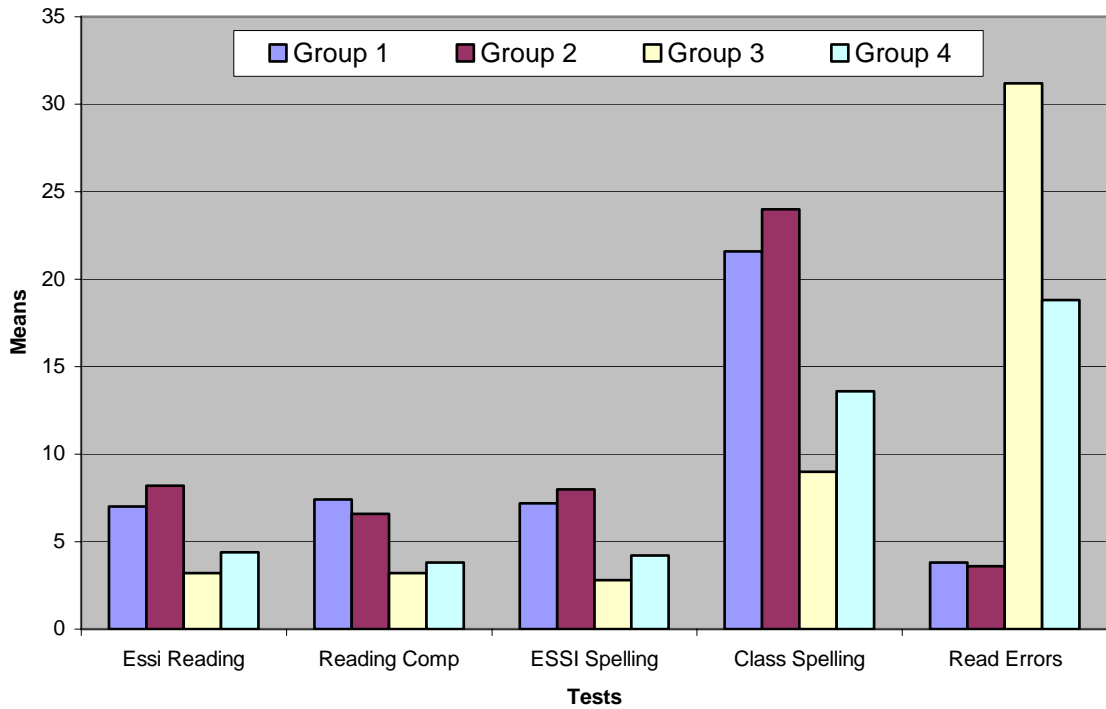


Figure 2. Means achieved by groups on Literacy measures

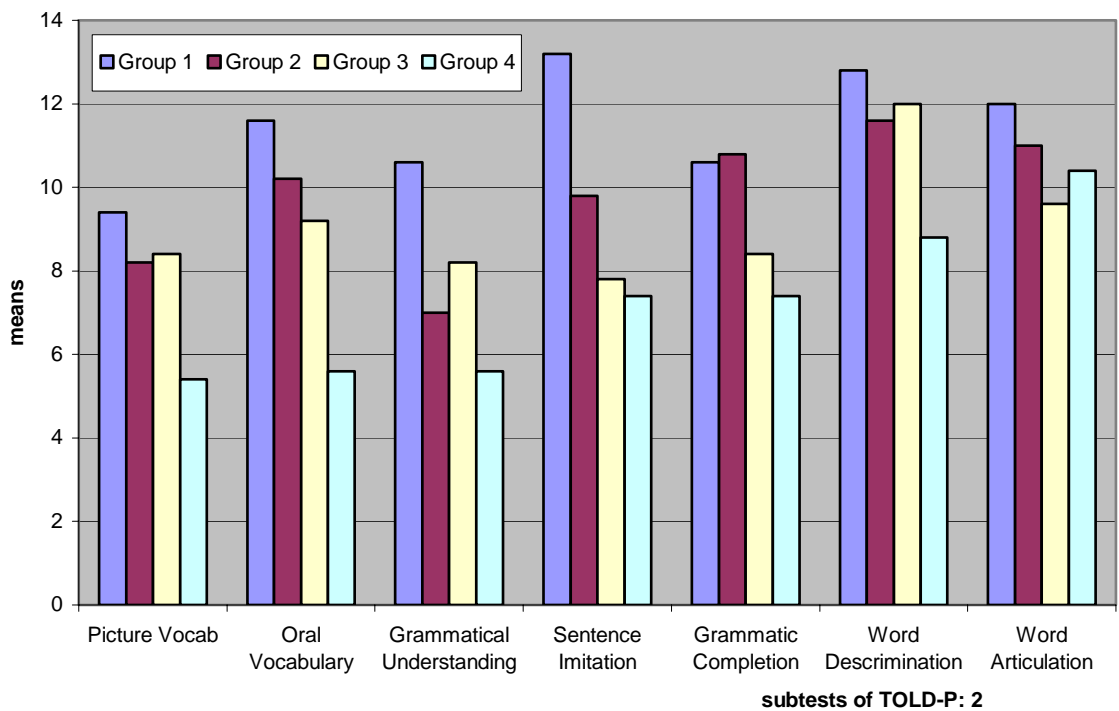


Figure 3. Means of subjects' scores on subtests of TOLD-P: 2

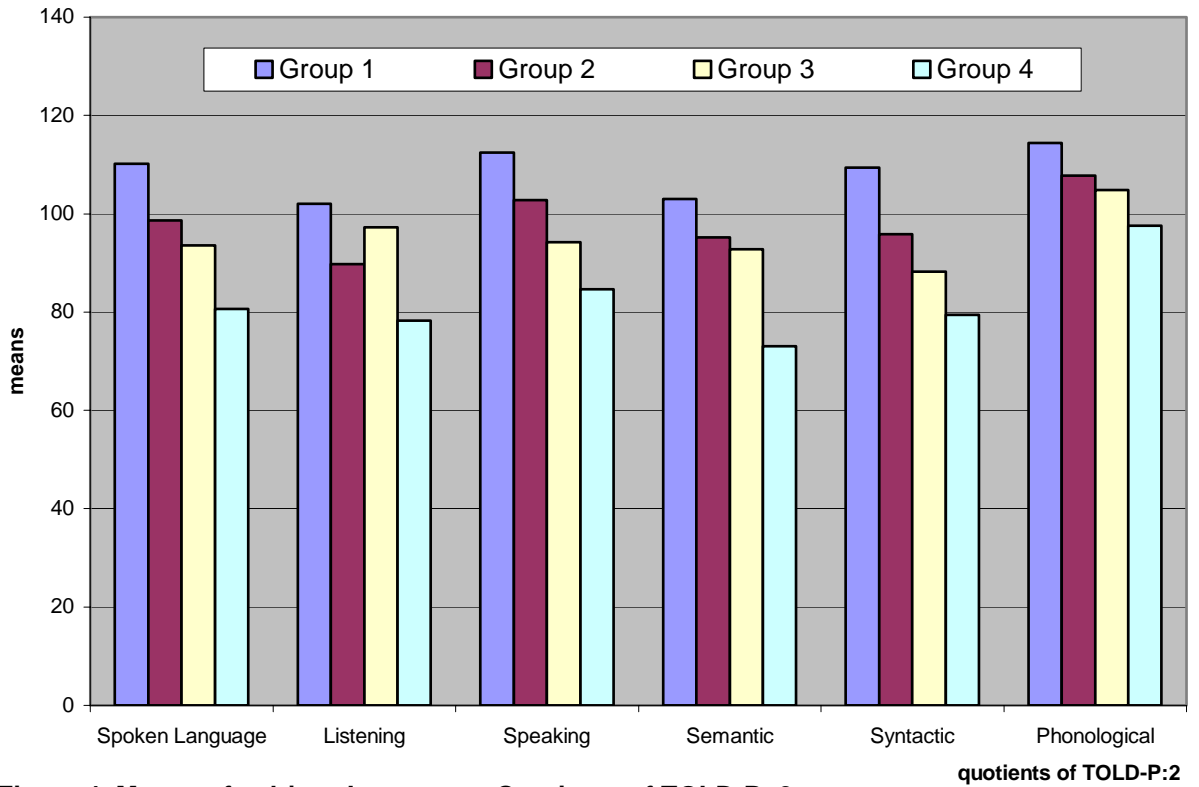


Figure 4. Means of subjects' scores on Quotients of TOLD-P: 2

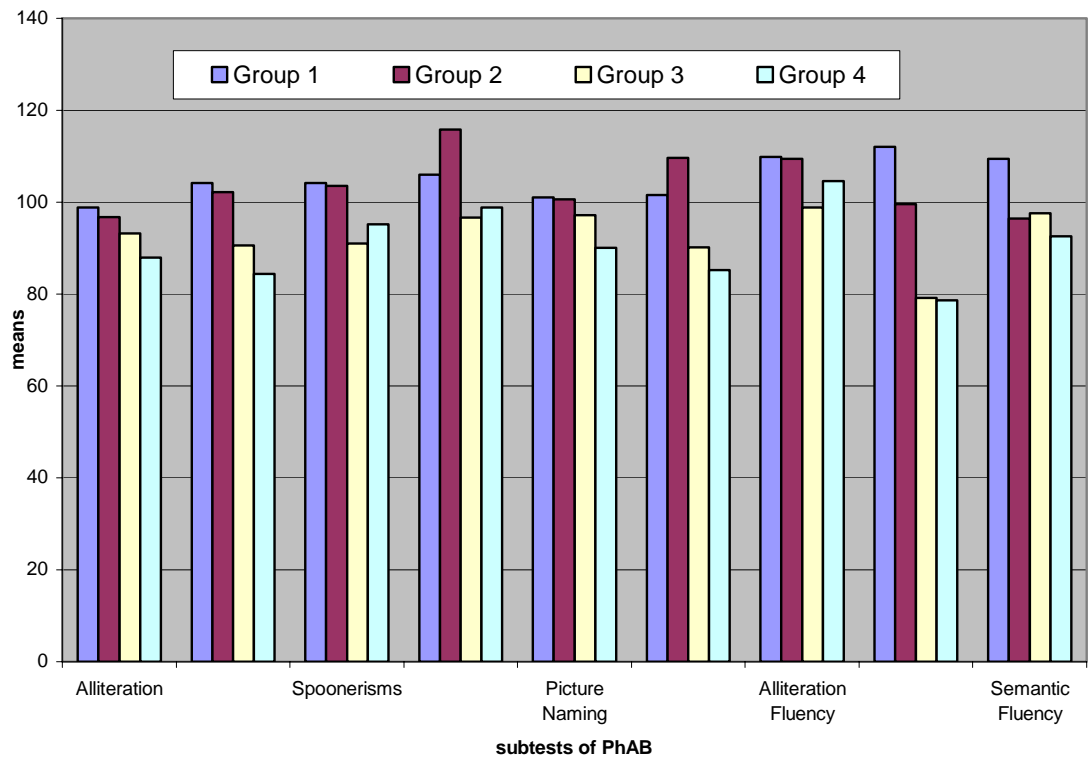
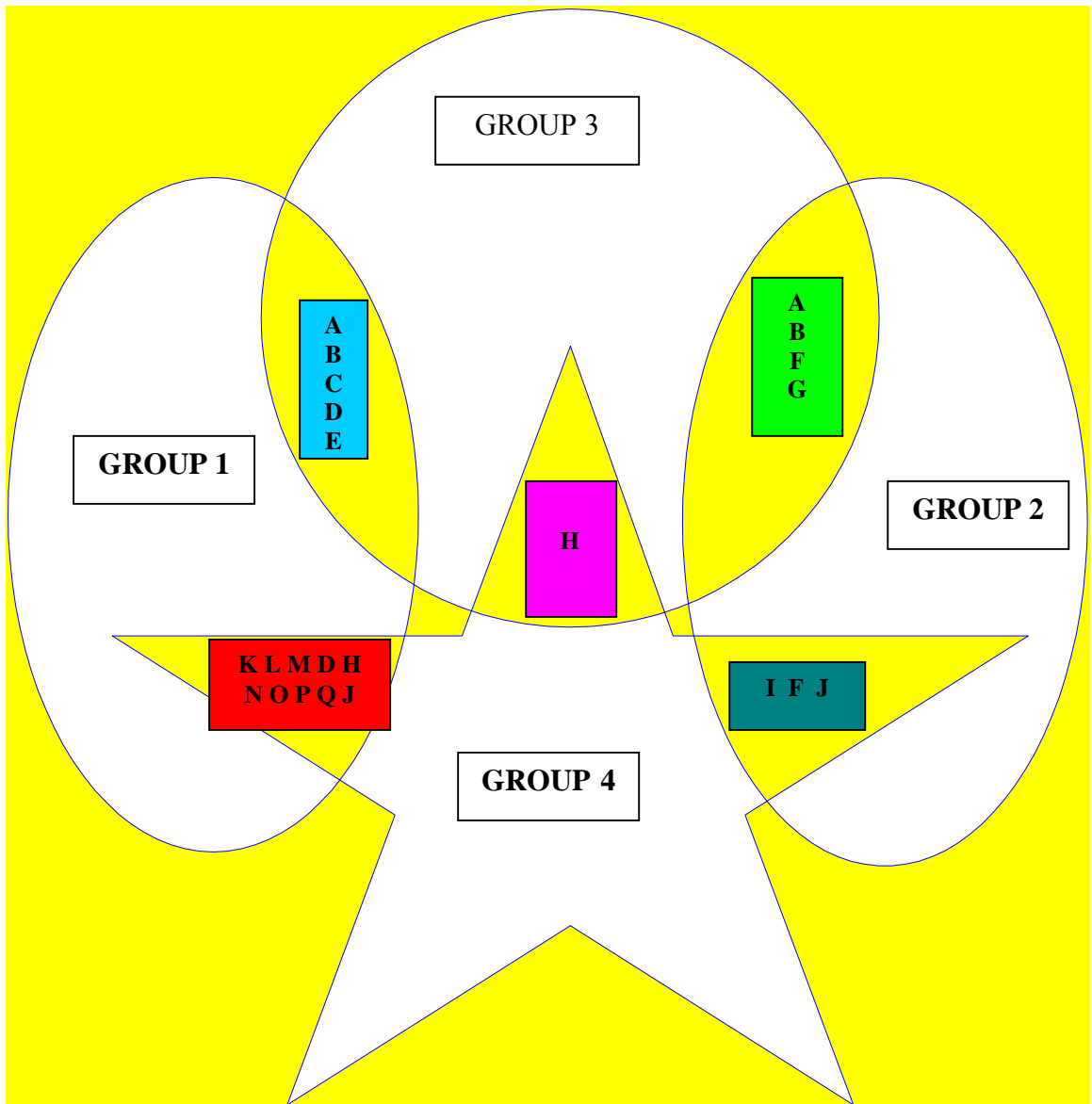


Figure 5. Means of subjects' scores on PhAB

An alternative method of examining the subtests of the test battery that showed significant differences between the mean scores obtained by the four research groups is offered in Figure 6.



**Figure 6. Significant differences between research groups**

Significant differences between groups 2 and 3    Significant differences between groups 1 and 4  
Significant differences between groups 1 and 3    Significant differences between groups 3 and 4  
Significant differences between groups 2 and 4

**KEY**

A ESSI Reading	B ESSI Spelling	C Reading Comprehension
D Sentence Imitation	E Rhyming Fluenc	F Class Spelling
G Reading Errors	H Listening Quotient	I Digit Naming
J Rhyme	K Picture Vocabulary	L Oral Vocabulary
M Grammm Understand	N Spoken Language Quotient	O Speaking Quotient
P Semantic Quotient	Q Syntactic Quotient	



In examining Figures 2 to 6, it is clear that none of the subtests in the test battery could significantly differentiate between Group 1 and Group 2. This supports the earlier observation that the subjects with a language other than English as Home Language (EAL) and judged to have good literacy skills performed as well as the subjects with English as Home Language and were judged to have good literacy skills.

Only the listening quotient of the TOLD-P: 2 (Newcomer & Hammill, 1991) differentiated between **Group 3 and Group 4**. Thus, only the listening ability of the subjects who had English as Home Language with poor literacy significantly differentiated them from the subjects with a language other than English as Home Language (EAL) with poor literacy. This finding illustrates the importance of listening skills particularly in the poor literacy subjects.

**Group 1 and Group 3** were found to differ on a range of subtests, namely ESSI Reading Test (Esterhuysen & Beukes, 1997), ESSI Spelling Test (Esterhuysen & Beukes, 1997), Reading Comprehension, Sentence Imitation of the TOLD-P: 2 (Newcomer & Hammill, 1997) and Rhyming Fluency of the PHAB (Frederickson et al., 1997). Three of the literacy measures used in this study were successful in differentiating between English speakers in this study with good and those with poor literacy ability. The Class Spelling List was not able to differentiate between them. Class spelling is suggested to be easier than casual spelling in the literature (Scott, 2000) and may rely less on phonological awareness and rather more on visual memorisation of a spelling list. The ESSI Spelling Test (Esterhuysen & Beukes, 1997) with its unfamiliar words proved to be a better discriminator of spelling ability between Group 1 and Group 3.

Similarly, the Reading Comprehension Task also did not reliably differentiate between Group 1 and Group 3. The reading comprehension task used in this study was presented in a simple multiple-choice format. As previously noted, this task may not have been complex enough to differentiate the subject groups and the context of the reading passage was well known to the learners in this school. A less familiar passage may have proved more challenging and a better differentiator.

This method of viewing the results does not reveal the direction of statistically significant differences between means but only the existence of a difference. Figures 2 to 5 show that Group 1 performed consistently better than Group 3 on the Sentence Imitation subtest of the TOLD-P: 2 (Newcomer & Hammill, 1991). This suggests that although the subjects in Group 1 and Group 3 were both English speaking, Group 3 had poorer short-term memory. This supports the finding that poor short-term memory or temporal processing and deficits in reading and spelling are linked (Lahey, Edwards & Munson, 2001).

**Group 2 and Group 3** showed the most differences in performance on the following elements of the test battery: ESSI Reading Test (Esterhuyse & Beukes, 1997), ESSI Spelling Test (Esterhuyse & Beukes, 1997), Class Spelling List and Reading Errors. The literacy measures used in this study, with the exception of the Reading Comprehension Task, differentiated clearly between the non-English (EAL) speakers with good literacy and the English speakers with poor literacy. Interestingly, the language subtests did not reliably differentiate these two groups, suggesting that language development may have been equally affected in both groups.

**Group 2 and Group 4** were differentiated by their performance on the Class Spelling List, and the Digit Naming and Rhyme of the PHAB (Frederickson et al., 1997). The phonological awareness abilities of these groups appear to be the best differentiator between these two groups who both have a non-English home language (EAL) but differ in terms of their literacy ability. This supports the findings of Catts and Kamhi (1986) who found that measures of phonological awareness and rapid naming contributed uniquely to the prediction of reading achievement in a 600-strong sample. Interestingly it was not the literacy measures, apart from the Class Spelling List that differentiated the two groups, although both groups did not have English as their home language and supposedly differed only on their literacy ability. This finding suggests that both groups had problems on the language measure and that differences in phonological awareness ability appear to predict differences in literacy ability for these two groups better than the other measures used in this study did.

**Group 1 and Group 4** had the most subtests in the test battery showing a significant difference between them. This was anticipated as these two groups are at opposite extremes in this study. Results of Picture Vocabulary, Oral Vocabulary, Grammatical Understanding, Sentence Imitation, Spoken Language Quotient, speaking Quotient, Listening Quotient, Syntactic Quotient and Semantic Quotient of the TOLD-P: 2 (Newcomer & Hammill, 1991) and the Rhyme of the PHAB (Frederickson et al., 1997) significantly differentiated the two groups. The group with English as home language and good literacy and the group with a language other than English as home language (EAL) and poor literacy were most reliably differentiated by language ability which suggests that many learners with poor literacy may well have poor language development. The finding also suggests that multilingual learners may be judged to have poor reading and spelling skills, whilst the problem may rather lie with the quality of their language development. The two groups were also differentiated by their rhyming ability, which is an aspect of phonological awareness that has been claimed as a sensitive predictor of reading achievement (Bryant, 1998).

A variety of subtests showed significant differences between the four groups. This suggests that using only one aspect of the test battery, for example the literacy tests and ignoring the language and/or phonological awareness tests, would fail to reliably differentiate between the groups.

When examining the four groups together, one notes that the literacy measures do differentiate between Groups 1, 2 and 3 but not between these groups and Group 4. It is not surprising that they did not distinguish between Groups 3 and 4 as both have poor literacy but one would expect a difference between Group 1 and 2's scores on the literacy tests and Group 4's performance on the same tests. Interestingly, it is the scores on the language test that show the most significant difference between these groups, with scores on some of the phonological awareness subtests also being affected. This suggests that attention to developing phonological awareness ability and boosting language development of EAL learners may well lead to better reading and spelling development, at least in this inclusive educational setting. There is an increasing body of research indicating

that learners with reading problems (and spelling problems) often have associated oral language deficits (Catts & Kamhi, 1999; Catts et al., 2001). The nature of the association is not yet clearly specified (Catts et al., 2002) and most of the more recent research focuses on the prevention of reading and spelling difficulties, with scant attention being paid to the integrated treatment of learners already experiencing delays (Gillon, 2000; Catts et al., 2002; Storkel & Morrissette, 2002).

### ***3.4.2 Performance of subjects in groups with good literacy skills in relation to groups with poor literacy skills***

An examination of results on The Goldman-Fristoe Test of Articulation (Goldman & Fristoe, 1986) shows that three of the subjects in the poor literacy groups (11, 12, 17) and only one subject in the good literacy groups (10) had articulation errors. This supports the suggestion that difficulty in articulating sounds may contribute to poor reading and spelling (Larrivee & Catts, 1999). Subject 12 actually confused /s/ and /θ/ (his articulation error) when spelling. The performance of the subjects in the research groups with reportedly good literacy ability according to the teachers' assessment (Group 1 and Group 2) and the subjects in the research groups with reportedly poor literacy ability according to the teachers' assessment (Group 3 and Group 4) was investigated. A further statistical analysis was performed on the combined scores of Research Groups 1 and 2 (Good Literacy) and Research Groups 3 and 4 (Poor Literacy) by using the Kruskal-Wallis Test. These results are presented in Table 5.

**Table 5. Subjects' scores on literacy measures, TOLD-P: 2 subtests and PHAB subtests in good and poor literacy groups**

		GOOD LITERACY		POOR LITERACY		P value
		Mean	Std Devn	Mean	Std Devn	
<b>READING</b>	ESSI Reading	7.6	1.265	3.8	1.033	<b>0.0002</b>
	Reading Comprehension	7.0	1.247	3.5	1.841	<b>0.0006</b>
	Reading Errors	3.7	5.208	25.0	12.979	<b>0.0004</b>
<b>SPELLING</b>	ESSI Spelling	7.6	1.265	3.5	1.650	<b>0.0003</b>
	Class Spelling	22.8	1.751	11.3	5.034	<b>0.0003</b>
<b>T E S T S</b>	Picture Vocabulary	8.8	2.300	6.9	2.601	<b>0.1003</b>
	Oral Vocabulary	10.9	1.663	7.4	2.716	<b>0.0053</b>
	Grammatic Understanding	8.8	2.974	6.9	2.183	<b>0.0523</b>
	Sentence Imitation	11.5	3.240	7.6	1.838	<b>0.0044</b>
	Grammatic Completion	10.7	2.710	7.9	2.331	<b>0.0216</b>
	Word Discrimination	12.2	2.573	10.4	2.836	<b>0.1506</b>
	Word Articulation	11.5	1.581	10.0	2.749	<b>0.1351</b>
	<b>TOLD-P:2</b> Spoken Language Quotient	104.4	12.122	87.1	11.967	<b>0.0700</b>
	Listening Quotient	95.9	11.723	87.7	13.392	<b>0.1964</b>
	Speaking Quotient	107.6	12.358	89.4	11.983	<b>0.0058</b>
	Semantic Quotient	99.1	11.140	82.9	14.700	<b>0.0188</b>
	Syntactic Quotient	102.6	14.600	83.8	11.821	<b>0.0011</b>
Phonological Quotient	111.1	11.580	101.2	12.017	<b>0.0455</b>	
<b>PHAB</b>	Alliteration	97.8	4.367	90.6	7.427	<b>0.0106</b>
	Rhyme	103.2	7.391	87.5	8.910	<b>0.0021</b>
	Spoonerisms	103.9	6.244	93.1	6.983	<b>0.0039</b>
	Non Word Reading	110.9	11.986	97.7	7.987	<b>0.0110</b>
	Picture Naming	100.8	10.261	93.6	9.312	<b>0.1117</b>
	Digit Naming	105.6	9.131	87.7	9.180	<b>0.0013</b>
	Alliteration Fluency	109.6	12.817	101.7	16.159	<b>0.3823</b>
	Rhyme Fluency	105.8	15.803	78.9	10.949	<b>0.0200</b>
	Semantic Fluency	102.9	14.122	95.1	14.502	<b>0.1586</b>

 **significant difference**

As indicated in Table 5, the subjects in the good and poor literacy groups showed a significant difference in their scores on all the reading and spelling measures. Performance on the subtests of the TOLD-P: 2 (Newcomer & Hammill, 1991)

showed three areas of significant difference namely Oral Vocabulary, Sentence Imitation and Grammatical Completion. Interestingly, the quotients that were calculated for the TOLD-P: 2 (Newcomer & Hammill, 1991) using the subtest scores revealed that there was a significant difference between the performance of subjects in the good and poor literacy groups on the Speaking Quotient, Semantic Quotient, Syntactic Quotient and Phonological Quotient. This confirms Catts' (1993) findings, which state that reading and spelling development is intimately connected with language development and cannot be treated out of context (Catts, 1993).

This is especially true for those who support the whole language approach to the acquisition of reading where reading is only acquired in the context of language (Ball, 1997). According to Storkel and Morrisette (2002), the association between lexical and phonological awareness development is observed in children with precocious language development as well as those with delayed language development. Prospective and retrospective studies have consistently found that children with poor literacy skills have deficits in language processing abilities (Scarborough, 1990). The current results concur with these findings and have important implications for the speech-language therapist working in this field.

Performance on the PHAB (Fredrickson et al., 1997) also revealed significant differences in the scores obtained by the good and poor literacy groups. The Alliteration, Rhyme, Spoonerisms, Non-word Reading, Digit Naming and Rhyme Fluency all showed a significant difference between Groups 1 and 2 on the one hand and Groups 3 and 4 on the other. Rhyme is suggested to be the most important of the phonological awareness skills (Bryant & Bradley, 1985). Bryant (1998) and Rosen and Manganari (2001) support this notion. The findings of this study also appear to support the findings of these researchers, rather than Muter et al. (1998) who proposed that rhyme might in fact be measuring a different type of phonological awareness that that tapped by other phonological awareness measures.

The current findings suggest that the literacy tests used in the current test battery are successful in differentiating subjects who appear to exhibit poor literacy development in the classroom and subjects who appear to have good literacy development in the classroom situation.

The tests did, however, not differentiate as reliably between subjects with English as their first language and those with a language other than English as their home language (or EAL subjects), and could be attributed to the complexity of the reading tasks. Reading consists of decoding skills and comprehension skills (Swank & Catts, 1994; Hatcher & Hulme, 1999) and although an attempt was made in this study to include aspects of both skills, the comprehension task appears to have been too simplistic to tap this skill fully.

### **3.5 RELATIONSHIP BETWEEN SUBJECTS' SCORES ON THE ASSESSMENT MEASURES**

During analysis of the data obtained from the subjects' scores on the various assessment measures, a number of interesting relationships between subjects' performance on the different measures emerged.

#### ***3.5.1 Relationship between subjects' scores on the language measure and the phonological awareness measure***

The correlations between the scores obtained by the subjects in the four research groups on the TOLD-P: 2 (Newcomer & Hammill, 1991) and the PHAB (Frederickson et al., 1997) were determined by using the Spearman correlation coefficient. These results are presented in Table 6.

Table 6. Spearman correlation coefficients for TOLD-P:2 and PHAB subtests

		PhAB								
		Alliteration	Rhyme	Spoonerisms	Non Words	Picture Naming	Digit Naming	Alliteration Fluency	Rhyme Fluency	Semantic Fluency
T O L D P 2	Picture Vocabulary	0.44825	0.37058	0.31284	0.00153	0.39568	0.14384	0.30023	0.58912	0.55786
	Oral Vocabulary	0.59066	0.59042	0.47941	0.28250	0.57726	0.51864	0.33372	0.74474	0.55471
	Grammatical Understanding	0.29074	0.44844	0.13269	0.25171	0.16865	0.38189	0.17770	0.46758	0.29266
	Sentence Imitation	0.76524	0.64759	0.64161	0.58824	0.31719	0.37822	0.42331	0.73981	0.46649
	Grammatical Completion	0.58919	0.41790	0.46576	0.62091	0.33463	0.41444	0.50403	0.69816	0.42726
	Word Discrimination	0.49718	0.53931	0.39946	0.41247	0.41775	0.30691	0.41223	0.63228	0.49034
	Word Articulation	0.46693	0.42731	0.11748	0.11147	0.33947	0.39278	0.14138	0.52949	0.35352
	Spoken Language Quotient	0.75460	0.62741	0.55387	0.47061	0.39713	0.43386	0.47838	0.79331	0.51675
	Listening Quotient	0.46543	0.39272	0.35511	0.28284	0.32071	0.14491	0.32814	0.52858	0.39543
	Speaking Quotient	0.71900	0.60581	0.57181	0.58028	0.31613	0.43788	0.45957	0.77439	0.41965
	Semantic Quotient	0.54203	0.49887	0.41379	0.16364	0.51870	0.35976	0.39371	0.69925	0.61536
	Syntactic Quotient	0.62872	0.50321	0.45985	0.55093	0.26926	0.39698	0.49015	0.72141	0.48823
	Phonological Quotient	0.58454	0.56365	0.31430	0.28989	0.53879	0.42009	0.33350	0.69407	0.59710

 significant correlation

As can be seen in Table 6, significant correlations were obtained in numerous areas. The TOLD-P: 2 (Newcomer & Hammill, 1991) subtests and quotients correlated best with the Alliteration, Rhyme, Rhyme Fluency and Semantic Fluency subtests of the PHAB (Frederickson et al., 1997). This appears to support both the notion that phonological awareness and language development are linked, as well as the relative value of rhyme and alliteration abilities as phonological awareness abilities which predict later literacy development. This would suggest that they are also linked to language development and this finding therefore concurs with the current literature (Catts, 1993).

Surprisingly the Listening Quotient of the TOLD-P: 2 (Newcomer & Hamill, 1991) only showed a significant correlation with the Alliteration and the Rhyme Fluency Subtests of the PHAB (Frederickson et al., 1997). The Listening Quotient did not correlate well with any of the other phonological awareness subtests. According to Mody et al. (1997), auditory processing problems are the underlying deficit in reading and spelling difficulties but the deficit lies in speech processing rather than general auditory processing.



However, the current findings appear to support Rosen and Manganari (2001), who found disordered auditory processing only in the presence of language delay. In those children with a language delay a substantial proportion has no measurable auditory deficit. This suggests that speech-language therapists may place too much emphasis on auditory perceptual tasks, where emphasis should also be placed on phonological awareness tasks during intervention.

According to Table 6 the subjects' performance on Oral Vocabulary, Sentence Imitation, Spoken Language Quotient, Speaking Quotient and Syntactic Quotient of the TOLD-P: 2 (Newcomer & Hammill, 1991) showed a significant correlation with the most subtests of the PHAB (Frederickson et al., 1997). Grammatical Completion, Semantic Quotient and Phonological Quotient of the TOLD-P: 2 (Newcomer & Hammill, 1991) of the subjects also correlated with a number of the PHAB (Frederickson et al., 1997) subtests. This again supports the relationship between phonological awareness development and linguistic development (Catts et al., 2002). This finding suggests that improvement of the level of language development of the EAL learner as well as in language-impaired English speakers is vital.

### ***3.5.2 Relationship between subjects' scores on the reading and spelling measures in relation to scores on the TOLD-P: 2 and the PHAB***

The total scores for all the subjects on each of the reading and spelling measures were compared to those obtained on the TOLD-P: 2 (Newcomer & Hammill, 1991) and the PHAB (Frederickson et al., 1997) by using the Spearman correlation coefficient. It was hypothesized that significant correlations would suggest a strong relationship between the literacy scores of the research subjects and their language and/or phonological awareness ability. The results are presented in Table 7.

Table 7. Spearman correlation co-efficients for reading and spelling measures vs. TOLD-P:2 and PHAB

	Essi Reading	Reading Comp	Essi Spelling	Class Spelling	Reading Errors
Picture Vocabulary	0.27253	0.41416	0.09749	0.54440	-0.29821
Oral Vocabulary	0.56787	0.70736	0.51257	0.53054	-0.53032
Grammatical Understanding	0.27011	0.39947	0.29864	0.23181	-0.32036
Sentence Imitation	0.70804	0.77062	0.61866	0.61360	-0.69298
Grammatical Completion	0.61496	0.72104	0.54574	0.63617	-0.48051
Word Discrimination	0.35083	0.42783	0.34434	0.38658	-0.30836
Word Articulation	0.35214	0.34673	0.27628	0.28098	-0.20502
Spoken Lang Quotient	0.63463	0.74315	0.48103	0.51746	-0.59651
Listening Quotient	0.19146	0.39334	0.09693	0.16230	-0.24260
Speaking Quotient	0.66911	0.76943	0.56916	0.60931	-0.60900
Semantic Quotient	0.44289	0.58119	0.29742	0.33751	-0.44849
Syntactic Quotient	0.61019	0.72515	0.56316	0.57733	-0.54601
Phonological Quotient	0.44928	0.51537	0.39412	0.44004	-0.32084
Alliteration	0.67388	0.70613	0.43749	0.46484	-0.64926
Rhyme	0.72018	0.61801	0.55992	0.54949	-0.71667
Spoonerisms	0.70843	0.62265	0.60443	0.61550	-0.79203
Nonword Reading	0.73284	0.66121	0.71566	0.76225	-0.68209
Picture Naming	0.32544	0.40235	0.31280	0.30720	-0.26220
Digit Naming	0.68961	0.54065	0.66995	0.65860	-0.54707
Alliteration Fluency	0.45145	0.32016	0.27030	0.35524	-0.35104
Rhyme Fluency	0.71396	0.74974	0.58722	0.63477	-0.61425
Semantic Fluency	0.26241	0.38861	0.29735	0.27287	-0.23068

significant difference

According to Table 7, it is interesting to note that, although there were a large number of significant correlations between the literacy measures and the TOLD-P: 2 (Newcomer & Hammill, 1991) and the PHAB (Frederickson et al., 1997), certain of the subtests of the language and the phonological awareness measures did not correlate significantly with either the reading or the spelling measures. These include the Picture Vocabulary, Grammatical Understanding, Word Discrimination, Word Articulation and Listening Quotient subtests of the TOLD-P: 2 (Newcomer & Hammill, 1991) and the Picture Naming and Semantic Fluency subtests of the PHAB (Frederickson et al., 1997). Of these the Listening Quotient and Word Discrimination subtests are the most difficult to explain.

Researchers such as Reed (1989 cited in Rosen & Manganari, 2001) have suggested that problems with reading and spelling are due, in part, to auditory perceptual difficulties, that is, listening difficulties. Stronger correlations between

the reading and spelling measures and the listening quotient were anticipated. A possible explanation for this finding is that the tasks that comprise the listening quotient are not sensitive enough to identify an auditory processing deficit, but that a more in depth auditory perceptual assessment, such as the Test of Auditory-Perceptual Skills- Revised (TAPS-R) (Gardner, 2000) may have revealed more problems in the area of auditory perception.

The participants' ability to point out pictures representing nouns or verbs, internal representation of grammar and the fluency with which an individual can name objects, did not appear to correlate well with the reading or spelling abilities assessed in this study. This may in part, explain why some of the subjects in this study and some learners in general, with a seemingly large receptive vocabulary, who can comprehend and process what is said to them, and can communicate with an adequate level of fluency, may still experience problems with learning to read and spell. Phonological awareness may explain this phenomenon (Winch et al., 2001).

This is confirmed by Table 7 which suggests that phonological awareness skills such as rhyming, decoding skills as utilized in non-word reading, the ability to manipulate the sounds of language as observed in spoonerisms and the ability to rapidly name items correlate well with good literacy performance. Given the obvious relationship of both language development and phonological development to the development of literacy, it is vital to improve phonological awareness and linguistic abilities in all learners, but particularly in those who are at risk for developing spelling and reading problems (Catts et al., 2002). This includes English-speaking learners with delayed language development as well as multilingual EAL learners.

### 3.6 OVERVIEW OF SUBJECTS' AND RESEARCH GROUPS' PERFORMANCE

To summarise, the findings of this study indicate that the subjects in **Research Group 1** were found to have good performance in all the areas assessed. Their phonological awareness ability, oral reading and written spelling ability as well as their language development were found to be average to above average as was to be expected.

The subjects in **Research Group 2** were found to have good performance in most of the areas assessed. Their oral reading and written spelling abilities and phonological awareness abilities were average to above average. Their language development was generally adequate for all subjects, except subject 10, although a scattered pattern of language difficulties was evident, reflecting their multilingual background (Gutierrez-Clellen, 1999).

The results obtained by the group, suggest that good phonological awareness and adequate EAL development can lead to the development of above average literacy ability. The possibility of later problems due to some high-level language difficulties (Stothard et al., 1998) does, however, exist, and remains a threat to even the achieving multilingual learner.

The subjects in **Research Group 3** performed mainly below average on the reading and spelling tests and some subjects had below average performance on the TOLD-P: 2 (Newcomer & Hammill, 1988) and on the PHAB (Frederickson et al., 1997). These findings suggest that working on both phonological awareness and language ability in these learners, and being educated in their mother tongue, may well contribute to increased literacy scores in the classroom for such learners.

The subjects in **Research Group 4** generally performed poorly on the measures of reading and spelling. The Reading Comprehension Task developed by the researcher and the Class Spelling List of words already familiar to the subjects

resulted in relatively better scores than did the formal ESSI Reading Test (Esterhuyse & Beukes, 1997) and the ESSI Spelling Test (Esterhuyse & Beukes, 1997). The subjects in this group showed numerous language delays and severe phonological awareness delays. These were generally more severe than the delays for Group 3. This was almost certainly due in part to their multilingual backgrounds. It is clear that multilingual learners, such as those participating in this study, require active phonological awareness and language therapy in order to improve their reading and spelling performance.

These overall results were confirmed when the scores of the two good literacy research groups (Groups 1 and 2) were compared to the scores of the two poor literacy research groups (Groups 3 and 4) and a variety of significant differences were revealed between the two groups in the areas of oral reading, written spelling, phonological awareness and language development.

In addition, the findings revealed that the research subjects' performance on language subtests correlated significantly with some of the phonological awareness subtests, confirming the interrelationship of these two abilities.

The findings of this study can be summarised as follows:

- Phonological awareness performance of the subjects in this study was linked to their reading performance.
- Phonological awareness performance of the subjects in this study was linked to their spelling performance.
- Language development of the subjects in this study played a role in the development of reading and spelling in these EAL learners.
- Language development played a role in the development of reading and spelling in the EAL learners in this study.

- Teachers' perceptions of the literacy ability of the subjects in this study were not always purely focused on the subject's reading and spelling abilities but appeared to be influenced by the learner's linguistic development.
- The skills of language, phonological awareness, reading and spelling were intrinsically linked for the subjects in this study and to attempt to isolate one aspect for treatment would be of little value. An integrated approach incorporating all these aspects appears to be indicated.
- Some subjects in this study, who were judged to have poor literacy abilities, may in fact have good decoding skills but lack the linguistic background to express themselves on paper or interpret what they have read. These EAL learners could benefit markedly from language intervention.

#### **4. CONCLUSIONS AND IMPLICATIONS FOR FURTHER RESEARCH**

Conclusions based on the results obtained, as well as implications for further research that will enrich the findings of this study, are presented forthwith.

##### **4.1 CONCLUSIONS**

In accordance with the main aim of this study, the relationships that exist between phonological awareness, written spelling and oral reading abilities in four groups of school-aged learners in an inclusive English-medium education setting, were successfully explored. Based on the results obtained from exploring the study's objectives, the following conclusions were drawn.

The phonological awareness ability of the subjects is indeed linked to their reading and spelling performance, based on the findings of this study. Poor phonological awareness ability and poor reading and spelling performance in the poor literacy groups (Group 3 and Group 4) were consistently found together. This was particularly true of Group 4, where subjects were EAL with poor literacy ability as judged by their teachers. Rhyme, Rhyming Fluency and Digit Naming were the subtests of the PHAB (Frederickson et al., 1997) that subjects in Group 4 found most difficult. This confirms findings by Bryant (1998) who maintains that rhyming ability is the single best indicator of a later spelling or reading problem. Digit naming was also one of the subtests found to be difficult by the subjects in this group, and it has been suggested that rapid automatised naming is an area of difficulty in learners with reading disorders (Catts & Kamhi, 1986; Lahey et al., 2001).

Johns (1999) suggested that certain of the PHAB (Frederickson et al., 1997) subtests were not appropriate for the minority groups that were assessed in her study, and recommended certain adjustments. The PHAB (Frederickson et al., 1997) appeared to be an adequate assessment measure in this study, however, and yielded results that are in keeping with recent trends in the literature. As always when using a test on a population for which it was not developed, caution is

necessary, but the PHAB (Frederickson et al., 1997) would nevertheless appear to be a useful measure in the South African context.

The literacy assessments used in this study produced varied results. The ESSI Reading Test (Esterhuyse & Beukes, 1997) and the ESSI Spelling Test (Esterhuyse & Beukes, 1997) are word list tests developed for English speakers in South Africa. They showed reading and spelling difficulties in the poor literacy groups. These tests would therefore appear to be useful in assessing both reading and spelling ability. It must be remembered, however, that neither this test, nor the Afrikaans version (Esterhuyse & Beukes, 1997) were developed for use with EAL learners. The researcher maintains that the ESSI tests for the Grade 2 level (Esterhuyse & Beukes, 1997) were appropriate for use with EAL learners, as they are assessed on the same criteria as their English-speaking peers in the inclusive educational setting.

Interestingly, the Group 3 subjects performed more poorly on these measures than did the Group 4 subjects. This suggests that the subjects in Group 3 have more severe problems with literacy development than their EAL peers.

The Class Spelling List designed by the researcher proved to be easier, even for some of the subjects in Group 3 and Group 4 who scored poorly on the ESSI Spelling Test (Esterhuyse & Beukes, 1997). This was possibly due to familiarity of the words included. There was more opportunity for a retained visual representation of the words learned for class spelling, than for the ESSI Spelling Test (Esterhuyse & Beukes, 1997). The ESSI Spelling Test (Esterhuyse & Beukes, 1997) relies more on decoding strategies (or phonological awareness abilities) for spelling of less familiar words. This supports the view of Scott (2000), that learning spelling words by rote, does not necessarily result in improved overall spelling ability. However, Treiman (1977 cited by Kamhi & Hinton, 2000) asserts that poor readers will do badly on any type of spelling test. This appears to hold true in this study and it may be of more value to teach spelling in context than in isolated spelling lists.



The Reading Comprehension Task developed by the researcher did not reliably differentiate between any of the groups. Subjects in Groups 1 and 2 experienced no difficulty on this task. Subjects in Groups 3 and 4 did struggle more with this test but this was not the case for all subjects in these two groups. The researcher suspects that this may be due to the familiar setting of the reading piece, taken from a Grade 2 class reader, containing familiar characters. In addition, the multiple-choice format of the questions and answers may have been easier than written answers to questions. Written answers would require integration of reading, spelling, linguistic and comprehension skills, as well as reading speed and reading accuracy to formulate answers. Performance on a test requiring written answers would be predictably poorer. The assessment in this case was aimed at tapping reading comprehension. While the researcher asserts that a multiple-choice format is not ideal, a reliable assessment of a multifaceted skill such as reading comprehension remains elusive.

An examination of the number of reading errors made by each subject when reading the prose excerpt on which the reading comprehension questions were based, revealed some interesting findings. The number of reading errors was actually higher in the Group 3 subjects than the Group 4 subjects. This suggests that the English-speaking subjects with poor literacy were making more errors when decoding words. They also took a number of attempts at decoding the same word without success and rarely self-corrected by using the context of the word in the general passage. This not only suggests a problem with decoding but also with linguistic development. Subjects in Group 4 also evidenced problems in this area but not to the same extent. They self-corrected with a little more ease, but were unable to utilise the context of the passage efficiently. While subjects in Group 1 and Group 2 did make some errors reading the passage, they could easily self-correct and move on. This again reflects the complex interactions of skills required for fluent and accurate reading (Catts & Kamhi, 1987) and supports the inclusion of a team-based and multi-faceted approach in the treatment of learners with reading difficulties.

The inclusion of the language measure in this study was considered to be vital. The results obtained by subjects in the four research groups in this study revealed a number of interesting findings that may have important implications for speech-language therapists' future management of learners with literacy problems in the multilingual South African society.

The TOLD-P: 2 (Newcomer & Hammill, 1991) was found to be a useful test despite the criticism levelled at it by Hammer et al (2002), who consider some of the test items to be biased against Afro-American learners. The test revealed language difficulties for both English-speaking and EAL subjects in this study and no evidence of item bias was found. The TOLD-P: 2 (Newcomer & Hammill, 1991) would therefore appear to be appropriate for use in the South African situation.

Language delays were evident in the subjects in Group 3 and Group 4 particularly, but some language delay was evident even in subjects in Group 2. The finding that the EAL subjects with good literacy as assessed by their teachers in Group 2, also presented with some language delays is interesting because it suggests that they had some subtle language problems, which unless they receive attention, may present difficulty and impact on their later literacy development (Catts et al., 2002; Stothard et al., 1998). The main areas of difficulty for subjects in Group 2 were Grammatical Understanding and Picture Vocabulary. The Listening Quotient was also delayed for subjects in Group 2. These represent areas of weakness that should receive attention in therapy or in the classroom setting.

English-speaking subjects in Group 3, with poor literacy as judged by their teachers, presented with scattered language profiles. Sentence Imitation, Grammatical Completion and Syntactic Quotient were most affected however. This suggests problems with word order and word endings, for example past tense, plural and other suffixes. This reflects a problem with encoding and decoding and therefore represents both a phonological awareness and a developmental language problem. This finding further supports the integration of phonological awareness training and language therapy in intervention.

EAL subjects in Group 4, who were also judged to have poor literacy by their teachers, presented with considerably more areas of language delay. Particular difficulties for this group were in the area of Picture (or receptive) Vocabulary, Oral (or expressive) Vocabulary, Grammatical Understanding, Listening Quotient and Semantic Quotient. This highlights the language delays of the multilingual learner. Many of the problems evidenced in the classroom with reading and spelling, may in fact be related more to delays in oral language development (Catts, 1997; Catts & Kamhi, 1999). De Witt et al. (1998) suggest that it may take as long as seven years to achieve a second language. Many of the Grade 2 EAL subjects in this study have only been exposed to formal English for two years. This supports the provision of additional language classes for EAL learners in the pre-school and foundation phases.

When scores obtained by the subjects on the TOLD-P: 2 (Newcomer & Hammill, 1991) and the PHAB (Frederickson et al., 1997) were correlated, a number of significant correlations were discovered between them. This finding would appear to support a close relationship between language and phonological awareness development as claimed by researchers such as Catts (1993) and Catts et al. (2001).

Figure 6 revealed that 17 different subtests of the test battery differentiated between the scores obtained by subjects in the four research groups. Of these only six were repeated. This suggests that speech-language therapists should not rely on one assessment measure when assessing the learner experiencing problems with developing literacy. It would appear that the areas of phonological awareness, language, reading and spelling should all be included as they all contribute to a full assessment of literacy ability (Winch et al., 2001; Catts et al., 2002).

The reading and spelling measures, many of the subtests and quotients of the TOLD-P: 2 (Newcomer & Hammill, 1991) and many subtests of the PHAB (Frederickson et al., 1997) did significantly differentiate subjects with good literacy ability and subjects with poor literacy ability (See Table 5). This again confirms the close relationship between language, phonological awareness and reading and spelling (Winch et al., 2001).

Similarly numerous significant correlations were found in Table 7, where scores on the reading and spelling measures were correlated with subtests and quotients of the TOLD-P: 2 (Newcomer & Hammill, 1991) and subtests of the PHAB (Frederickson et al., 1997). Again the close relationship between the measures is evident and this finding supports the literature claiming a strong relationship between phonological awareness and language development (Catts et al., 2002).

The **main aim** of this study was to examine the relationships that exist between phonological awareness, written spelling and oral reading abilities in four groups of school-aged learners in an inclusive English-medium education setting. This aim was achieved. Findings of this study support recent international research trends and highlight the need for integrated assessment and integrated therapy approaches to improving spelling and reading, especially in the multilingual South African learner population.

#### **4.2 CRITICAL EVALUATION OF THE RESEARCH**

This study was carried out in only one school with a limited number of subjects in each research group and thus generalisations were made difficult. It would have been desirable to include a number of schools in order to provide a broader subject base.

The language and phonological awareness measures used in this study were standardised on European and American populations. Their suitability for use in the South African context, particularly with the EAL learner, may be criticised. Given that no South African- based standardised measures were available, this was however unavoidable.

The Reading Comprehension Task developed by the researcher for use in this study proved to be of limited use. A pilot study to investigate the suitability of this measure could have been undertaken, on more than just one learner with average literacy development, prior to the inclusion of this test in the test battery.

It may have been useful to include a standardized test of auditory perception, such as the Test of Auditory-Perceptual Skills-Revised (TAPS-R) (Gardner, 2000) in the test battery, in order to better explore that aspect of the subject's performance and its relationship to reading and spelling performance.

For the purposes of this study, only oral reading and written spelling ability were examined. Other aspects of spelling such as oral spelling, as well as other aspects of reading ability, such as reading of varied materials or silent reading could have been included for a broader perspective.

It would also have been of interest to include questions regarding parental reading habits and the presence or absence of books in the home. Both of these factors are claimed to have an effect on learners' reading development (Norris & Hoffman; Craig et al, 2003).

While every effort was made to retain reliability and validity within this study, due to the small number of subjects and the variety of languages spoken by the multilingual subjects in this study, an exact replication of this study may prove challenging.

In addition to the limitations of this study, a number of strengths were also revealed.

The language and phonological assessment measures, as well as the ESSi Reading Test (Esterhuysen & Beukes, 1997) and the ESSi Spelling Test (Esterhuysen & Beukes, 1997) used in the assessment battery proved to be applicable to the South African context explored in this study.

This study attempted to include subjects judged to have poor literacy and subjects with good literacy in the same study, as well as subjects with English as Home Language and English as Additional Language subjects in the same study. In addition the subjects were tested on a varied test battery providing insights into their performance on phonological awareness, language and reading and spelling

measures. The study of dyslexia (specific reading disability) has focused on monolingual learners and to the knowledge of this researcher, a study of this nature has not been attempted previously (Cline, Ganschow & Reason, 2000 a). Studies have included monolingual and bilingual subjects but have not included the other parameters included in this study (Bialystok & Herman, 1999).

The performance of subjects in this study confirmed international research suggesting a strong link between phonological awareness ability and reading and spelling ability.

The results of this study also supported international findings regarding multilingual learners and provided insights into how speech-language therapists and educators in South Africa might approach the assessment and treatment of such learners. The assessment is complicated and requires “teasing apart phenomena associated with normal second language reading acquisition from authentic warning signs of reading failure” (Cline et al., 2000 b, p. 13).

In conclusion, the researcher believes that the findings of this study are valuable, and provide insight into the relationship between phonological awareness, oral reading and written spelling in the inclusive English-medium education setting.

### **4.3 IMPLICATIONS FOR FURTHER RESEARCH**

The findings of this study have many implications for speech-language therapists who manage the English-speaking or the multilingual learner. The clinical and theoretical implications, as well as implications for future research are presented forthwith.

#### ***4.3.1 Clinical implications for speech-language therapists***

- Speech-language therapists and educators should take cognisance of the relationships between phonological awareness, reading, spelling and language when assessing and treating learners with reading and spelling

problems (Gilbertson & Bramlett, 1998). Therapists need to expand their assessment batteries to include these aspects (Masterson & Apel, 2000). Torgesen and Davis (1996) suggest that therapists may even need to go further in therapy than the training programs offered in the literature. Focusing on only one aspect of the development of a learner is not sufficient to ensure remediation of reading or spelling difficulties. The speech-language therapist needs to work as a member of a team involved in the treatment of these learners and to use all the areas of expertise available to her, including knowledge regarding language development and phonological awareness.

- Multilingual (EAL) learners may present with language delays and phonological awareness delays in English as their language of learning and teaching (L.L.T). Therapy with such learners should include special emphasis on vocabulary and syntax as part of the treatment program. The individual learner's case history, assessment and intervention must take into account the multilingual background of the learner (SASLHA, 2003).
  
- Learners with delayed language may present with poor reading and spelling performance and poor phonological awareness development. Similarly, learners with poor reading and spelling may well have underlying developmental language and poorly developed phonological awareness skills. Assessment and intervention should explore and treat a variety of areas. Gillon (2000) and Ehri (2000) advocate an integrated approach to assessment and intervention to better aid the struggling learner.
  
- Learners, who have received early language therapy at a pre-school level, may present with spelling and reading difficulties later at school as was the case in this study. Therapy should extend beyond basic auditory perceptual and oral language therapy, to include phonological awareness and if necessary written language therapy to prevent later spelling and reading problems.

- Speech-language therapists need to be aware of the relationship of phonological awareness and language development in spelling and reading acquisition when treating the pre-school learner. Many later problems with the development of literacy can be prevented by early intervention (Norris & Hoffman, 2002).
  
- The TOLD-P: 2 (Newcomer & Hammill, 1991), the PHAB (Frederickson et al., 1997) and the ESSI Reading Test (Esterhuyse & Beukes, 1997) and the ESSI Spelling Test (Esterhuyse & Beukes, 1997) appear to form a useful test battery when distinguishing the state of a learner's reading and spelling development. Whilst the TOLD-P: 2 (Newcomer & Hammill, 1991) and the PHAB (Frederickson et al., 1997) are not standardised on the South African population, they provide useful information for diagnostic and therapy purposes. The ESSI Reading Test (Esterhuyse & Beukes, 1997) and the ESSI Spelling Test (Esterhuyse & Beukes, 1997) appear to be quick and useful assessment measures. The use of these measures is therefore recommended.
  
- While a learner may achieve good results in a weekly spelling test, spelling of unfamiliar word and repeatedly occurring words may remain problematic. Intervention with a learner experiencing spelling difficulties needs to take the learner beyond the weekly spelling test words to unfamiliar words and the practice of decoding strategies to unlock the word.
  
- Speech-language therapists, due to their training in language development, auditory processing and phonological awareness are ideally suited to co-coordinating treatment programs for learners with spelling and reading difficulties. The speech-language therapist can be a vital member of a team collaborating to assess and intervene with these learners (Catts, 1991; Masterson & Apel, 2000; ASHA, 2001).



- As part of the collaborative team speech-language therapists have a role to play in organizing workshops highlighting the importance of phonological awareness and language development in the classroom. Such workshops could be aimed at a pre-school as well as a primary school level. Catts and Kamhi (1987) believe that learners are always worth our attempts to collaborate with educators and other specialists to help the learner with spelling and reading problems. The speech-language therapist can also play a role in advising educators and parents as to suitable reading material for the learner experiencing reading difficulties.
- The speech-language therapist working in an inclusive educational setting needs to be aware of a variety of possible areas of need requiring input, namely the improvement of the child's speech, language and communication skills, improving their own understanding of the issues facing teaching staff in the classroom and helping educators to develop strategies to help learners with specific impairments, liaison with educators and understanding of the respective roles each plays, and finally, the development of a resource base which could be used by educators and therapists working with learners experiencing difficulties (Wren, Roulstone, Parkhouse & Hall, 2001).
- Educators as team members should be encouraged to teach context-relevant spelling and to discuss effective study techniques to learn spelling with the learners in their class. This will, of necessity, include decoding, meanings of words, and comparisons between words. With these modifications, and practice of metalinguistic skills such as phonological awareness (Bourassa & Treiman, 2001), the memorisation of word lists can continue to be recommended as a part of an effective spelling curriculum (Scott, 2000).

- The establishment of English language support classes for EAL learners, and even English-speakers with weak linguistic skills, is strongly recommended. Every public school in South Africa educating EAL learners needs to consider including such a program in order to support the multilingual learner and reduce the influence of language development on general educational achievement.

#### **4.3.2 *Theoretical implications***

- Many assessment tools developed internationally are thought to be biased towards linguistically diverse populations in Europe and America (Laing & Kamhi, 2003). Therefore, the use of diagnostic tools developed in Europe or America with South African learners whose background may differ from the population on which the measure was standardised, is clearly problematic (Johns, 1999). Speech-language therapists and educators need to develop diagnostic tools to assess the areas of phonological awareness and language development in South Africa's multicultural society. These may be based on Euro-American measures, but ideally should be developed in South Africa (Graz, 1998).
- The lack of formalised assessment procedures in the Foundation Phase due to the Outcomes Based Education system followed in South Africa is of concern. Parents are often unaware of the extent of their child's learning difficulty. Due to the fact that learners begin formal education only in their seventh year, early diagnosis and intervention to prevent later reading and spelling difficulties are indicated. It has been suggested by Salinger (1991), that the educator write a written statement of his or her perceptions of a learner's literacy ability, outlining strengths and weaknesses on the learner's report, which may be more useful than a symbol. This may ensure that parents are more informed regarding the nature of the difficulties their children are experiencing and therefore more motivated to press for intervention.

- The ‘whole language’ versus ‘decoding emphasis’ argument for developing reading and spelling, would not appear to be of much value (Ball, 1997) as based on the findings of this study, problems would

appear to present in both language development and phonological awareness development. Attention to both areas during intervention is therefore indicated in order to improve reading and spelling.

- Many researchers consider phonological awareness to be ‘the key’ of learning to read English (Swan & Goswami, 1997) but others view it as only one of many components that must be developed and integrated to encourage the development of reading (and spelling) (Gillon, 2000). Although the value of phonological awareness is undeniable, the results of this study appear to support the second view. A full battery of tests is therefore recommended when assessing learners with reading and spelling difficulties and a multi-faceted approach is indicated in intervention with these learners.

#### ***4.3.3 Implications for future research***

- Further research on how multilingual learners learn to read and spell in English, is indicated in order to improve assessment and therapy techniques with these learners, who comprise a large proportion of South African learners (Macleod, 1998).
- Studies should be undertaken to examine the nature of phonological awareness development in languages other than English to enable a better understanding of how phonological awareness develops in these

languages and how differences may impact on the reading and spelling development of multilingual learners.

- This study could be replicated in other public schools utilising a larger subject sample to investigate whether the same relationships between phonological awareness, oral reading and written spelling, as well as language are found.
  
- Further investigation regarding the applicability of the test battery used in this study as an effective assessment battery for evaluating learners with spelling and reading delays must be undertaken.
  
- The development and standardisation of phonological awareness tests for the South African learner population is indicated. These should be not only available in English but in all the official languages.
  
- The development of an effective treatment program for learners with reading and spelling difficulties involving the integration of various aspects, such as those outlined in this study requires attention.
  
- Research into the efficacy of introducing phonological awareness and language stimulation at the pre-school level in South Africa, and its impact on later spelling and reading development, particularly in the EAL learner, is necessary.
  
- Research into the efficacy of workshops for educators, particularly Foundation Phase educators, highlighting the role of the speech-language therapist in the treatment of learners with reading and spelling difficulties, is indicated. Research into the resulting impact on learners in the South African situation, is also indicated. There is currently a general lack of awareness as to the role of the speech-language therapist

as part of the team working with learners experiencing spelling and reading problems.

In Conclusion,

“ Understanding the complexities of the processes involved in bilingual (multilingual) learning should help the clinician make clinical decisions that will address the needs of bilingual (multilingual) children and their families.”

(Gutierrez-Clellen, 1999, p.300)

This is especially true in the South African context, where the presence of eleven official languages increases the probability of a large number of multilingual learners receiving their education in a language other than their mother tongue. The speech-language therapist has an increasingly important role to play in the educational context of the New South Africa.

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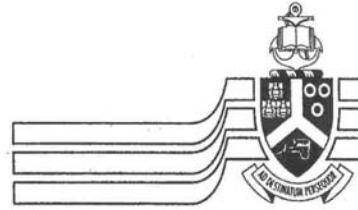


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**6. APPENDIXES**

Appendix A

**Members:**  
**Research Proposal and Ethics Committee**  
Prof D Beyers; Dr L Davis; Prof C Delpont;  
Dr M de Waal; Dr JEH Grobler; Prof KL Harris;  
Dr JdeC Hinch; Prof E Krüger; Prof B Louw;  
Prof IA Niehaus; Prof C Potgieter; Prof D Prinsloo;  
Dr E Taljard; Prof J van Eeden; Prof A Wessels



University of Pretoria

Research Proposal and Ethics Committee  
Faculty of Humanities

30 October 2003

Dear Professor Louw

**Project:** *The phonological awareness, written spelling and oral reading of learners in an inclusive English-medium education setting*

**Researcher:** N Pijper  
**Supervisor:** Prof B Louw  
**Department:** Communication Pathology  
**Reference number:** 91835829

Thank you for the application you submitted to the Research Proposal and Ethics Committee, Faculty of Humanities.

I have pleasure in informing you that the Research Proposal and Ethics Committee formally approved the above study on 30 October 2003.

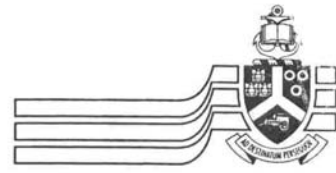
The committee requests you to convey this approval to Ms Pijper. We would like to commend the researcher for the sensitivity displayed towards ethical issues.

We wish you success with the project.

Sincerely

**Prof Brenda Louw**  
**Chair: Research Proposal and Ethics Committee**  
**Faculty of Humanities**  
**UNIVERSITY OF PRETORIA**

APPENDIX B



Universiteit van Pretoria

Pretoria 0002 Republiek van Suid-Afrika Tel (012) 4202357/420291  
Faks (012) 420 3517 <http://www.up.ac.za>

Departement Kommunikasiepatologie  
Sprak- Stem- en Gehoorkliniek

02.10.2000

The Headmaster  
Brooklyn School  
P O Box 35712  
Menlo Park  
0102

Dear Mr Morgan

**Re: Permission to conduct Research Study for M.Communication Pathology**

As you know I am a Speech Therapist treating some of the learners at Brooklyn School. I am also currently registered for M.Communication Pathology degree at the University of Pretoria. In order to complete the degree, I am required to conduct a research project.

The subject of my research is "THE RELATIONSHIP BETWEEN PHONOLOGICAL AWARENESS , WRITTEN SPELLING AND ORAL READING ABILITIES OF GRADE 2 PUPILS IN AN INCLUSIVE SCHOOL SETTING."

The subject of this research has received a lot of attention in Britain and America but very little here in South Africa. The information obtained from such a study will greatly contribute to our knowledge of how to further the development of literacy skills of learners in South African schools.

The study will involve selecting **ten** learners who are achieving **very good** literacy evaluations on their latest report, and **ten** learners who are achieving

poor literacy evaluations on their latest report. These learners will then be evaluated on a test battery including: an audiological (hearing) screening, language test, phonological awareness test and spelling and reading evaluations. Results will then be examined and conclusions drawn regarding the relationships between these various aspects, considered to affect reading and spelling development. The thesis will be made available to Brooklyn School, but the learners' identities will remain confidential.

It is estimated that testing will take approximately two hours per learner. Testing will not be continuous but will take place over a two-week period within school hours. I would like to commence testing early in the fourth term.

Parents of the learners selected will be required to give permission and to complete a short case history information sheet. (See letter and form attached.)

Your permission to conduct this study at Brooklyn School in school hours is thus formally requested. Your co-operation in this regard is greatly appreciated.

Yours sincerely



**NOELENE PIJPER**

Tel: 012 4600786  
Cell: 0832681147  
E-mail: [pijper@iafrica.com](mailto:pijper@iafrica.com)

**RESEARCH SUPERVISORS:**

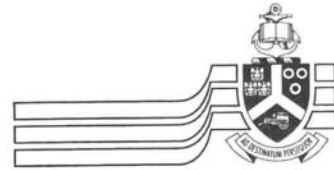
PROF. B. LOUW



MRS N. CAMPBELL



APPENDIX C



Universiteit van Pretoria

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Faks (012) 420 3517 <http://www.up.ac.za>

Departement Kommunikasiepatologie  
Spraak- Stem- en Gehoorkliniek

02.10.2000

Dear Parent of .....

I am a Speech, Language and Hearing Therapist who treats some of the learners in Brooklyn School. I am also currently registered for a Masters Degree in the Department of Communication Pathology at the University of Pretoria. As part of the requirements, I am conducting a study in the Grade 2 classes of Brooklyn School. The study involves examining the literacy skills of some of the children on a short test battery. The tests include aspects such as language, phonological awareness, hearing, spelling and reading.

The testing will be conducted on the school premises in a child-friendly manner, with the approval of the headmaster and the teacher. The children will not be aware of the reason for the evaluation or scores obtained, but only that they are helping me with some important research that will help other children of their age. Testing is estimated to take a total of approximately two hours, spread over a two-week period and will be achieved with minimal disruption of class work. Please note that the child will neither benefit or be penalized by participating in the study.

This study is an attempt to examine children's literacy skills in the South African context, in a manner that is at the forefront of education in Britain and America. It is hoped that findings from this study will provide insights into the manner in which teaching of literacy skills could be improved in South African schools, to the benefit of all learners.

Your child has been randomly selected from his/her group for this study. I would be very grateful if you would allow him/her to participate. It will not be a stressful experience for the child. If you are interested in the results of his/her test battery, I will gladly share them with you in confidence. For the purposes of the study, strict confidentiality will be observed throughout the thesis. The subject is indicated only by a code number. The study must be made available to the school, but they will also be unaware of which subject is which. The data which is obtained will only be used for the purposes of this study and will thus only be reflected as results in this study.

If you are agreeable to your child participating in this study, please take a few minutes to complete the attached questionnaire as carefully as possible, and remember to sign the informed consent. Please return it sealed in the envelope provided to the class teacher by .....

Thank- you for your co-operation in allowing me to test your child. I can be contacted at the following numbers for further information :

Tel: 012 4600786  
E-mail: [pijper@iafrica.com](mailto:pijper@iafrica.com)

Cell: 0832681147

NOELENE PIJPER

Research Tutors: PROF B LOUW  
MRS N CAMPBELL

**CONFIDENTIAL QUESTIONNAIRE**

Please complete the questionnaire by filling in the relevant information and placing an X in the appropriate blocks.

1. Name of child .....
2. Gender of child        MALE         FEMALE
3. Date of Birth .....
4. Birth weight of child (in kg).....
5. Duration of pregnancy (40 weeks is normal).....
6. Home Language .....
7. How long has the child attended **this** school? .....
8. Did he/she attend nursery school?    YES         NO   
    If yes, for how long? .....
9. Has he/she had middle ear infections?    YES         NO   
    If yes, approximately how many times? .....
- When was the last ear infection? .....
10. Has your child had any therapeutic intervention eg.
  - a) Speech Therapy                    YES     NO
  - b) Occupational Therapy            YES     NO
  - c) Remedial Therapy?                YES     NO
  - d) Other Therapy?                    YES     NO

If you have answered YES to any of the above interventions, please give details of type of therapy and areas treated if possible

.....  
.....

**CONFIDENTIAL QUESTIONNAIRE CONTINUED**

11. Does your child use Ritalin or any other medication for attention/  
concentration? YES  NO   
If yes, Name of drug.....  
For how long? .....

12. Does your child enjoy reading? YES  NO  SOMETIMES

13. Does he/she read for pleasure? YES  NO  SOMETIMES

14. Is there anything you would like to add regarding your child?  
.....  
.....  
.....

**I, PARENT OF ..... HEREBY  
CONSENT TO HIS/ HER INCLUSION IN THE RESEARCH  
STUDY. I UNDERSTAND THAT MY CHILD'S IDENTITY AND  
THE CONTENTS OF THIS QUESTIONNAIRE WILL REMAIN  
CONFIDENTIAL.**

**Signed:** ..... **Parent of:**  
.....

**Date:** .....

*Thank you for  
completing this  
questionnaire*

*Noelene*



APPENDIX D

Name:  
Subject No:

IMPEDANCE SCREENING

	Tymp Type	Compliance	Mid Ear Press	Pass?
LEFT				
RIGHT				

Pass Values: Type : TYPE A  
Compliance : 0.3 –1.75  
Middle ear pressure : -100mmH2O to +50mmH2O

PURE TONE SCREENING

Pass Values: testers HL in noise +10dB at all frequencies

	250Hz	500Hz	1000Hz	2000Hz	4000Hz	Pass?
LEFT						
RIGHT						

APPENDIX E

**R2 - READING WORDS**

1. look
2. jump
3. swim
4. lunch
5. money
6. because
7. carpet
8. ladder
9. kite
10. picnic
11. towel
12. noise
13. study
14. breath
15. tune
16. huge
17. creature
18. courage
19. especially
20. language

APPENDIX F

**S2 - SPELLING WORDS**

1. hunt
2. drum
3. ship
4. door
5. stick
6. apple
7. mouth
8. fork
9. bread
10. table
11. sound
12. belt
13. plate
14. rang
15. please
16. beside
17. nail
18. neat
19. puzzle
20. thumb

APPENDIX G

**Class (informal) spelling test words.**

Instruction: Please write an answer to every word.

1. leaf (a leaf on a tree)
2. pack
3. stars
4. things
5. grab
6. meet (I'll meet you after school)
7. morning
8. gave
9. school
10. whip
11. black
12. king
13. spin
14. drive
15. shirt
16. ask
17. broke
18. bump
19. curly
20. tube
21. sheep
22. smell
23. sent (I sent you a letter)
24. chick
25. over

APPENDIX II

Please read this short story very carefully. You will need to answer questions later.

**After lunch Kathy walked up to the corner of the street. She leaned on the fence and looked at the red house for a long time. Nothing happened. Being a detective all by yourself wasn't much fun.**

**Then all at once Kathy had an idea. She looked at the house again. Next she began to count the windows. She walked all round the house, counting and thinking.**

**"That house is too big for just two people," she said to herself. "It has room for someone else. Perhaps that's the answer. Perhaps someone else is coming to live in the house as well as Mr. and Mrs. Hardy."**

**Kathy was feeling better now. She was going to be the best detective after all. The others hadn't thought of this. She rushed off to tell Daddy.**

**(134 words)**

Please circle the correct answer to the following questions:

1. What meal did Kathy eat?
  - a. breakfast
  - b. lunch
  - c. tea
  - d. supper
  
2. Why didn't Kathy enjoy being a detective?
  - a. she was on her own
  - b. it was too hard
  - c. there was nothing exciting happening
  - d. she wanted to watch TV
  
3. Why did Kathy count the windows?
  - a. to see if it was a hotel
  - b. to show how well she can count
  - c. she needed to practice her counting
  - d. to see how many rooms there were
  
4. Why did Kathy think she was the best detective?
  - a. she was cleverer than the other children
  - b. she thought of a new idea
  - c. she was Dad's favourite
  - d. she always came first in class
  
5. What do you think is happening in this story?
  - a. Kathy is writing a story about a detective
  - b. Kathy is telling her brother a story about a detective
  - c. Kathy is just doing her job
  - d. Kathy is trying to solve a mystery

6. What does “all at once” mean?
  - a. one
  - b. suddenly
  - c. only
  - d. twice
  
7. A detective .....
  - a. hunts animals
  - b. shoots people
  - c. solves mysteries
  - d. teaches policemen
  
8. A good title for this story is .....
  - a. Kathy plays detective
  - b. Daddy goes to work
  - c. The party
  - d. The big green house
  
9. Who are Mr. and Mrs. Hardy?
  - a. Kathy’s parents
  - b. Kathy’s grandparents
  - c. The people who live in the red house
  - d. The people who live next door
  
10. Which words in the story mean “alone”?
  - a. “all by yourself”
  - b. “said to herself”
  - c. “as well as”
  - d. “after all”

**APPENDIX I**

**ANSWER SHEET: Reading (R2)**

**Name of Pupil:** ..... **Gender (m/f):** .....

**Name of School:** ..... **Age:** .....

**Grade:** .....

	Remark
1. look	
2. jump	
3. swim	
4. lunch	
5. money	
6. because	
7. carpet	
8. ladder	
9. kite	
10. picnic	
11. towel	
12. noise	
13. study	
14. breath	
15. tune	
16. huge	
17. creature	
18. courage	
19. especially	
20. language	

	Raw score	Stanine
Spelling:	/20	
Reading:	/20	



APPENDIX J



ANSWER SHEET: Spelling (S2)

Name of Pupil: ..... Gender (m/f): .....

Name of School: ..... Age: .....

Grade: .....

	Remark
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	
11.	
12.	
13.	
14.	
15.	
16.	
17.	
18.	
19.	
20.	

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APPENDIX K

**Class (informal) spelling answer sheet**

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_
6. \_\_\_\_\_
7. \_\_\_\_\_
8. \_\_\_\_\_
9. \_\_\_\_\_
10. \_\_\_\_\_
11. \_\_\_\_\_
12. \_\_\_\_\_
13. \_\_\_\_\_
14. \_\_\_\_\_
15. \_\_\_\_\_
16. \_\_\_\_\_
17. \_\_\_\_\_
18. \_\_\_\_\_
19. \_\_\_\_\_
20. \_\_\_\_\_
21. \_\_\_\_\_
22. \_\_\_\_\_
23. \_\_\_\_\_
24. \_\_\_\_\_
25. \_\_\_\_\_

APPENDIX L APPENDIX L

Please circle the correct answer to the following questions:

1. Why was Kathy feeling sad?
  - a. She had not eaten yet
  - b. She was feeling sick
  - c. She had not solved a mystery yet
  - d. She was a mystery
  
2. What meal did Kathy eat?
  - a. breakfast
  - b. lunch
  - c. tea
  - d. supper
  
3. Why didn't Kathy enjoy being a detective?
  - a. she was on her own
  - b. it was too hard
  - c. there was nothing exciting happening
  - d. she wanted to watch TV
  
4. Why did Kathy count the windows?
  - a. to see if it was a hotel
  - b. to show how well she can count
  - c. she needed to practice her counting
  - d. to see how many rooms there were
  
5. Why did Kathy think she was the best detective?
  - a. she was cleverer than the other children
  - b. she thought of a new idea
  - c. she was Dad's favourite
  - d. she always came first in class

6. What do you think is happening in this story?
- a. Kathy is writing a story about a detective
  - b. Kathy is telling her brother a story about a detective
  - c. Kathy is just doing her job
  - d. Kathy is trying to solve a mystery
7. Who are Mr. and Mrs. Hardy?
- a. Kathy's parents
  - b. Kathy's grandparents
  - c. The people who live in the red house
  - d. The people who live next door
8. What did Kathy want to tell her Dad?
- a. That she had solved the mystery
  - b. That she had finished lunch
  - c. That the other children were teasing her
  - d. That she loved him

APPENDIX M

Means and standard deviations of groups' scores  
on literacy measures

	Essi Reading	Reading Comprehension	ESSI Spelling	Class Spelling	Reading Errors
Group 1 mean	7.0	7.4	7.2	21.6	3.8
Group 1 std devn	1.225	0.894	1.483	1.517	6.943
Group 2 mean	8.2	6.6	8.0	24.0	3.6
Group 2 std devn	1.095	1.517	1.000	1.000	3.578
Group 3 mean	3.2	3.2	2.8	9.0	31.2
Group 3 std devn	1.095	1.643	1.304	4.848	15.498
Group 4 mean	4.4	3.8	4.2	13.6	18.8
Group 4 std devn	0.548	2.168	1.789	4.506	6.535
p value	0.0013	0.0059	0.0029	0.0047	0.0047

Means and standard deviations of subjects' scores on subtests of TOLD-P: 2

	Picture vocabulary	Oral vocabulary	Grammatic understanding	Sentence imitation	Grammatic completion	Word discrimination	Word articulation
Group 1 mean	9.4	11.6	10.6	13.2	10.6	12.8	12.0
Group 1 std devn	1.517	1.140	3.209	2.588	1.949	1.643	0
Group 2 mean	8.7	10.2	7.0	9.8	10.8	11.6	11.0
Group 2 std devn	2.950	1.924	1.225	3.114	3.564	3.362	2.236
Group 3 mean	8.4	9.2	8.2	7.8	8.4	12.0	9.6
Group 3 std devn	2.302	1.304	2.490	1.643	2.793	3.082	3.362
Group 4 mean	5.4	5.6	5.6	7.4	7.4	8.8	10.4
Group 4 std devn	2.074	2.608	0.548	2.191	1.949	1.483	2.302
p value	0.0569	0.0124	0.0097	0.0174	0.1226	2.302	0.4222

**Table 10** Means and standard deviations of groups' scores on quotients of TOLD-P: 2

	Spoken language	Listening	Speaking	Semantic	Syntactic	Phonological
Group 1 mean	110.2	102.0	112.4	103.0	109.4	114.4
Group 1 std devn	5.805	9.028	5.030	5.612	13.483	4.930
Group 2 mean	98.6	89.8	102.8	95.2	95.8	107.8
Group 2 std devn	14.588	11.606	16.146	14.481	13.498	15.818
Group 3 mean	93.6	97.2	94.2	92.8	88.2	104.8
Group 3 std devn	12.300	12.617	11.628	9.149	14.202	15.385
Group 4 mean	80.6	78.2	84.6	73.0	79.4	97.6
Group 4 std devn	8.081	4.324	11.415	12.550	8.019	7.47
p value	0.0180	0.0126	0.0268	0.0166	0.0332	0.1233

APPENDIX O

Means and standard deviations of groups' scores on subtests of PHAB

	Alliteration	Rhyme	Spoonerisms	Nonword reading	Picture naming	Digit naming	Alliteration fluency	Rhyming fluency	Semantic fluency
Group 1 mean	98.8	104.2	104.2	106	101	101.6	109.8	112.0	109.4
Group 1 std devn	1.789	3.564	4.324	8.246	10.863	8.081	16.589	11.446	15.614
Group 2 mean	96.8	102.2	103.6	115.8	100.6	109.6	109.4	99.6	96.4
Group 2 std devn	6.099	10.378	8.295	13.971	10.900	9.072	9.711	18.298	9.965
Group 3 mean	93.2	90.6	91.00	96.6	97.2	90.2	98.8	79.2	97.6
Group 3 std devn	93.2	11.371	8.396	10.431	9.176	7.823	10.826	9.338	16.652
Group 4 mean	5.070	84.4	95.2	98.8	90.0	85.2	104.6	78.6	92.6
Group 4 std devn	88.0	5.030	5.310	5.630	8.860	11.819	21.197	13.502	13.428
p value	9.0589	0.0195	0.0361	0.0612	0.2692	0.0105	0.7996	0.0160	0.2543