A COMPARATIVE STUDY OF SYLLABLES AND MORPHEMES AS LITERACY PROCESSING UNITS IN WORD RECOGNITION: ISIXHOSA AND SETSWANA

A thesis submitted in fulfilment
of the requirements for the degree of

MASTER OF ARTS
of
RHODES UNIVERSITY

by
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December 2015

ABSTRACT

Word recognition is a core foundation of reading (Invenizzi & Hayes 2010) and involves interactions of language skills, metalinguistic skills and orthography. The extent of the interaction with one another in reading has yet to be fully explored, especially in the Southern-Bantu languages. This comparative study of isiXhosa and Setswana explores this three-way interaction between language skills (effect of Language of Learning and Teaching (LoLT)), metalinguistic skills (Phonological and Morphological Awareness) and orthography (conjunctivism vs. disjunctivism). This thesis is novel in three respects, (a) a set of linguistic-informed reading measures were developed in isiXhosa and Setswana for the first-time, (b) to my knowledge, the comparisons made and study of Morphological Awareness in the Southern-Bantu languages have never been done, and (c) the use of d-prime as a way of testing for grain size in reading is an innovative approach. Grade 3 and Grade 4 learners were tested on four independent linguistic tasks: an open-ended decomposition task, a Phonological Awareness task, a Morphological Awareness task and an independent reading measure. These tasks were administered to determine the grain size unit (Ziegler & Goswami 2005, Ziegler et al. 2001) which learners use in word recognition, with the grain sizes of syllables and morphemes being studied. Results showed that syllables were the dominant grain size in both isiXhosa and Setswana, with morphemes as secondary grains in isiXhosa. Grain size differed slightly between the two orthographies. These results are reflected in the scores on the metalinguistic tasks. LoLT was not shown to have a significant impact on word recognition in first-language reading. The Psycholinguistic Grain Size Theory (PGST) was found to be the most applicable model of word recognition to the Southern-Bantu languages, as opposed to the Dual-Route Cascade Model and Orthographic Depth Hypothesis. This thesis concludes with suggested adaptations to this theory in order to allow for morpheme grain size to be included. This study has implications for teaching practice and curriculum design, and contributes to a broader understanding of literacy in the foundation phase in the Southern-Bantu languages.

ACKNOWLEDGEMENTS

The success of this thesis is based on financial, moral and physical support given to me by my parents, friends, colleagues and supervisors.

I express my deepest gratitude to my primary supervisor, Prof. Mark de Vos for his endless support, guidance and advice. Despite other academic and professional commitments, he was always willing to assist me. His expertise and knowledge of the subject matter assisted in shaping this thesis. I am grateful to have been given the opportunity to conduct research under his guidance. My co-supervisor, Ms. Kristin van der Merwe's advice and assistance cannot go unmentioned. Her work on my drafts and providing me with ideas all assisted in shaping my research. Additional thanks are extended to Dr. Will Bennett for his expertise on the phonetics and phonology and language structure of the Southern-Bantu Languages under investigation in this study which he used in assisting me with setting up the phonological awareness tasks, specifically with deciphering the differences between Setswana and isiXhosa. Further thanks go to Prof. Ron Simango, who drew on his expertise in the Southern-Bantu Languages to assist and provide me with advice when putting together the model answers for the open-ended decomposition task. Dr. Jadezweni from the African Languages Department also assisted with this.

I acknowledge and thank all the research assistants who have assisted me with my research over the past two years. I extend my thanks for being first-language speakers of isiXhosa or Setswana and being willing to use their language skills to assist me with translations and data scoring and in conducting tests at the different schools. Without them none of this would have been possible.

To the schools where I conducted my research, I send my whole-hearted thanks to the Principals, staff and learners: to the staff at all the schools for allowing us to do the testing at their schools, for giving up time for us to conduct testing and for their hospitality; to the learners of these schools for their accommodation and excitement in taking part in the study. My experiences at all the schools were a heart-warming and enjoyable experience. I also extend my thanks to Ms. Jenny Katz, who put me in touch with the schools in the North West Province.

For financial support, I thank Rhodes University for awarding me the Rhodes University Prestigious Scholarship and to the Sandisa Imbewu Literacy Fund for providing me with additional funding as well as for funding my trip to the North West Province to conduct research.

Without these scholarships and funding I would not have been able to have furthered my studies at Rhodes University, nor to have conducted the research which made this thesis what it is today. I also thank my parents for continuously providing me with financial support throughout my university career.

For moral support, I extend my deepest of thanks to my friend, Maxine Diemer, who inspired and motivated me with advice and guidance. In addition, Maxine organised the research at the isiXhosa schools. Maxine and I also worked together developing the Phonological Awareness tests for isiXhosa. I would also like to thank Sian Rees, who designed the Morphological Awareness tasks for isiXhosa which she allowed me to use for my study. Sian also looked over the MA tests for Setswana and assisted me with the Setswana data collection in the North West Province, giving up her time to be with me. Thanks must also go to my friend and colleague, Justine Kerford for her continuous support and motivation.

The love, support and patience of my parents and their faith in me over the years was a constant encouragement. I thank them for all their advice and for looking over my work for me. They instilled within me a drive to succeed. I hope that I can continue to make them proud.

I thank the English Language and Linguistic Department for making this all possible. The department became a home away from home for me. A special thanks to all the lecturers and administrative staff for their support, guidance and assistance in every endeavour. I greatly appreciate every act, small or large.

Finally, I thank Malcolm Hacksley for his work on proofreading and editing this thesis.

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GLOSSARY

CRPM	- Characters Read Per Minute
DRC	- Dual-Route Cascade Model of word recognition
Group E.EC	- English LoLT School in the Eastern Cape (isiXhosa L1 speakers)
Group E.NW	- English LoLT School in the North West (Setswana L1 speakers)
Group T.NW	- Setswana LoLT School in the North West
Group X.NW	- IsiXhosa LoLT School in the Eastern Cape
LoLT	- Language of Learning and Teaching
L1	- First-language
L2	- Second-language
MA	- Morphological Awareness
ODH	- Orthographic Depth Hypothesis
ORF	- Oral Reading Fluency
PA	- Phonological Awareness
PGST	- Psycholinguistic Grain Size Theory
SRF	- Silent Reading Fluency

CHAPTER 1: INTRODUCTION

The present study set out to explore three factors that are crucial for a solid understanding of word recognition in the Southern-Bantu Languages. These are Language of Learning and Teaching (LoLT), orthography and metalinguistic skills. The extent of their interaction with one another in reading has yet to be explored in the literature. This research is therefore intended to contribute to existing knowledge about the relationship between metalinguistic skills and reading, and to assist in determining the literacy processing unit/s used in reading strategies in the Southern-Bantu Languages. The results are interpreted in light of the Psycholinguistic Grain Size Theory (PGST) (Ziegler & Goswami 2005, Ziegler *et al*. 2001).

Literacy in South Africa is a national educational crisis given the relationship between reading ability and learners' academic performance (Pretorius 2002). Literacy in South Africa remains a challenge for various reasons. The sources of the problem of the literacy crisis in South Africa are complex and multifaceted, with majority of the literature focusing on the social, historical and political sources of the problem. Apart from these factors there are linguistic dimensions which need to be considered, such as the unique structure of the Southern-Bantu languages, the different writing systems which they employ and decoding challenges associated with these orthographies.

Although this study focuses on the linguistic dimensions, it is important to acknowledge other contributory factors to reading in South Africa. Early literacy instruction involving the Southern-Bantu languages often happens in the context of high poverty schools. According to Fleisch (2008), approximately 80% of South African children are underperforming and come from disadvantaged schools. It is most often in these schools where first literacy instruction occurs in the learner's home language. Despite this, learners are still unable to read well. What is happening (or not happening) in these classrooms? Home-language schooling has often been directed at marginalized communities who have suffered from a lack of services of all kinds. A failure in meeting the basic human rights for food, shelter and health places a great challenge in providing quality schooling for these learners. Thus in order to fully grasp an understanding of the literacy situation in South African schools it is important to understand the factors which hinder or promote success in reading in these contexts. These factors include a mismatch between language policy and implementation, lack of resources and insufficient teacher training, large class sizes, child-headed households, and effects of poverty and HIV/Aids (Walter & Davis 2005). The variables that co-occur with high poverty contexts therefore do not create enabling contexts for literacy development. Many learners come to school hungry and/or suffer from poor

nutrition; this has a snowball effect with high absenteeism and poor concentration in classrooms. This provides pedagogical challenges for literacy development within these schools. Within the broader context of a dysfunctional education system, it is important to bear in mind the broad spectrum of contributory factors in reading in agglutinating African languages, in particular when reading performance is so poor.

Recent findings from literacy-based assessments highlight the extent to which South African children are underperforming. South African learners reach lower than expected literacy levels during their primary school years compared to that of international standards (Mothibeli 2005).The International Progress in Reading and Literacy Study (PIRLS 2006, 2011) found that South African learners do not reach adequate levels of literacy achievement (Howie *et al.* 2008, Howie *et al.* 2012), with the South African learners scoring well below the international benchmark. (Howie *et al*. 2012). Analysized by language, the results of the PIRLS (2006) showed that first-language speakers of English and Afrikaans performed the best, with scores of 458 and 364 respectively (PIRLS 2006). In comparison, learners who were tested in the Southern-Bantu languages received extremely poor results. Setswana scored the highest with only 250 points and isiNdebele and isiXhosa scored the lowest, with scores of under 200 points (PIRLS 2006).

In additon to the PIRLS, results of the 2011 Annual National Assessments (Department of Basic Education 2011) revealed that Grade 3 and Grade 6 learners scored an average of 35% and 28% respectively in the literacy performance measures. One of the reasons for the poor results in literacy performance in the ANA's was attributed to the change in language of learning and teaching from Grade 4 (GADRA education 2012). Spaull (2013) suggests that a decline in academic achievement over the schooling years is a reflection of a lack of mastery of literacy skills in the foundational years.

Education in South Africa is characterised by a system in which learners can either receive first literacy[1] in English or in one of the Southern-Bantu languages. Where schooling does occur in a Southern-Bantu language, it does so from Grade 1 to Grade 3, thereafter learners switch to English as the medium of instruction. Most learners therefore acquire literacy either solely in an Additional Language (AL) or via a bilingual system in which they initially learn to read in a Southern-Bantu language (Pretorius and Mampuru 2007). Learners therefore have the choice to

[1] The term 'first literacy' refers to the learners' first exposure to formal literacy education. In this study it refers to the medium of instruction from Grade 1 to Grade 3.

attend schooling from Grade 1 to Grade 3 in their first-language. However what counts as a first-language is problematic.

In South Africa, learning in one's first-language is complicated by the multilingual and multidialectal reality of the nation. South Africa boasts significant language diversity (Valley *et al*. 2002), with at least 25 different tongues (more than 20 languages) (Lemmer 1995). The child's right to be educated in their first-language and/or language of his/her choice has however been limited to the 11 official languages.

Despite the linguistic diversity of the country, little is known of how orthography interacts with morphology, syntax and lexis in the African languages or how these translate into norms and standards which can inform curriculum design (De Vos *et al*. 2014). In addition there are no standardised linguistic measures found in the Southern-Bantu languages. South African literacy research focuses predominantly on macro-aspects of literacy such as classroom practice or language policy. De Vos *et al.* (2014) argue for literacy research that focuses on the micro-linguistic aspects of reading, and in particular research on the Southern-Bantu languages.

This study investigated the micro-linguistic dimensions of orthography and metalinguistic skills, namely, Phonological Awareness and Morphological Awareness, in word recognition in the Southern-Bantu languages: isiXhosa and Setswana. Word recognition is believed to be a foundation of reading (Aaron *et al.* 1999, Snowling & Hulme 2005, Invenizzi & Hayes 2010). Word recognition involves retrieving information about the spoken form and meaning of a word from its written form (Snowling & Hulme 2005, Invenizzi & Hayes 2010). Previous psycholinguistic studies have shown that word recognition can be influenced by orthography (Perre & Ziegler 2008, Taft 2001 cited in Simon and Van Herreweghe 2010). This is because mappings differ from orthography to orthography according to grain size (Ziegler *et al.* 2001, Ziegler & Goswami 2005). "Grain size" refers to the literacy processing units which learners use when approaching reading. The process of learning to read across different languages and orthographies involves a system of mapping the correspondences between symbols and sounds (Byrne 1998, Share 1995, Ziegler & Goswami 2006). According to Asfaha et al. (2009), the representation of language units in an orthography can take the phoneme, syllable or morpheme as a starting point, depending on the writing system. A range of metalinguistic skills, including Phonological and Morphological Awareness is therefore necessary for the acquisition of reading skills.

"Metalinguistic skills" refers to the "ability to identify, analyse and manipulate language forms" (Koda 2007: 2). The two metalinguistic skills under investigation in this study are Morphological Awareness and Phonological Awareness. Morphological Awareness (MA) is the readers' conscious awareness of the morphemic structure of words and their ability to reflect on and manipulate that structure (Carlisle 1995 cited in McBride-Chang *et al*. 2005, Kirby *et al.* 2012). Phonological Awareness (PA) is the awareness that words can be broken down into units and that these units can be manipulated (Anthony & Francis 2005; Chard & Dickson 1999; Stahl & Murray 1994). A number of studies have demonstrated that PA plays an important role in reading success in alphabetic orthographies (Bradley & Bryant 1985, Stanovich, Cunningham & Cramer 1984, Castles & Colheart 2004). Likewise, there is evidence that MA also promotes literacy development in both early (Casalis & Louis-Alexandre 2000) and in later literacy development (Carlisle 2000).

Although it is clear from these studies that Phonological and Morphological Awareness is important for alphabetic literacy acquisition, what remains unclear is how the characteristics of orthography (conjunctivism vs. disjunctivism) and its relationship to the spoken language may influence the development of Phonological Awareness and literacy (Durgonglu & Oney 1999). In addition, the precise mechanism by which Morphological Awareness interacts with literacy skills remains largely unexplored (Rispens *et al*. 2008). Given the prominent role of morphology in the Southern-Bantu language group, the role of the morpheme in reading needs to be considered.

Another important factor in reading acquisition is the medium of instruction. In South Africa, language of learning and teaching (LoLT), either occurs in English or in a Southern-Bantu language for an initial 3-year period after which a switch is made to English. Most learners therefore acquire literacy either in their additional language or via a bilingual system in which they initially learn to read in a Southern-Bantu language and then continue their education in an additional language, English (Pretorius and Mampuru 2007). Thus some of these learners learn to read in a second language, which often results in cross-linguistic influences. Cross-linguistic influences have been found to affect word recognition processes. Cross-linguistic studies have shown that readers have access to and often use their word recognition skills from their first-language (L1) as a reading strategy for their second language (L2) (Carson *et al.* 1990, Upton & Lee-Thompson 2001, Jiang 2011). The question which arises from this, however, is whether learning to read in their L2 will affect word recognition and reading strategies in the learners' L1.

If so, the language of learning and teaching which children encounter when acquiring literacy will play an important role in their literacy development, both in their L1 and L2.

This study will focus on the grain size unit which learners of isiXhosa and Setswana use when approaching reading in their first-language. IsiXhosa and Setswana were chosen as the languages of study as although they are both Southern-Bantu languages, they differ with regards to the writing systems which they employ respectively, a conjunctive and a disjunctive writing system. This is where orthography is important. Furthermore, this research was undertaken at two different types of school settings: one where learners received education in their first-language (isiXhosa or Setswana) in the first three years of schooling, and the other in which English was the medium of instruction from Grade 1. This sets the scene for the question of the influence of languages of learning and teaching on reading strategies.

The first chapter provides an overview of the study, introducing the reader to key concepts and contextualising the study.

The second chapter, the literature review, further contextualises the research, outlining the need for research within this area and addressing how this study attempts to fill these gaps. Furthermore, the literature review aims to discuss the research conducted in this field, creating a foundation for the reader. The literature review is structured from general to specific and from a broad social context to narrow linguistic details. The South African context of LoLT is presented first, including a discussion on transfer of language skills from first-language reading to second-language reading. Following on from this is an outline of the language structure and linguistic characteristics of the languages under investigation (isiXhosa and Setswana) and a discussion on the relationships between the metalinguistic skills and reading. Thereafter, research on the models of word recognition namely; the Dual Route-cascade Model of word recognition, the Orthographic Depth Hypothesis and the Psycholinguistic Grain Size Theory are presented.

The third chapter provides an in-depth discussion of the methodology. The tasks used were designed specifically for the purpose of this research. This section therefore explains the processes involved in developing the language-specific tasks, the differences between the isiXhosa and Setswana tasks and the data coding procedures. An open-ended decomposition task was designed to test for the literacy processing unit which learners use when breaking up sentences. This type of task has not yet been done in the literature. Metalinguistic tasks

(Phonological Awareness and Morphological Awareness) as well as an Independent Reading Measure were also designed for isiXhosa and Setswana. There are currently no standardised linguistic tests for the Southern-Bantu languages. This research will thus develop and make available a set of literacy measures. Research was carried out at four schools which differed with regards to their language of learning and teaching in the first three years of schooling. This study is a unique experiment, and the findings will contribute to a better understanding of reading in the Southern-Bantu languages.

The fourth chapter presents the results and discussion of the study. This chapter comprises four sections. The first three sections of the data analysis look individually at grain size unit in isiXhosa and Setswana, orthography and Language of Learning and Teaching (LoLT). The fourth section draws all this together in an effort to establish the extent of the interaction of these three factors in determining word recognition strategies among isiXhosa and Setswana learners. Furthermore, a model suitable for the Southern-Bantu languages, based on the findings of this study is proposed. It will be argued that the syllable is the dominant grain size used in reading by isiXhosa and Setswana learners. In addition, an argument is presented for the use of the morpheme as a secondary grain in isiXhosa, which suggests the use of multiple grain sizes (Brown & Deavers 1999, Ziegler & Goswami 2005). The concept of the secondary grain, not previously mentioned in the literature, is developed through the findings of this study. Transparency aside, Morphological Awareness plays a greater role for a conjunctive orthography than a disjunctive orthography. Additionally, the PGST is shown to be the most suitable model of word recognition for the Southern-Bantu languages.

The concluding chapter makes recommendations for further research and draws together the conclusions summarised below;

- The syllable is the dominant grain size for both isiXhosa and Setswana learners.
- Transparency aside, Morphological Awareness, and the use of the morpheme as a grain size in decoding plays a greater role in isiXhosa than it does in Setswana.
- The learner's first language, rather than the language of first literacy determines initial metalinguistic skills and grain size in reading. This has implications for multilinguistic classrooms.
- Adaptations to the PGST theory in the form of a model which incorporates the morpheme as a grain size is proposed.

CHAPTER 2: LITERATURE REVIEW

Compared to English and other European languages, little research has been done on word recognition in the Southern-Bantu Languages. This study aims to address this lack. It examines word recognition strategies employed by isiXhosa and Setswana learners. The discussion will move from the broad social context towards specific linguistic dimensions investigated in the study. Given the multi-linguistic context of South Africa, it is necessary to include a discussion of the language policy in South Africa, introducing the reader to the context of language of learning and teaching (LoLT) and the effect which this may have on word recognition. Orthography is introduced in section 2.2, focusing specifically on its role in influencing word recognition. Given the differing characteristics of writing systems, it is natural to expect that script-specific typological features will impact learning to read, as well as the strategies employed in reading. The orthographic and linguistic characteristics of isiXhosa and Setswana (section 2.2.1) are therefore outlined prior to the discussion of orthography. Section 2.4 builds on the discussion of orthography as it relates to reading and introduces the reader to the metalinguistic skills which are believed to affect and be involved in word recognition, namely Phonological Awareness (section 2.3.1) and Morphological Awareness (section 2.3.2). An in-depth discussion on the word recognition models (section 2.4.1) is presented to give the reader an understanding of the different views which are found in the literature on word recognition and the different strategies which learners can employ. Finally a summary is presented of the main arguments of the literature review, specifically relating to how each research question develops from these arguments, followed by an outline of the research goals. The focus of this thesis is on the literacy processing unit/s (grain size) which isiXhosa and Setswana learners use in reading strategies in order to achieve successful word recognition.

2.1 Language of Learning and Teaching

2.1.1 Language Policy in South Africa

During the apartheid era (1948-1994) a policy of bilingualism which gave status solely to English and Afrikaans as official languages was upheld by government (Manyike & Lemmer 2014). This policy made first-language instruction compulsory during the first four years of schooling alongside English and Afrikaans being taught as subjects from the first year of schooling, thus compelling African[2] learners to become trilingual (Manyike & Lemmer 2014). By the 1970s,

[2] The term "African" refers to speaking a language belonging to the Southern-Bantu language family, in line with the usage of the term in the references used.

however, English and Afrikaans were being used as the medium of instruction in African classrooms, while first-language was used only for non-examinable subjects. The usefulness and status of first-language instruction in education was thus lowered (Lemmer 2010). This perception of first-language education still persists today and influences parents' choice of the medium of instruction in schools or the choice of which school to choose for their children, with a preference towards English medium.

"English is the first-language of only 9.01% of the South African population, yet it is the LoLT of more than 90% of South African learners" (Strauss, Van der Linde, Plekker & Strauss 1999: 10-11). The choice of English as the preferred LoLT has been ascribed to parents' memories of oppressed Bantu education combined with their perceptions and the prestige associated with English as a gateway to better education and empowerment (Lemmer 2010, Van Louw 1998, De Wet & Niemann 1995, Lemmer 1995).

Lanham (1970) undertook a study in which he investigated the issues associated with English as medium of instruction in African education in the Soweto township located outside Johannesburg. The aim of this study was to design a research-based programme. This programme was developed in order to strengthen the English language proficiency skills of African primary school teachers in order to improve the implementation of English as the medium of instruction (Manyike & Lemmer 2014). Findings from Lanham's (1970) research demonstrated that African learners were not ready to switch to English as LoLT after their fourth year of schooling. This was attributed to the mismatch between the linguistic environment encountered by the learners at school and at home, as well as the lack of specialised knowledge of effective methodologies required for first-language and second-language learning amongst African teachers (Kingwill 1998, Manyike & Lemmer 2014). This study highlights the importance of a strong foundation in first-language education, and raises awareness for teaching methodologies which are language specific and allow for optimal transition from first-language to English as medium of instruction, particularly when the learner does not have a solid grounding of reading strategies in his/her first-language. This study examines the strategies which learners use when approaching word recognition in the Southern-Bantu languages, isiXhosa and Setswana.

After the demise of Apartheid in 1994, the South African constitution (RSA 1996a) accorded all nine Southern-Bantu Languages (SeSotho, Setswana, Sepedi, isiZulu, isiXhosa, Ndebele, Tshivenda, Xitsonga, Siswati) and Afrikaans and English, equal status in education. The

Language in Education Policy (LiEP) (DoE 1997) thus aimed at promoting [3]additive bilingualism through developing first-language education in the early years of schooling, together with gradual access to additional languages (Manyike & Lemmer 2014, Matjila & Pretorius 2004). Vermeulen 2000, Von Gruenedwaldt 1999, Sarinjeive 1999, De Witt, Lessing & Dicker 1998, showed that the first-language is the most appropriate medium to use for reading instruction in the initial years of schooling (De Wet 2002). The implementation of this policy was clarified by the Revised National Curriculum Statement (DoE 2002) which specified that all learners should study their first-language and at least one additional language as subjects from Grade 1 (Manyike & Lemmer 2014) and was reaffirmed by the Curriculum and Assessment Policy Statements (CAPS) (DoE 2012). Thus all South African learners are given the right to be educated in the language of their choice, where reasonably practicable (Manyike & Lemmer 2014, De Wet 2002). However, the LOLT in a school is determined by the School Governing Bodies (parents and teachers) who select the LOLT of their schools in accordance with Section 6(2) of the South African Schools Act (DBE 2010). Due to the prestige given to English over the Southern-Bantu Languages, many schools still opt for the medium of instruction to be English from the onset of school. More research showing the importance of first-language education is therefore needed to assist in strengthening the status which is given to Southern-Bantu Languages as a medium of instruction in schools.

2.1.2 Research on the state of language and literacy in South African Schools

In 2010, the Department of Education issued a report which provided an analysis of the trends of language data for the period 1997 to 2007. This data classified the number of learners according to home language, the number of learners using a particular LoLT by grade and the number of learners enrolled for first, second and third additional languages (Manyike & Lemmer 2014). The data showed an increase in the number of foundation phase children learning in their first-language (from 55% in 1998 to 80% in 2007) yet no improvement was found in learning outcomes. From the intermediate phase (Grade 4) it was found that majority of the children were learning in English as their LoLT, despite not having studied English as a subject in the Foundation Phase (Manyike & Lemmer 2014), "this would imply that many learners would have had insufficient grounding in English to cope with using it as LoLT from Grade 4 onwards" (Manyijke & Lemmer 2014: 255). Probert (2013) showed that when a learner develops first literacy in a transparent orthography, reading strategies are able to transfer to reading in an

[3] According to Luckett (1993), 'additive bilingualism' refers to the gaining of linguistic competence in an individual's second language while still maintaining the first-language.

opaque orthography. Learners who have developed a strong foundation of literacy in a transparent orthography, such as isiXhosa or Setswana, should therefore be able to implement their reading strategies when approaching English word-reading. The current study considers only reading strategies in the learners' first-language, isiXhosa or Setswana. Research on their reading strategies when approaching English word-reading is still needed.

The Progress in International Reading Literacy Study (PIRLS) (Howie *et al*. 2012), showed that South African children achieved well below the International benchmark. Learners were tested in their first-language and it was shown that English and Afrikaans learners performed relatively well in comparison to those who were tested in the Southern-Bantu Languages. Language of learning and teaching was not singled out as a contributory factor despite the poor performance in the Southern-Bantu Languages. This points towards a failure to realise first-language education (Manyike & Lemmer 2014) and highlights the need for research on the influence of LoLT. The fact that its role has not been included indicates that the impact of LoLT on reading outcomes is not yet understood. This is of particular importance in the South African context where there is a divide between first-language education and English as the preferred language of education. This study intends to contribute to an understanding of the influence of LoLT on reading strategies in the Southern-Bantu languages.

In 2012, the National Education Evaluation and Development Unit (NEEDU) undertook a survey in the high growing areas of the country, in an effort to inquire into the state of literacy teaching and learning in the foundation phase (Manyike & Lemmer 2014). The report confirmed the complex linguistic situation found in the classrooms in South Africa, particularly the mismatch found between first-language and LoLT. This mismatch was attributed to the [4]dialectisation of the Southern-Bantu Languages (Manyike & Lemmer 2014). This contributed to problems in the comprehension of written communication in standardised textbooks as well as curriculum documents encountered by the teachers (Manyike & Lemmer 2014).

2.1.3 Reason for studying Grade 3

During the first three years of schooling there is generally a strong emphasis on teaching letter-sound relations and developing decoding skills. It is also during this phase that children's oral proficiency can influence the ease and fluency with which they learn to read (Snow & Dickinson 1991, Tabors, Snow & Dickinson 2001), which is why there is a strong case for early literacy

[4] This term refers to the process of translating the standard dialect into the dialect of an area or a social group.

instruction in the first-language (Pretorius 2014). By the time learners reach the end of Grade 3, it is expected that they will have mastered the basic skills necessary for sufficient reading, writing and speaking in their first-language and are therefore ready to transfer these skills to an additional language (Wildsmith-Cromarty & Gounden 2006).

In Grade 4, in most schooling systems across the world, there is a transition where the focus changes from 'learning to read' to 'reading to learn' (Pretorius 2014). This transition is however not automatic and is particularly challenging within multilingual educational contexts where learners are expected to be bi-literate, and reading is done in a language which is not the learners' first-language (Pretorius 2014). This is true of South Africa where the majority of children are taught in a Southern-Bantu Language in the foundation phase and make a switch to English as the LoLT in Grade 4. These learners are required to develop adequate oral communication skills in English as well as book-orientated academic literacy skills in the LoLT in order to cope with the challenges of the Intermediate phase. If these learners have developed good reading skills in their first-language, they should have a firm basis for developing reading skills in English. Bilingual reading research has found that decoding skills can transfer across languages with alphabetic orthographies (Probert 2013, Geva & Zedeh 2006, Lipka & Siegel 2007). It is therefore important that learners in bilingual educational systems develop strong literacy skills in their first-language in the first three years of schooling in order to ensure a firm basis for building academic literacy proficiency that can be shared across languages (Pretorius 2014).

2.1.4 Reading in a second language: The effect of LoLT

Learning to read is a complex process, regardless of the language. Learning to read in a second language is even more complicated because of cross-linguistic influences which come from the reader's two languages. Cross-linguistic influences have been shown in particular to affect word recognition processes (Miller 2011). Reading in a second language involves the interplay of two language systems. When reading in a second language, readers have access to their L1 and often use the word recognition skill from their L1 as a reading strategy for their L2 (Carson, Carrell, Silberstein, Kroll & Kuehn 1990, Upton & Lee-Thomson 2001, Jjiang 2011). Second language learners who have acquired proficient reading skills in their first-language (L1) develop reading competence faster than those readers who are not skilled readers in their L1 (Cummins 1999, Cummins *et al* 1984, Akamatsu 1998). It is therefore important that learners have a firm grounding in the literacy of their first-language.

2.1.5 Transfer of L1 literacy skills to L2 reading

Decoding strategies acquired when learning to read in one's first-language have been shown to transfer to reading in a second-language (Miller 2011). Cross-language transfer is believed to take place when students who are learning in another language have access to and make use of linguistic resources from their L1 (Leasfstedt & Gerber 2005 cited in Cardenhas-Hagan, Carlson & Pollard-Durodola 2007). There are two main positions regarding the relationship between L1 literacy and L2 reading development. The first and most prominent position in the literature is the Linguistic Interdependence Hypothesis (Cummins 1979, Cummins *et al*. 1984). According to which L1 literacy provides a good foundation for second-language reading development. The hypothesis posits that fundamental similarities exist between first and second language skills but are interdependent. Specifically, reading performance in a second-language is largely shared with reading ability in the first-language (Bernhardt & Kamil 1995). The second position, known as the Linguistic Threshold Hypothesis, emphasises the role of L2 proficiency in L2 reading development. The main assumption is that readers will need to develop a certain level of language proficiency in the target language before they can transfer L1 reading skills or strategies to improve L2 reading comprehension. The central argument of these two hypotheses is not whether there is transfer or not. They both acknowledge that there is transfer which takes place. However, they differ in the views on when it occurs (Bernhardt 2005, Grabe 2009, Jiang 2011). Both hypotheses share strong arguments and have been supported in literacy research. There is evidence that transfer does take place from the L1 to the L2, but that there are elements which may differ between the two languages which contributes to or limits this transfer (see Probert 2013). Furthermore, proficiency and vocabulary knowledge in the L2 does play a role in reading development. L1 reading skills cannot be transferred to reading in the L2 if the learner has no linguistic competence or basic vocabulary in that language.

Much research has been conducted on second-language reading skills in order to understand the role of transfer and the relationship between first and second language reading. Koda (1998, 1990) applied the Orthographic Depth Hypothesis (ODH) to examining L2 word recognition in L1 Japanese, Spanish and Arabic learners of English. Findings showed that the Japanese L1 readers (a deep orthography) relied on orthographic information when approaching English (L2) word recognition, whereas L1 Spanish and Arabic (shallow orthographies) readers relied on phonological processing. This showed that learners applied the word recognition strategies of their L1 to the word recognition in their L2 (Miller 2011). In another study on cross-linguistic transfer of word recognition strategies from L1 to L2, Wang, Koda and Perfetti (2003) explored

the role of L1 Chinese (a deep orthography) and L1 Korean (a shallow orthography) in English (L2) word recognition. Chinese readers were affected more by orthographic interference than phonological interference in a semantic category judgement task, whereas the Korean L1 speakers were affected more by phonological interference. Again these results show that L2 readers transferred their word recognition strategies from their L1 to word recognition in their L2 (Miller 2011).

Several of these studies have provided evidence for transfer in the areas of orthographic skills, Phonological Awareness, vocabulary skills and comprehension skills. Durgunoglu *et al*. (1993) studied native Spanish-speaking children who were learning to read in English. Their findings showed that Spanish word recognition as well as Spanish Phonological Awareness were better predictors on English pseudo- and word reading tests than were English and Spanish oral proficiency skills and English word recognition. Reading skill and Phonological Awareness in the children's L1 thus predicted their ability to read new English words. L1 and L2 oral proficiency did not have an influence on the ability to read unfamiliar words. Gottardo, Van, Siegel and Wade-Woolley (2001) also found evidence of transfer of Phonological Awareness across orthographies. Gottardo, Van, Siegel and Wade-Woolley (2001) examined the linguistic factors associated with English reading skill in a group of 65 children whose first-language was Cantonese and whose second-language was English. Parallel measures of phonological processing, orthographic processing, and oral-language skill were administered in English and Cantonese to the participants. Findings showed that phonological skill in both Ll (a non-alphabetic orthography) and L2 (an alphabetic orthography) reading were correlated with L2 reading. The results illustrate that the relationship between Phonological Awareness in the child's Ll and decoding skill in an alphabetic orthography exists, even if the Ll does not have an alphabetic orthography. These findings add to a growing body of evidence for cross-language transfer of phonological processing in L2 learning of English as Second Language (ESL) students.

Evidence for the transfer of orthographic skills from Ll to L2 can be found in the study by Chikamatsu (1996), who examined whether Ll orthographic effects in word recognition are transferred to L2 word recognition. The participants included 45 American and 17 Chinese college students who were enrolled in a second semester Japanese language course. Lexical judgement tests using Japanese kana were given to the two groups of native English and native Chinese learners of Japanese. Visual familiarity and length of words were controlled for to

examine the involvement of phonological coding in word recognition strategies. Results showed that native speakers of English and Chinese used different word recognition strategies based on their L1 orthographic characteristics. Thus L1 word recognition strategies were shown to transfer into L2 Japanese kana word recognition. A correlation between Ll and L2 reading ability is evident from the research conducted in this field and transfer of reading skills has been shown to have a facilitative influence on L2 reading. Probert (2013) investigated the bidirectional transfer of reading strategies from isiXhosa and English, as well as from English to isiXhosa, and also provided evidence that reading strategies are transferable from the L1 to the L2, particularly when the L1 is a transparent orthography.

2.1.6 Interaction between language of instruction and literacy development

Cummins (1979) reported that there is an interaction between the language of instruction and the type of competence that a child develops before schooling. The language of instruction must facilitate the development of vocabulary, conceptual knowledge, print awareness and language in the learner. An interaction between these aspects of L1 development and the language of instruction influences reading in a L2. For children who have not been exposed to a literate (print-rich) environment before school, the initial language of instruction is crucial in determining their reading strategies. When learning to read is only introduced to the child via their L2, the task is more difficult because children cannot relate L2 linguistic and emergent literacy knowledge to their spoken native language (Cardenas-Hagan, Carlson & Pollard-Durodola 2007). The transfer of skills fundamental for literacy acquisition, such as Phonological Awareness and decoding skill, is enhanced when students receive some instruction in their L1 and have made a transition to their L2 reading and instruction (August, Calderon & Carlo 2002, Carlson & Pollard-Durodola 2007).

Given the multi-linguistic context of South Africa it is necessary to include the effect which the language of learning and teaching (LoLT) may have on word recognition, despite most of the literature indicating that orthography and metalinguistic skills are sufficient in understanding and contributing towards word recognition strategies. These are explored in the following sections.

2.2 Orthography and Overview of Southern-Bantu Language Structure

Orthography is concerned with how language structures are mediated through a print system. Furthermore, the PGST emphasizes the phonological structures and the consistency with which those structures are coded in the orthography (Ziegler & Goswami 2005). Therefore the language structures and orthographies of isiXhosa and Setswana will be outlined before describing the issues of orthography presented in the literature. Furthermore, literacy is conditioned by language specific structures. "Orthographic transparency is almost never absolute, languages often encode specific phonological or morphological information in their orthographies, and such information is helpful in decoding" (Rubinov 2015: 12). It is therefore necessary to understand these structures. The section below presents an overview of Southern-Bantu language structure followed by an outline of the phonology and morphology of the Southern-Bantu languages (with particular focus on isiXhosa and Setswana), which is followed by a discussion on conjunctive and disjunctive orthographies.

2.2.1 Overview of Bantu Language Structure

The Southern-Bantu languages follow an SVO (subject-verb-object) word order and have an agglutinative verb structure. The orthographies of the Southern-Bantu languages have been described as being 'phonetic' (Doke 1954). They are thus considered to be transparent and consistent in characteristic. In writing, Setswana and isiXhosa however differ in their word division. IsiXhosa adopts a conjunctive writing system, whereas that of Setswana is disjunctive (See section 2.2.1.2).

2.2.1.1 Phonology of Southern-Bantu Languages

In the Southern-Bantu languages the orthography (spelling) matches the pronunciation relatively well in contrast to English. In other words, there is a close relationship between the graphemes and phonemes, particularly in the consonant system.

The Southern-Bantu languages have a symmetrical vowel system with one low vowel and an equal number of front and back vowels (Doke 1954). The consonant system of isiXhosa and Setswana differs considerably, with isiXhosa having plain consonants and click consonants and Setswana plain consonants and sound compounds.

Vowels:

The Southern-Bantu languages have five-vowel systems in the Nguni languages, with isiXhosa splitting /e/ into [ɛ ~ i] and /o/ into [ɔ ~ o] (Doke 1954, Nurse & Phillipson 2003). These variants are dependent on the quality of the vowel in the succeeding syllable and are not represented in the orthography. The Sotho-Tswana languages have seven to nine vowels, depending on the number of phonemic heights which are distinguished, these are typically, /i, ɪ, e, ɛ, a, ɔ, o, ʊ, u/ with /ɪ/ and /ʊ/ having the allophones [ɪ̯] and [ʊ̯] (Nurse & Phillipson 2003).

The Sotho group of the Southern-Bantu languages lacks the initial vowel with noun prefixes, which is called the augment. Thus they have typically monosyllabic prefixes, for example ba-, mo- etc. (Doke 1954). This is because the phenomena of elision and coalescence of vowels are practically non-existent in these languages. However, in the Nguni language group, an initial vowel which is similar to the vowel of the prefix is found with all nouns. The noun class prefixes are typically disyllabic, for example aba-, imi- etc. (Doke 1954).

Consonants

Both Setswana and isiXhosa have complex consonant systems which make use of the pulmonic egressive and glottalic ingressive and egressive airstream mechanisms. IsiXhosa also makes use of the velaric airstream. These airstream mechanisms include plain consonants, implosives, ejectives and clicks respectively (Doke 1954, Nurse & Phillipson 2003). Clicks found in isiXhosa include the dental [ǀ], the alveolar [ǃ] as well as the alveolar-lateral [ǁ], which are orthographically written as /c, q, and x/. These clicks may occur as voiceless, voiceless aspirated, breathy-voiced, nasalised, breathy-voiced nasalised and/or as a voiceless nasalised ejective (Nurse & Phillipson 2003).

The Southern-Bantu languages also make use of both aspirated and unaspirated consonants phonemically in order to distinguish meaning (Zerbian 2009) as seen in the examples below (1, 2),

1) Thaba (T^{h}aba) – mountain (Northern Sotho: Zerbian 2009).
2) Taba – a matter

Syllable structure

The Southern-Bantu languages are syllable-timed languages which means that in these languages syllables occur at roughly equal intervals (Zerbian 2009). The syllable structure of syllable-timed languages is less complex than other non-syllable-timed languages, as a result of permissible consonant clusters in onsets or codas of syllables (Zerbian 2009). The general canonical structure of syllables in the Southern-Bantu languages is the simple CV (consonant-vowel) structure (Doke 1954). However, there are constraints on complex syllable onsets which are found in the Southern-Bantu languages. There are arguably no consonant clusters which are found in these languages, however many words appear to have complex CCV onsets, such as the prenasalised ndi-. However, these are almost always considered as single consonants which correspond to a single phoneme and thus do not constitute a true cluster. In contrast to this, English allows for more complex structures such as CCV or CCCV words (3, 4).

3) CCV: flew, cry
4) CCCV: straw

2.2.1.2 Southern-Bantu Language Morphology

According to Kruger (1994: 17), a morpheme is "a meaningful part of a word expressed by form and which exists as an integral part of the word meaning and the word form". This has been illustrated in the examples below (5, 6). Each word is made up of two morphemes.

5) Monna
   NC1+MAN
   'Man'

6) Ditlhare'
   NC8-TREE
   'Tree' (Setswana)

The Southern-Bantu languages have a unique combination of morphological characteristics. These languages are inflectional, making use of prefixes, suffixes and at times internal vowel change. They also employ a noun class system, with each noun being assigned to a noun class. The morphological structure of the verb is complex: the verb stem is decomposed into a root and

suffixes which typically mark argument changing processes, such as causative or passives. Furthermore, prefixes are added to the stem to indicate subject- and object- agreement.

Southern-Bantu languages are agglutinating in nature. They are thus characterised by a rich complex morphological system, where affixes are prominent (Kruger 2006). Most Southern-Bantu languages have non-derived and derived nouns, with derived nouns having an inflectional and a derivational suffix. For derived nouns, a stem is formed by the addition of a derivational suffix. A class prefix is then added, and in some cases a pre-prefix (otherwise referred to as the augment) (Nurse & Phillipson 2003). All nouns in the Southern-Bantu languages are assigned to noun classes. A noun class is characterized by a distinct prefix, a specific singular/plural pairing ('a gender') and agreement with other constituents (Nurse & Phillipson 2003). For example, noun class 1 denotes a subset of singular nouns which have particular characteristics. Noun class 2 denotes the plurals of the same subset as noun class 1, together forming the equivalent of a grammatical gender (Ortner 2013, Smouse *et al*. 2012, Mitchley 2011). This can be seen in the examples given above, (5 & 6), and in the summary of the noun class system in Table 1.

Similarly, verbs in the Southern-Bantu Languages are characterised as having an elaborate set of affixes (Nurse & Phillipson 2003). For verbs, an (abstract) base may be derived from the root via the suffixation of an extension. An addition of a final inflectional suffix then provides a stem, to which pre-stem inflection is added (Nurse & Phillipson 2003). The verb is pivotal in the sentence and can have up to six possible verb-stem positions. It is therefore possible for a string of a dozen or more morphemes to occur in one verbal word. The verbal prefixes and suffixes commonly express negation, tense, aspect, conditionality, subject (person/noun class), object (person/noun class), focus, derivational extensions and mood (Nurse & Phillipson 2003). These are shown in Table 3 & 4 under the verbal morphology section.

Nominal morphology

The Southern-Bantu noun (in both isiXhosa and Setswana) consists of grammatical morphemes (prefixes and suffixes), and a stem (Kruger 1994, Welmers 1973). Nouns are classified into a number of different noun classes on the basis of the prefixes which they take (Nurse & Phillipson 2003). Suffixation too, is found in Southern-Bantu nouns; however, it is the prefixation of noun classes which forms the hallmark of Bantu morphology (Nurse & Phillipson 2003). Noun class prefixes provide information regarding class and number, while noun suffixes such as locative and diminutive suffixes, extend the meaning of nouns, providing information regarding certain

characteristics (Kruger 2006). The noun class system in the Southern-Bantu languages is morphophonemic (Nurse & Phillipson 2003). Setswana will be used to illustrate the nominal morphology of the Southern-Bantu language group, while reference will be made to differences between isiXhosa and Setswana.

Prefixes:

There are fifteen noun classes in the Southern-Bantu languages (Kruger 2006). The various noun classes are marked by different noun class prefixes. Noun classes 1 to 14 contain singular and plural marking, with the odd numbers containing singular nouns and the even plural, as in the examples (7-10) below;

7. Mo - Monna (man) -Setswana
   NC1+man

8. Ba- Banna (men) -Setswana
   NC2+plural

9. Um – Umvubu (hippo) -isiXhosa
   NC3+hippo

10. Imi – Imivubu (hippos) -isiXhosa
    NC4+plural

The noun class prefixes have the canonical CV (consonant-vowel) shape, with the exception of the augment in isiXhosa which takes the form V, as seen with, a-, e-, o-. The table below (Table 1) presents a summary of the noun class system of the Sotho and Nguni language groups, under which Setswana and isiXhosa fall.

Table 1: Noun Class system in Northern Sotho and isiZulu (Taljard & Bosch 2006:430).

Class #	Northern Sotho (Setswana)		isiZulu (isiXhosa)	
1	Mo-	Motho ‘person’	Umu-	Umuntu ‘person’
2	Ba-	Batho ‘persons’	Aba-	Abantu ‘persons’
1a	N-	Makgolo ‘grandmother’	u-	Udoketela ‘doctor’
2b	Bo-	Bomakgolo ‘grandmothers’	o-	Odokotela ‘doctors’
3	Mo-	Mohlare ‘tree’	Umu-	Umuthi ‘tree’
4	Me-	Mehlare ‘trees’	Imi-	Imithi ‘trees’
7	Se-	Setulo ‘chair’	Isi-	Isitsha ‘dish’
8	Di-	Ditulo ‘chairs’	Izi-	Izitsha ‘dishes’
14	Bo-	Botho ‘humanity’	Ubu-	Ubuntu ‘humanity’

Suffixes:

A number of distinguishing suffixes are found in the Setswana noun. These include the deverbative, the augmentative, the feminitive, the diminutive and the locative suffixes. The table below (Table 2) illustrates this.

Table 2: Nominal Suffixal morphology in Setswana (Cole 1955)

Morpheme	**Example**
Deverbative suffix (-i,-o-,-a)	The suffix –i is used to indicate words which are personal in significance 1.1 modudi (chair person) 1.2 batsadi (parents) Nouns with the suffix –o are impersonal 3.3. mpho (gift) 3.4 moago (building)
Augmentative suffix (-gadi) - These are very rare in Setswana.	1.1 podigadi (a big goat)
Feminitive suffix (-gadi)	1.2 kgosigadi (queen) 1.3 motlhologadi (widow)

Diminutive suffix (-ana, -nyana, -anyana) - Diminutive suffixes are used to indicate the diminutive form corresponding to a noun, or a young one, or small quantity corresponding to a noun.	1.1 motsana (small village) 1.2 mosimanyana (small boy)
Locative suffix (-ing, -nnye, -nyeng) - These indicate the place in connection with which some action is carried out	1.1 ntlong (house) 1.2 letsatsing (sun)

Verbal Morphology

Verbal prefixes and suffixes provide information regarding the type, tense, aspect and mood of the verb (Kruger 2006). The most basic morphological structure of the verb in Setswana is characterised as consisting of an infinitive prefix/agreement morpheme + a root + a verb final suffix. This is illustrated in the examples below, (11, 12).

11) Go bona
'To see'
Consists of the infinitive (go), root (bon) and the verb final suffix (-a)

12) Ba re thusitse (go fetsa tiro ya rona)
'They helped us (to finish our work)'
Agrsubj-NC12-AgrOgj-p1-Pl+help+cau+Perf+verbend

However, the verb can be modified and extended by adding a variety of morphemes. As with nouns, verbs in Setswana include both prefixes and suffixes. However, it is the root that forms the lexical core of the word. Thus it may be said that being able to identify the root forms the basis of Morphological Awareness in Setswana. According to Kruger (2006: 36), the root in Setswana can be described as "a lexical morpheme that can be defined as part of a word which does not include grammatical morphemes, cannot occur independently, constitutes the lexical meaning of a word and belongs quantitatively to an open class".

Prefixal morphology:

Table 3: Verbal prefixal morphology

Morpheme	**Example**
Subject agreement morphemes (written disjunctively in Setswana), include non-consecutive and consecutive morphemes. The same subject agreement morpheme can therefore take a non-consecutive or a consecutive form. This is the only modal distinction which influences the form of the subject morpheme.	1. Lekau le a tshega 'The young man is laughing' Subject agreement morpheme for class 5: le (non-consecutive) 2. Lekau la tshega 'The young man then laughed' Subject agreement morpheme for class 5: la (consecutive)
Object agreement morphemes (written disjunctively in Setswana)	1. Ba **di** bona 'They see it'
The **reflexive morpheme –i (meaning -self)** is written conjunctively with the root in Setswana.	1. O **i**pona 'He sees himself'
The **aspectual morphemes** (written disjunctively in Setswana), include the present tense morpheme a, the progressive morpheme sa (still) and the potential morpheme ka (can).	1. O **a** araba 'He answers' 2. Ba **sa** ithuta 'They are still learning' 3. Ba **ka** ithuta 'They can learn'
The **future tense (temporal) morpheme** (written disjunctively in Setswana)	1. Ba **tla** ithuta 'They shall learn'
The **negative morphemes** (ga, sa and se, written disjunctively in Setswana)	1. **Ga** ba ithute 'They do not learn' 2. Re **sa** mo thuse 'We do not help him'

Suffixal Morphology:

Table 4: Verbal suffixal morphology

Morpheme - Suffixes in Setswana are written conjunctively to the root.	**Example**
Verb final morphemes, include –a, -e, the relative –ng and the imperative –ng.	Ga ba ithut**e** 'They are not learning'
The **causative suffix –is-**	O rek**is**a 'He sells (causes to buy)'
The **applicative –el**	O bal**el**a 'She reads for'
The **reciprocal suffix –an-**	Re a thus**an**a 'We help each other'
The **perfect suffix –il-**	Ba utlw**il**e 'They heard'
The **passive suffix –w-**	O romi**w**a 'He is sent'

2.2.1.3 Conjunctive vs. Disjunctive orthographies

The Southern-Bantu languages are agglutinative in nature. Words are therefore made up of a linear sequence of morphemes (prefixes, stems and suffixes), with each component of meaning being represented by a morpheme (Taljard & Bosch 2006). Informally this basically means that a whole sentence can be expressed as a single word. Consequently, the notion of a "word" is different to what constitutes a "word" in English (Guthrie 1948, Louwrens & Poulos 2006, Prinsloo 2009, Van Wyk 1995). IsiXhosa and Setswana are two South African Bantu languages that employ different orthographically transparent, agglutinative orthographies respectively, a conjunctive and a disjunctive writing system. The difference between the two relates to the relationship between orthographic word and linguistic word. The linguistic word refers to the piece of speech which behaves as a unit of pronunciation as well as meaning in context, and as a domain for linguistic procedures, whilst the orthographic words refers to a written sequence bounded by spaces at each end (Trask 2004). Thus a word like "rail road" is essentially two orthographic words, but one linguistic word. In a conjunctive orthography, the linguistic word coincides with the orthographic word, whereas in a disjunctive orthography, the linguistic word is

usually represented by several orthographic words (Taljard & Bosch 2006). This is illustrated in the examples below (13, 14).

The example in (13) is an isiXhosa word in which the orthographic word corresponds to the linguistic word. In other words, there is one orthographic word and one linguistic word. This word is classified as a verb. The example given in (14) is an example of a Sesotho sentence. In this example, there are four orthographic words, (indicated by the space between the words), corresponding to one linguistic word. Thus the four orthographic words make up one-word category.

13) Ndiyababona
'I see them'
IsiXhosa (Conjunctive): *one orthographic word, one linguistic word*

14) Ke a ba bona
'I see them'
Sesotho (Disjunctive): *four orthographic words, one linguistic word*

The conjunctive writing style has repercussions for length. As seen in the examples above, conjunctive scripts have longer words compared with disjunctive scripts. Although longer words look more complicated to read than shorter words, conjunctive orthographies of the Southern-Bantu languages have a more transparent mapping between the linguistic word and the orthography, compared with the disjunctive one. This raises the question of whether the more difficult word length is balanced by more transparent mappings between orthography and linguistic words. Due to the agglutinative nature of these orthographies, readers need to deal with longer words (Acha *et al*. 2010). This study will not be looking specifically at length effects on word recognition, but it is an important issue which needs further study and which has been taken into consideration when comparing the Southern-Bantu languages to other languages.

The reason for the utilization of different writing systems is based partly on historical and partly on phonological considerations. According to Kosch (1993: 23), "the concept of the European word clearly influenced the early Bantuists in their approach to Bantu word division." For instance, English missionaries wrote the Setswana equivalent for the sentence '*I am talking,*' as three separate orthographic words; following the English pattern (Van Wyk 1987).

15) Ke a bua (Setswana)
1sg-pres-TALK
'I am talking'

The Zulu however opted for a conjunctive writing system, i.e. a system whereby the Zulu equivalent of a sentence like, *I am walking*, is written as one word due to the influence of Latin (Van Wyk 1987). Thus an orthographic tradition was initiated that still prevails.

16) Ngiyahamba
Ngi-ya-hamb-a
1sg-pres-WALK-fv (Zulu)
'I am walking'

17) Ambulo (Latin)
Ambul-o
WALK-1sg
'I am walking'

Despite the influence of the different European missionaries' imposition of their writing convention onto different writing systems opted for in the Bantu languages, the decision to adopt either a conjunctive or a disjunctive writing system was probably guided by an underlying realisation that the phonological systems of the two languages necessitated different orthographical systems (Louwrens & Poulos 2009). In Zulu, the presence of phonological processes such as vowel elision, vowel coalescence and consonantalization makes the use of a disjunctive writing system highly impractical: For example, the disjunctive representation of the sentence, seen in the example 19) is almost impossible to read and/or to pronounce (Taljard & Bosch 2006: 433). In Northern Sotho phonological processes such as elision and coalescence are much less prevalent, and most of the morphemes are syllabic and therefore pose no problems for disjunctive writing (Wilkes 1985).

18) Wayesezofika ekhaya (conjunctive)
'He would have arrived at home'

19)*W a ye s' e zo fika ekhaya (disjunctive)

Another example of vowel coalescence (the phonological process whereby two adjacent vowels cause each other to change) is shown below (20). The conjunctive writing system of isiXhosa exists because of such a phonological process.

20) Indodo nomfazi banomama.
(Original sentence: Indodo no umfazi ban a umama)
(na+umfazi > nomfazi, a+umana > nomama)
'The man and the woman have a mother.'

A question which arises from this is whether these different writing systems have differential influences on determining the grain size units used in word recognition strategies. This study aims to answer this by investigating the effect which conjunctivism and disjunctivism have on word recognition strategies. It also aims to investigate whether the grain sizes differ between the two orthographies.

2.2.2 Issues of Orthography

There is a central focus found in the literature on a comparison between shallow and deep orthographies (see also section 2.4.1 on word recognition models), with English almost always being the deep orthography under investigation. This study, in contrast, compares two shallow orthographies which vary in their consistency (degree of shallowness). Relatively little research has been conducted on this, therefore most of the discussion below refers to studies comparing deep versus shallow orthographies.

Orthography refers to the conventional writing system of a language (Treiman & Kessler 2004). Recently there has been increased attention in the literature to the question of whether difficulties in reading acquisition are related to features which characterise particular orthographies (Aro 2004). Research has shown that the rate of reading acquisition differs between orthographies (e.g. Frost 1993, Aro 2004, Ellis *et al*. 2004), and this difference has been attributed to orthographic depth. Orthographic depth refers to the consistency of grapheme-to-phoneme correspondences (Aro 2004, Anthony & Francis 2005), otherwise referred to as mappings of symbol-to-sound (for reading) and sound-to-symbol (for writing). These mappings take place at different levels, for example, phoneme-to-grapheme (/k.æ.t/), and morpheme-to-sound (e.g. –tion /ʃɪn/) among others. More complex mappings may be found in isiXhosa and Setswana, for example: trigraphs (ingcongconi – [iŋǀʱɔŋǀʱɔni] 'a mosquito') and digraphs (Dlala - [ɮala] 'play').

A shallow orthography alternatively referred to as a transparent orthography, is one in which there is a one-to-one correspondence between letters and sounds in the writing system (Katz & Frost 1992, Frost 1994, Ziegler *et al*. 2001). An example of a shallow orthography is that of Finnish. In Finnish there are 23 graphemes that match the exact number of phonemes. In contrast to this there are deep (otherwise called opaque) orthographies such as English. English is considered a deep orthography in that some instances in English, the reader has to make orthographic segmentation and irregular pronunciations of multi-letter and inconsistent graphemes, for example in the word 'thief'- /th/ /ie/ /f/. Therefore, knowledge of basic letter-sound correspondences would not be sufficient if presented with the task of decoding such a word. Furthermore, there are words where the reader would need to take contextual influences into consideration and some irregular words completely elude phonemic assembly, such as the word 'yacht' (Davis 2005).

The issue of differences in reading acquisition across orthographies of varying orthographic depth has attracted interest in studies on skilled reading and lexical access, otherwise referred to as word recognition. The issue was first introduced in studies comparing Serbo-Croatian (a transparent consistent orthography) and English (an opaque, equivocal orthography) (Feldman & Turvey 1983, Katz & Feldman 1983, Lukatela, Popadic, Ognjenovic & Turvey 1980). These studies showed that in Serbo-Croatian word recognition processes were biased towards grapheme-phoneme correspondences, whereas in English, orthographic processes were more important. As will be seen in Section 2.4.1 on word recognition models, learners acquire different reading strategies when decoding in different orthographies. This is because mappings differ from orthography to orthography according to grain size (Ziegler *et al*. 2001, Ziegler & Goswami 2005).

The effect of orthographic depth on reading strategies has been the focus of extensive research (e.g., Baluch & Besner 1991, Besner & Smith 1992, Frost *et al.* 1987, Katz & Feldman 1983, Tabossi & Laghi 1992, Ziegler et al. 2001). Öney and Durgunoğlu (1997) investigated early literacy acquisition in a phonologically transparent orthography, Turkish. Findings showed that a phonologically transparent orthography fosters early development of word recognition skills, and that Phonological Awareness contributes to word recognition in the early stages of reading acquisition. These results were attributed as a reflection of the phonological and orthographic characteristics of the Turkish language. Wimmer & Goswami (1994) conducted a study on groups of 7, 8 and 9-year-old children who were learning to read in English and German. Results

of this study showed that German children were making use of assembled pronunciation via grapheme-to-phoneme mappings whereas English children showed a reliance on direct word recognition (sight word reading). This study provided evidence of the adoption of two different strategies for word recognition based on orthography.

Similar findings emerged from an investigation by Spencer & Hanley (2003), into the relationship between the development of reading skills and the consistency of the orthography in children living in Wales. Performance of children learning to read in Welsh, a transparent orthography, was compared to the performance of children learning to read in English, an opaque orthography. Findings showed that children learning to read in Welsh performed better at reading both real and pseudowords than children learning to read in English. English children were shown to make fewer phonetically based errors than their Welsh counterparts, with the Welsh children performing better on Phoneme Awareness tests. This study therefore provided further evidence of the adoption of different reading strategies, and supported the claim that children learning to read in transparent orthographies are able to read more quickly than children learning in deep orthographies.

Most studies concerning the question of orthography in literacy research are European and reveal a certain Anglo-centric bias. Although there exists a large amount of research on orthographic depth (shallow versus deep) as it relates to word recognition, there is a lack of studies focusing on how word recognition processes develop in orthographically transparent languages that have an agglutinating morphology (Acha *et al*. 2010). More research is needed on Southern-Bantu Languages for a more comprehensive understanding of the role of orthography in reading. This study is intended to contribute to research on the orthography of the Southern-Bantu languages and their relationship to word reading.

Most studies on orthography study it from a Phonological Awareness perspective. The links between orthography, word recognition and Phonological Awareness are therefore easily observable. However, orthographies are not classified only according to whether the orthography is purely phonetic, but also according to whether morphological information is coded into the script (Aro 2004). Alphabetic orthographies, such as isiXhosa, Setswana and English reflect linguistic features at the level of the phoneme and the level of the morpheme. They however vary in the degree to which they represent either (Trudell & Schroeder 2008). Therefore, a discussion on Morphological Awareness is also necessary. The literature has shown that deep orthographies

represent the morphology more than the phonology of the language, whereas shallow orthographies aim to represent the phonology of the language (Frost 1993, Trudell & Schroeder 2008). While this is true to a certain extent, some shallow orthographies are morphologically rich, for example, Turkish and the Southern-Bantu Languages. Given this, it is worth focusing on the specific implications of this kind of writing system on word recognition strategies. Orthography thus presents readers with different textual puzzles. It is the mappings between orthography and grain size which constitutes the nature of this puzzle (Probert & De Vos 2014). Thus it is natural to expect that script-specific typological features will impact learning to read, as well as the strategies employed in reading.

2.3 Metalinguistic skills

Metalinguistic skills which underpin literacy apply differently in separate languages and differ for different orthographies (Bialystok 2002). It is therefore essential for the discussion on metalinguistic skills to include an integration of the linguistic and orthographic characteristics underlying isiXhosa and Setswana respectively.

When learning to read, children need to start by acquiring basic decoding skills. They learn gradually to apply these skills with greater speed and accuracy until word recognition becomes automatic (Verhoeven & van Leeuwe 2009). Automatic word recognition grants immediate access to multiletter units such as consonant clusters (CC), morphemes, syllables, and whole-words (Adams 1990, Gough, Ehri, & Treiman 1992, Verhoeven & Perfetti 2003). Skills in automatic word recognition eventually make reading a rapid and efficient process. Furthermore, automatic word recognition allows children to comprehend text which subsequently allows them to use reading as a tool for the acquisition of new information and knowledge (National Reading Panel 2000, Samuels & Flor 1997).

Most of the research done on word recognition has focused on English, with its opaque orthography. English orthography is riddled with inconsistencies and complexities between the phonology and the orthography. Thus for the English-speaking child it is believed that the main task of achieving automaticity is learning to crack the code of unfamiliar words when approaching word reading. However, as seen in Section 2.2.2 on orthography, ease of acquisition of word recognition differs across various languages depending on orthographic depth (Frost, Katz, & Bentin 1987). In other words, orthographies differ in the degree to which they represent

the underlying phonetic representations and thus the extent to which deeper linguistic information is preserved (see Berninger 1994, cited in Verhoeven & Leeuwe 2009).

2.3.1 Phonological Awareness

Reading involves the process of decoding and grasping verbal language represented in print (Davis 2005). Thus in order for one to become literate, one has to learn the mappings between spelling and sound, in other words the mapping of the written symbol to the phonology of the language, a process known as phonological recoding, which is believed to work by searching out shared orthographic or phonological grain sizes in words (Davis 2005). Skilled reading is defined as rapid and immediate access to words and their meanings, which is determined by the efficiency of the phonological process, by which children learn larger orthographic units, including whole-words. It has been argued that even the most direct route in word recognition is paved by phonological associations (Davis 2005). It is thus important to consider Phonological Awareness when studying the process of word recognition involved in literacy development. This study investigated the contribution of Phonological Awareness in determining word recognition strategies. Phonological sensitivity contributes to an understanding of how different phonological grain sizes relate to the acquisition of reading skills.

Phonological Awareness refers to awareness that words can be broken down into units and that these units can be manipulated at the level of syllables, onset-rimes and phonemes (Anthony & Francis 2005, Chard & Dickson 1999, Stahl & Murray 1994, Treiman 1991). Phonological Awareness is the awareness of sounds in the oral and auditory medium, whereas phonics is in the written and visual medium (Diemer 2013). Phonological Awareness and phonics, although closely related, are not identical. Phonics as a method of teaching reading is used with alphabetic scripts (Chard & Dickson 1999). According to Wolf (2008), phonics involves an emphasis on the association between written letters and their correspondence to certain sounds in the language. This helps children learn the alphabetic principle which inevitably underlies reading in alphabetic orthographies. Phonological Awareness is thus necessary to facilitate phonics instruction (Scheule & Boudreau 2008).

There are three different dimensions of Phonological Awareness: Phoneme Awareness, syllable awareness and onset-rime awareness (Brady & Shankweiler 1991). “Phoneme Awareness refers to the ability to detect constituent phonemes within a word” (Wilsenach 2013: 18), for example the word *mat* can be segmented into three phonemes *(m-a-t).* Syllable Awareness refers to the

sensitivity to detect syllables within a word, for example *mitten* can be segmented into two syllables *(mi-ten)*. Onset-rime awareness is the ability to separate a word's onset from its rime, for example *'m'* and *'at'* in *(mat)* (Wilsenach 2013). These three dimensions of Phonological Awareness are the more complex ones. Easier dimensions include the ability to synthesize phonemes into syllables and to detect the number of syllables in a word (Perfetti, Beck, Bell and Hughes 1987). According to Goswami (2002), phonological sensitivity develops first at larger grain sizes: syllables, onsets and rimes.

Phonological Awareness can be demonstrated by the ability to perform a number of mental operations on speech segments (Oktay & Aktan 2002). These include tapping out the number of syllables in a word, deleting the onset of a word, or deleting initial or final phonemes of a word (Yopp 1988, McBride-Chang 1995). Phonological Awareness skills are thus distinguished by the task performed as well as by the size of the unit of sound which is the focus of the task (Anthony & Francis 2005). Examples include the a) blending of sounds, for example, "ti" in a word like "station," / stəiʃən/, b) segmenting words into constituent sounds, such as "rude" broken down into phonemes is /r/ /u://d/, c) deletion of a phonological unit, for example, /stash/ without /t/ is /sash/ (Anthony & Francis 2005, Diemer 2013).

The relationship between Phonological Awareness and reading has been well researched and established since the 1970s (Stahl & Murray 1994). In alphabetic orthographies, Phonological Awareness is believed to be an essential skill involved in the acquisition of reading at different grain sizes and has been demonstrated to be one of the most powerful predictors of subsequent reading ability (Goswami 2002, Wagner & Torgesen 1987).

Evidence for the importance of Phonological Awareness comes from correlation, training and longitudinal studies. Correlation studies have shown that there are parallel and predictive relations between Phonological Awareness and reading success (e.g. Liberman, Shankweiler, Fischer & Carter 1974, Mann 1984). Longitudinal studies have shown development of metalinguistic phonological skills prior to the onset of reading (Wagner & Torgesen 1987). Training studies in which an effort is made to train Phonological Awareness have led to significant achievements in reading acquisition (Ball & Balchman 1991, Bradley & Bryant 1985, Lungberg, Frost & Petersen 1988, Williams 1979). These studies, although different, all highlight the importance of Phonological Awareness in reading development and success.

In transparent alphabetic orthographies, graphemes map onto phonemes, thus the acquisition of reading and spelling is closely related to a child's awareness of phonemes. The nature of the relationship between Phonological Awareness and reading acquisition is however less clear (Oktay & Aktan 2002). There are conflicting views in the literature as to whether Phonological Awareness is causally related to reading proficiency (Blachman 1991, Bryant, Maclean, & Bradley 1990) or whether the relationship is reciprocal (Bialystok & Herman 1999). Researchers arguing for a causal link between Phonological Awareness and reading have considered Phonological Awareness to be a precondition for learning to read (Liberman *et al*. 1989, Liberman & Liberman 1990), whereas those arguing in favour of a reciprocal relationship between Phonological Awareness and reading believe Phonological Awareness to be a result of learning to read. "The recognition of the internal phonemic structure of spoken words is a result of learning to read in an alphabetic orthography" (Morais *et al.* 1979 cited in Oktay & Aktan). Thus, Phonological Awareness is necessary but not sufficient for reading acquisition (Chard and Dickson 1999, McBride-Chang *et al*. 2005, Ehri 1992). Phonological Awareness is necessary for decoding, which is essential for successful reading, but reading and the skills involved in reading also enhance Phonological Awareness (Chard & Dickson 1999, Adams 1990). Thus Phonological Awareness precedes literacy, and in turn literacy acquisition affects Phonological Awareness levels (Diemer 2013, Anthony & Francis 2005). Syllable Awareness and onset-rime awareness develop in pre-schoolers whereas Phoneme Awareness develops as a consequence of learning to read (Kyritsi, James and Edwards 2008, Chard & Dickson 1999).

Research has shown that Phonological Awareness is important in the development of literacy across languages, including English, French, Italian, Serbo-Croatian, Spanish and Turkish (Bruck & Genesee 1995, Campbell & Sais 1995, Cisero & Royer 1995). Studies (Ziegler & Goswami 2005, Stewart 2004) have shown that Phonological Awareness skills vary from language to language depending on salient phonological aspects of the language. Thus it was shown that Italian children were more sensitive to syllable and phoneme detection than English children and Czech children showed higher phoneme but lower onset-rime awareness than English children. These findings were attributed to the saliency of the phonological forms in each language (Bruck & Genesee 1995). This study investigates the salient phonological forms in isiXhosa and Setswana, which should be revealed by the literacy processing unit most attended to by learners in these languages.

2.3.1.1 Phonological Awareness and orthography

Just as languages differ in the complexity of their phonological structure, they also differ in how they represent the spoken language in written form, thus Phonological Awareness develops in relation to a particular language and orthography. As mentioned in Section 2.2.2, alphabetic orthographies differ according to the transparency of their letter-sound correspondences, their orthographic depth (Liberman *et al.* 1989). "In the area of reading development, there has been considerable debate about the grain size of the orthography-phonology correspondences that are basic to the acquisition of reading" (Goswami 2002: 47). Early studies on the relationship between Phonological Awareness and orthography considered how differences between languages lead to differences in the development of Phonological Awareness. Caravolas and Bruck (1993) studied the effects of oral language input and introduction to an alphabetic system on the development of Phonological Awareness in Czech and English. Czech and English differ with respect to orthographic depth as well as phonological complexity. Czech is a transparent orthography and has a large variety of syllabic onsets, thus it was hypothesised that there would be higher levels of Phonological Awareness in Czech, when compared to those of English. The results showed that indeed, Czech children displayed higher levels of Phonological Awareness for complex onsets. Therefore, this confirmed that learners of transparent orthographies have higher levels of Phonological Awareness than learners exposed to inconsistent orthographies.

The focus of many Phonological Awareness studies has been predominantly on English speakers, with cross-linguistic studies comparing English with other languages (Caravolas & Landerl 2010). Thus the findings of such studies tend towards a degree of Anglo-centric bias (Bernhardt 2003). There is a lack of research concerning the role of Phonological Awareness in the Southern-Bantu Languages. This study addresses this by investigating the relative contribution of Phonological Awareness to determining word recognition strategies.

2.3.1.2 Transfer of Phonological Awareness

As shown, the importance of Phonological Awareness to literacy has been well researched and established. However, the role of Phonological Awareness in bilingual children, particularly the question of whether Phonological Awareness transfers from one language to another, is less clear. This needs to be taken into account in South Africa, where some children learn in their mother-tongue from Grade 1 to Grade 3 and then make a switch to English as the language of learning.

Bruck & Genesee's (1995) study compared English-speaking children in a monolingual school to English-speaking children in a French immersion programme. Their findings provided support for cross-language transfer of Phonological Awareness. Compared with the monolingual children, the immersion children showed superior onset-rime manipulation skills. This increased metalinguistic ability was attributed to exposure to an L2 (Bruck & Gensee 1995). Similarly, Durgunglu, Nagy & Hancin-Bhatt (1993) studied Grade 1 Spanish-speaking students with English L2 learners. Their findings showed that L1 Phonological Awareness correlated with both L1 and L2 word recognition. It was thus argued that acquisition of Phonological Awareness in L1 aids in developing literacy skills in both an L1 and L2, thus providing support for cross language transfer of Phonological Awareness. More recently, Mumtaz and Humphreys (2001) investigated the English reading and Phonological Awareness of bilingual Urdu-English as well as monolingual English children. The bilingual Urdu-English children showed superior Phonological Awareness and were more proficient at reading real- and pseudo- words than the monolingual children. The shallow orthography of Urdu was believed to increase bilingual Phonological Awareness and reading skill.

Cockcroft & Alloway (2012) compared Phonological Awareness in South African and British children. The sample of children included English first-language British children (EL1), English first-language South African children (EL1) and English second-language South African children (ESL). For the Phonological Awareness tasks, findings showed that the South African EL1 children did significantly better than both the British EL1 and the South African ESL children. Furthermore, the South African ESL children's results were comparable to those of the British EL1. It was also found that Phoneme Awareness was the last of the three hierarchical levels of Phonological Awareness to develop for the South African ESL children. Thus the authors have speculated that the lower performance of the South African ESL children in comparison to the South African EL1 learners on the phoneme task is related to the influence of Nguni orthography in which there is an emphasis on the phoneme (Guma 1971) due to the consistent grapheme-to-phoneme correspondences, whereas in English there is more emphasis on larger phonological units (onset, rimes and syllables) due to the inconsistencies in the orthography. It was concluded that specific linguistic knowledge from an ESL child's first-language may impact on Phonological Awareness skills in their second language (Geva & Siegel 2000, Lesaux & Siegel 2003). The role of Phonological Awareness in the Southern-Bantu languages is explored next. It is expected that the learners in the current study who receive medium of instruction in their first-

language will thus show higher levels of phonological awareness, than the learners who receive first literacy in English.

2.3.1.3 Phonological Awareness and reading in Southern-Bantu Languages

There is not much research on the relationship between phonological abilities and literacy in South Africa. Soares, De Sousa, Broom and Fry (2010) studied the effects of Zulu and English Phonological Awareness on the acquisition of English spelling skills in learners with Zulu as L1 but who receive literacy instruction in English only. It was shown that Zulu Phonological Awareness related to both Zulu and English spelling, but more so to English than to Zulu. This shows the relationship between PA skills and reading development. Wilsenach (2013) studied phonological skills and reading in emergent bilingual Northern Sotho/English learners. She chose to focus on two groups of learners, the first at a school where literacy instruction took place in their first-language (Northern Sotho) for the first three years of schooling and the second group at a school where English was the medium of instruction from the first grade. Wilsenach (2013) tested non-word repetition skills, Syllable Awareness, phonological working memory as well as reading. Findings showed that there was a significant correlation between reading and phonological skills in Northern Sotho. Specifically, those learners schooled in Northern Sotho for the first three years of schooling performed significantly better on all the measures. Wilsenach (2013) claims that a lack of mother tongue education can influence Phonological Awareness and reading development negatively, in the sense that lack of mother tongue instruction causes stagnation in the development of phonological skills in the learners' L1.

Diemer (2013) investigated Phonological Awareness in isiXhosa Grade 4 learners. Results showed that the learners performed better in Syllable Awareness than in Phoneme Awareness. The open CV structure of the spoken language structure was therefore seen to play a greater influential role on Phonological Awareness than the orthography. This influenced the salient unit which learners attended most to. Diemer (2013) did not look into the influence of this on reading. This study addresses the question of whether Phonological Awareness will influence reading strategies in the Southern-Bantu languages.

2.3.2 Morphological Awareness

"Reading involves the decoding of written forms into language forms that represent phonological, morphological and word level units. Thus orthographies convey not only phonological but also morphological information" (Verhoeven & Perfetti 2003). In the Southern-Bantu languages there

is often an overlap between syllables and morphemes. This mostly occurs within the prefix domain, not necessarily for suffixes and not when vowel coalescence occurs. It is therefore important that Morphological Awareness be considered in studies on word recognition. This study investigates the contribution of Morphological Awareness to word recognition strategies.

"Morphemes are the fundamental building blocks of words in spoken and written language. Words that contain more than one morpheme can be broken down into these smaller units, providing cues for meaning, spelling and pronunciation" (Carlisle 1995: 194). According to Koda (2005), awareness of the morphology of a language makes an important contribution to literacy acquisition in that language. The most widely used definition of Morphological Awareness is that by Carlisle (1995) which states that Morphological Awareness is a "child's conscious awareness of the morphemic structure of words and their ability to reflect on and manipulate that structure" (Carlisle 1995 in McBride-Chang *et al*. 2005: 417, Kirby *et al*. 2012).

As seen in the previous section, studies have demonstrated that Phonological Awareness plays an important role in reading success in alphabetic orthographies (Bradley & Bryant 1985, Stanovich, Cunningham & Cramer 1984, Castles & Coltheart 2004). Likewise, a growing body of research has provided evidence that Morphological Awareness also promotes literacy development in both early (Casalis & Louis-Alexandre 2000) and in later literacy development (Carlisle 2000). Morphological Awareness has been shown to be significantly related to word identification, vocabulary and reading (Carlisle 2000, Casalis & Louis-Alexandre 2000, Deacon & Kirby 2004). The current literature on Morphological Awareness highlights its role in reading in deep orthographies, such as English and French (Carlisle 2000, Singson, Mahony & Mann 2000). However, studies involving shallow orthographies have received less attention (Ramirez *et al*. 2010). This study aims to contribute to research on shallow orthographies by comparing two shallow orthographies of varying consistency.

Languages vary in how they represent morphological information. For example, English has a relatively simple morphology in comparison to other languages, such as Hebrew or Arabic, which have a greater morphological complexity with triconsonantal roots containing a sequence of three consonants and many word patterns which are created by inserting different phonological information into the root (Davis 2005), for example k-t-b (meaning 'to write') can surface as kataḇ כתב 'he wrote', kataḇnu 'we wrote', koteḇ כותב 'writer'. Hebrew is considered a deep orthography; however, the "depth" differs to that of English in which difficulties are primarily

associated with letter cluster/sound inconsistencies (Davis 2005). In Turkish, a shallow agglutinating language, the morphology is highly inflected, with up to 139 possibilities for a simple noun, e.g. –lik, lık, luk, lük can be added to nouns to create collective nouns, abstract nouns, nouns of location and many more. A single word in Turkish can therefore represent eight different words in English. In an agglutinative language like Turkish, Morphological Awareness has to include information regarding the order of suffixes. Furthermore, morphological knowledge involves understanding the phonological properties of the word so as to be able to choose the appropriate form of a suffix (e.g. using –ler for ev (home) and –lar for okul (school) when pluralizing). There is therefore a close relation between Phonological Awareness and Morphological Awareness in such a language.

2.3.2.1 Morphological Awareness and orthography

Language is represented cognitively by phonemes and morphemes but practically through orthography. Orthographies also include morphological graphemes e.g. –tion, -ation. Morphology comprises meaning. Automaticity maps orthography to meanings. The question arises whether their meanings represent lexical or morphological grains.

"It is argued that the different orthographic systems obscure the morphological similarities" between languages (Taljard & Bosch 2006: 428). There are several ways in which morphology can be represented in orthographies (e.g. Bryant, Nunes & Aidinis 1999). Firstly, morphology can determine which of two possible spellings of sound should be used for a word, for example in English the ending /ks/ is spelled as 'cks' when the word is a plural noun (socks, locks, books) but as 'x' or 'xe' when the word is a singular noun (box, axe). Secondly, sometimes spelling involves representing morphological distinctions which are unpronounced, such as the apostrophe in English. Thirdly, there are cases where the conventional spelling of a morpheme contradicts that of phonological grapheme-to-phoneme correspondence rules. For example, in English, the past tense ending can be pronounced as /t/, /d/, or /ɪd/ but is spelled as '-ed'. However, there are some orthographies in which words are spelled as they are pronounced and morphemes that are pronounced differently in different words are also spelled differently. For example, in Finnish the morpheme marker for the inessive case (equivalent to English preposition 'in') is pronounced as /sːa/ in some words, but as /sːæ/ in others and is spelled as –ssa and –ssä respectively (Lehtonen & Bryant 2005). In such cases it would appear that the morphology delays matters.

Caramazza, Laudanna and Romani (1988) examined the lexical decision-task performance of Italian speakers for pseudowords with different structures. The findings showed that the shortest response latencies occurred for nonwords which contained no segments that could be considered morphemes. Pseudowords composed of two real morphemes produced the longest reaction times. The morphological analysis involved in word recognition therefore depends on the degree to which the word contains segments which can be interpreted as morphemes (Lehtonen & Bryant 2005). It is important to bear this in mind, as words in Southern-Bantu languages are made up of linear segments of morphemes.

Recent research on Finnish has also provided evidence that morphemes are important units of lexical processing which are necessary in word recognition. Laine, Vainio and Hyönä (1999) found that compared to monomorphemic words, multimorphemic words produced longer fixations and longer reaction times in the lexical decision tasks as well as higher error rates. Studies on Morphological Awareness and word recognition in different languages emphasise the importance of morphemes as processing units in richly inflected languages and highlight the importance of considering the differences in morphological structure between languages (Lehtonen & Bryant 2005). The question which stems from this is whether the morpheme acts as a grain size in reading strategies in morphologically rich languages. The current study aims to investigate this in isiXhosa and Setswana.

Wang, Ko & Choi (2009) investigated the importance of Morphological Awareness in Korean-English biliteracy acquisition. English orthography is opaque whereas that of Korean Hungul is transparent. Results showed that Morphological Awareness has a significant effect on word reading and comprehension in both languages. Thus Morphological Awareness was shown to facilitate word reading across different orthographies. Korean derivational morphology was found to predict English reading (4%, $p<0.05$). Similarly, English derivational morphology was significantly correlated to Korean word reading (7%, $p<0.05$).

Burani *et al.* (2002) assessed the role of morphology in children's reading aloud. Their study showed that young Italian readers could benefit from the presence of morphemes similarly to adult/skilled readers. According to Burani & Thorton (2003) parsing a word into morphemic units when approaching word recognition could be an efficient strategy when a word is unfamiliar, such as with the reading of pseudowords. Using this, Burani *et al.* (2008) investigated the reading aloud of morphologically complex words and pseudowords in Italian children of differing reading

abilities, one of which included developmental dyslexics. The aim of this study was to show that in a transparent orthography readers of differing reading skills make use of morphemes as a reading unit, as opposed to a single grapheme grain size unit. It was expected that the presence of morphemes, particularly in pseudowords would result in shorter reading times and higher accuracy rates than the single-grapheme grain size units would. This highlights the importance of the morpheme as a potential grain size unit in word recognition, and indicates that morphemes may develop as salient reading units when smaller grain sizes are not consistent or are unavailable, for example in unpointed Hebrew (Frost 2006), but also when smaller units are easily available as in a transparent orthography, seen in the study on Italian learners. Further research is needed on other languages in order to better understand the role of the morpheme in reading cross-linguistically. Research such as this can assist with developing standardized measures for testing for dyslexia in the Southern-Bantu languages for which there is no measure currently available.

Presently little is known about how orthography interacts with morphology in the Southern-Bantu languages, or how these may translate into norms and/or standards which can inform curriculum design (De Vos *et al*. 2014). This study investigates the contribution which Morphological Awareness has on word recognition strategies in isiXhosa and Setswana, particularly the question of the morpheme as a potential grain size unit. The difference between the roles of the morpheme in reading in each orthography is also considered.

2.3.2.2 Morphological Awareness and literacy

Research shows that Morphological Awareness contributes to reading competence (Carlisle 2003, Carlisle & Stone 2005, Deacon & Kirby 2004, Carlisle 2000). Kirby *et al.* (2012) however questioned whether Morphological Awareness makes an independent contribution to reading or whether it overlaps with other metalinguistic skills.

A distinction is typically made between inflectional and derivational morphology. In inflectional morphology, inflections alter grammatical function without changing the word class (Kirby *et al*. 2012). For example, the word ‘danced’ is formed by adding the suffix –ed to the base ‘dance’. The word remains a verb, even though its grammatical function changes from present to past tense. Derivational morphology however involves the generation of new words from a base morpheme, altering both the meaning and the word class. For example, by adding the suffix –ful

to the word play, a new word ‘playful’ is created. The word function changes from a verb to an adjective.

In 1998, Carlisle explored the implications of students’ knowledge of derivational morphology, and how this is applied to the spelling of derived words. Once the implications of this relationship were established, research changed direction by investigating the nature and scope of children’s knowledge of morphological relations (Carlisle 2000, Verhoeven & Perfetti 2003). Singson, Mahony & Mann (2000) assessed Morphological Awareness using a sentence completion measure in order to test for derivational suffixing ability. Results showed that only Phonological Awareness contributed significantly to reading development in Grade 3, but Morphological Awareness increased its contribution in reading ability in Grade 4 through 6 in comparison to Phonological development. It was also found that awareness of derivational suffixes made a unique contribution to decoding over and above vocabulary and phonemic awareness. Similarly, Deacon & Kirby (2004) found that Morphological Awareness predicted pseudoword reading and reading comprehension after controlling for measures of prior reading ability, verbal and nonverbal intelligence and Phonological Awareness. Thus Morphological Awareness appears to contribute to reading development in conjunction with other metalinguistic skills.

Studies by Libben 1994, Taft & Forster 1976, Bradley 1980, Caramazza *et al*. 1988, Feldman & Andjelkovic 1992, have provided support that morphological analysis contributes to decoding and reading comprehension. This is further supported by studies which used lexical decision tasks. It was found that normal, fluent readers broke down semantically and phonologically transparent words into morphemes (Libben 1994, Zwitserlood 1994). A study by Bradley (1980) showed that highly productive morphemes were more effective as units in decoding. Studies on the role of morpheme recognition have also provided proof in support of a correlation between Morphological Awareness and decoding (Torneus 1987, Elbro & Arnbak 1996).

Ortner (2013) explored the relationship between Morphological Awareness and reading ability in isiXhosa Grade 4 learners. According to a one-way ANOVA, the score on the Morphological Awareness Building Task was significantly related to reading in isiXhosa and English ($p<0.05$). Furthermore, reading in isiXhosa and performance on an Inflectional Awareness Task was statistically significantly related ($p<0.001$). Findings from this study showed that Morphological Awareness was related to reading ability, which confirms what has been previously stated in the literature on other languages (Berninger, *et al*. 2010, Carlisle 2000, Deacon & Kirby 2004,

Deacon, *et al.* 2007, Kirby, *et al.* 2012, Kuo & Anderson 2006, Nagy, *et al.* 2006, Ramirez, *et al*. 2010). This study provides evidence that Morphological Awareness correlates to reading ability in isiXhosa. However, the extent of this contribution is unclear. The present study aims to assist in making this contribution clearer.

2.3.2.3 Transfer of Morphological Awareness

Transfer of Phonological Awareness has received the most attention in research on the development of reading (refer to Ramirez *et al*. 2010). Much less however is known about transfer of Morphological Awareness. It has been argued that certain aspects of morphological knowledge, such as bound morphemes, are language specific and are therefore unlikely to transfer between first and second languages (Jiang 2000, Kellerman 1977, 1983). However, these assumptions have been challenged by several studies that examined Morphological Awareness in second language learners. No research has yet been done in South Africa on the transfer of Morphological Awareness. This creates a gap which calls for more investigation.

Ramirez *et al.* (2010) investigated cross-language effects of Morphological Awareness on word reading among Spanish-speaking children who were second-language English learners. This study found that Morphological Awareness in Spanish contributed the same amount to Spanish word reading as it did for English word reading (about 5%). Morphological Awareness was thus as important in the first-language as it was for English word reading. For cross-linguistic transfer of Morphological Awareness it was found that there was transfer from Spanish to English but not from English to Spanish. There was thus evidence of unidirectional transfer, highlighting the importance of Morphological Awareness for word reading in Spanish, which is a shallow orthography with a complex morphological system. Thus transfer of Morphological Awareness took place from a language with a morphologically complex system to one with a simpler morphological system. The findings of this study also suggest that Morphological Awareness which develops in a child's L1 is associated with reading in their L2 (Ramirez *et al.* 2010). It therefore appears that Morphological Awareness can transfer from learners' L1 into their L2 reading. It is unclear whether Morphological Awareness skills from learners' L2 transfer into their L1 reading and Morphological Awareness abilities.

In a longitudinal study Deacon *et al*. (2007) investigated children in a Canadian French immersion programme from Grade 1 to 3. Results showed that English Morphological Awareness measured in Grade 1 and Grade 2 predicted French word reading and that French Morphological

Awareness measured in Grade 2 and Grade 3 predicted English word reading. This study therefore provided evidence of bidirectional transfer of Morphological Awareness.

These and other studies have provided evidence of cross-linguistic transfer of Morphological Awareness. However, little is known about the direction of transfer. The direction of transfer may be influenced by childrens' proficiency levels in the two languages by the aspect of Morphological Awareness under investigation (inflectional vs derivational) and by the morphological complexity of the two languages. However, it is unclear how these different factors interact with each other in determining the transfer process. The precise mechanisms by which Morphological Awareness and literacy skills interact thus remain largely unexplored (Rispens *et al*. 2008). Given the prominent role of morphology in the Southern-Bantu language group, its role needs to be examined.

2.3.2.4 Morphological Awareness and Grain size

Burani *et al*. (2008) investigated three groups of Italian children of different ages and a group of adult readers. Their aim was to show that in a transparent orthography readers of different skills use grain sizes, in particular the morpheme, to aid their reading. Less skilled readers (dyslexics and younger readers) used morphemes to supplement grapheme-to-phoneme decoding. It was thus proposed by Burani *et al.* (2008) that the morpheme is a unit of intermediate grain size. The morpheme as a grain was shown to be useful in processing all linguistic stimuli, including words for individuals with limited reading ability (dyslexics and younger readers) who were unable to make use of whole-word processing. Furthermore, it was found that morpheme parsing in skilled readers was useful for reading stimuli for which whole-word units did not exist, such as pseudowords. The morpheme provides lexical reading units which are larger than grapheme-to-phoneme mappings which places fewer limitations on decoding for such readers.

The Psycholinguistic Grain Size Theory (PGST) (Ziegler & Goswami 2005), which will be outlined in Section 2.4.1.2, states that children learning to read in transparent orthographies rely on small grain-size units, such as grapheme to phoneme mappings, while readers of inconsistent orthographies rely on a mixture of multiple grain sizes, from small to large (whole-words) grains. This theory focuses on phonological recoding without considering the role of morphemes as grain sizes in decoding[5]. The findings of Burani *et al*. (2008) however have shown that morphemes

[5] Ziegler and Goswami (2005) do however acknowledge that units of different grain sizes may emerge that are phonologically more accessible than the level of phoneme- to-grapheme correspondences.

may develop as grain sizes, not only when smaller grain sizes are inconsistent but also when smaller reading units are available and consistent, such as in a transparent orthography.

According to Elbo & Arnbak (1996) the use of morpheme recognition as a decoding strategy in reading depends to some extent on the reader's linguistic awareness of morphemes in the language. The use of morphemes as a grain size unit is more economical than storing whole words in the lexicon. Thus a reading strategy which involves the use of morpheme parsing may provide a direct mapping onto the lexicon. Evidence for this has been provided through studies on a number of languages, such as Dutch (Javella & Meijers 1983), English (Henderson 1985) and Italian (Carmazza *et al*. 1998). Considering the rich morphological structures of the Southern-Bantu languages under investigation in this study, it is expected that the morpheme will be used in decoding strategies. This will influence current models of word recognition which have not emphasised the role of the morpheme in reading strategies. A model suited for the Southern-Bantu languages will be explored in chapter 4, section 4.4.2.

The reason why it is important to study the metalinguistic skills is because they are directly linked to word recognition ability. At the level of word recognition, the metalinguistic skills discussed above, enable the learner to segment words into parts and access and identify phonological and morphological constituents through manipulation of knowledge of orthography (Tsung & Cruikshank 2011).

2.4 Word recognition

There appears to be a thematic link in the literature between orthography and word recognition models. There is a common concern in that the studies which have been done on orthography and word recognition either affirm or disclaim the different models of word recognition. Thus it may appear that there is an overlap in the scope of the two sections. The literature confirms this, but in different ways.

According to the Literary Information and Communication System (LINCS), word recognition is defined as "the ability of a reader to recognize written words correctly and virtually effortlessly." Word recognition therefore includes the ways in which people recognise words and access the corresponding word representations stored in their mental lexicon. A linguistic-decoding dimension such as word recognition is believed to be a foundation of reading (Aaron *et al.* 1999, Snowling & Hulme 2005, Invenizzi & Hayes 2010) and involves interactions between

language structure, orthography and metalinguistic skills. Word recognition involves retrieving information about a word's spoken form and meaning from its written form (Snowling & Hulme 2005, Invenizzi & Hayes 2010). Most research on word recognition focuses on words in isolation. Because of the blurred concept of what constitutes a word in the Southern-Bantu languages, this study examines sentence reading.

The current study focuses on a particular angle of word recognition, namely, grain size unit which learners pay attention to when reading. Grain size refers to the literacy processing units, such as phonemes, syllables and whole words, which learners use in achieving word recognition. Thus learners use grain size in order to unpack words. Grain size contributes to the larger picture of word recognition. Research on word recognition has been situated in word recognition models which look into the different types of strategies employed by learners when approaching reading. These word recognition strategies are discussed in the following section.

2.4.1 Models of Word recognition

2.4.1.1 Two-Route Word Recognition Models

The task of nonword (alternatively referred to as pseudoword) and real word reading has played a central role in the development of models of word recognition (Seidenberg 1992). Two extensively researched models of word recognition are the Dual-Route Cascaded (DRC) Model of word recognition and the Orthographic Depth Hypothesis (ODH).

2.4.1.1.1 Dual-Route Cascade Model of Word Recognition

The DRC model (Jackson & Coltheart 2001) theorizes that there are two distinct pathways along which reading takes place: a phonological (non-lexical) route and an orthographic (lexical) route. In the phonological route, letter strings are segmented and then serially converted into sounds using grapheme-to-phoneme mappings. The lexical route maps whole-word orthographic representations to word phonology by accessing word knowledge which is already stored in the mental lexicon (Lima & Castro 2009, Coltheart *et al.* 2001).

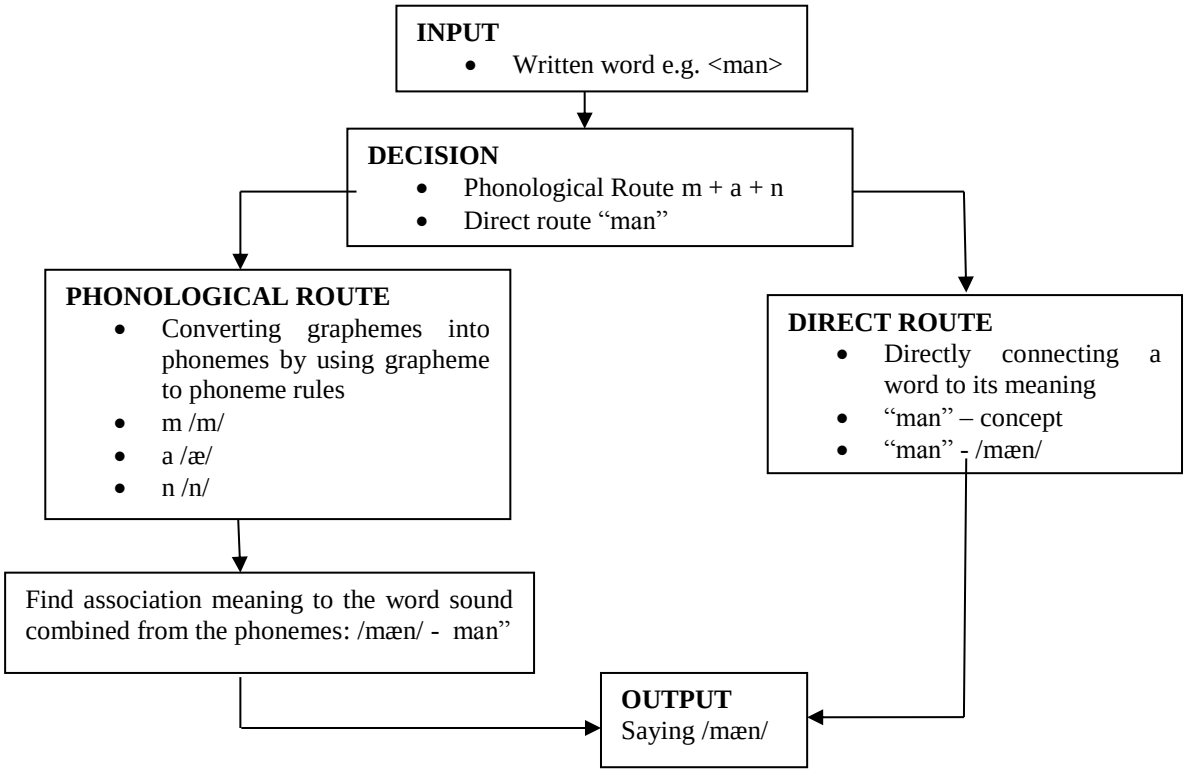


Figure 1. Dual Route Model of Word Recognition (Coltheart et al. 2001)

The DRC model assumes that for successful word decoding to take place, the lexical route would process frequent and orthographically irregular words; however, it would fail to process unfamiliar or pseudowords (Levy *et al*. 2009). In contrast to this, the sublexical route would process all pseudo- and real- words which have a grapheme-to-phoneme representation but would fail to process irregular words which violate this representation (Levy *et al.* 2009). The DRC describes the process of adult/skilled reading, but lacks mention of the processes involved reaching this stage.

According to Widjaja & Winskel (2004), errors made when reading real words and pseudowords can supply clues about the strategies which readers use when initially learning how to read in different orthographies. Pseudowords are particularly useful as they require the child to assess his/her phonological decoding skills and test his/her ability to map phonemes onto graphemes. Studies done on German and English (Stuart & Coltheart 1988, Wimmer & Goswami 1994) showed that readers of English made use of whole-word reading strategies whereas German readers made use of grapheme-to-phoneme correspondences, providing support of two lexical pathways involved in reading. In their 1994 study, Wimmer and Goswami found that errors predominantly made by German learners were nonwords, whereas English children produced more real-word errors. This showed that the German readers have immediate access to letter-

sound conversion (grapheme-to-phoneme) strategies due to the transparency of the orthography, whereas English readers also use a direct lexical or whole-word strategy for word recognition because of the inconsistency and irregularity of the orthography (Goswami, Ziegler, Dalton & Schneider 2003). This was shown by the close to perfect correlation found between number-word reading time and nonsense-word reading time as well as by the tendency to produce nonsense-word errors and a lack of reading refusals made by the German children. The English children, in contrast, had difficulty in reading the nonsense-words and there was a lower correlation found between number-word reading and nonsense-word reading times. Furthermore, these children displayed a large number of word errors. In addition to this, according to Wimmer & Goswami (1994), the refusals made by the English children in the reading task suggest that they may have been relying on a lexical recognition strategy in assembling pronunciations of the nonsense words.

Few studies have been conducted on the Southern-Bantu languages using the models of word recognition as a theoretical framework. Probert (2013) studied transfer of word recognition skills in isiXhosa emergent bilinguals. Results were interpreted using the Orthographic Depth Hypothesis and Wimmer and Goswami's (1994) framework set out above. Probert (2013) focused on transfer from a transparent to an opaque orthography, and vice versa, by looking into the strategies, sublexical and/or lexical, which were employed by learners when approaching the reading of words. Probert (2013) conducted word recognition tasks in the form of pseudo- and real-word reading in both isiXhosa and English. Results showed that transfer of skills took place to a limited extent from isiXhosa to English. Furthermore, transfer was less predictable from English to isiXhosa. Learners were able to transfer sublexical decoding skills from their LoLT to new words encountered in the language. Transfer of lexical strategies was however low. It was further found that successful transfer of skills from LoLT to language of second literacy was mixed.

2.4.1.1.2 Orthographic Depth Hypothesis (ODH)

The Orthographic Depth Hypothesis (ODH) emerged from the classical models of the DRC and postulates that the use of different routes when approaching word decoding is attributable to orthographic depth (Frost et al. 1987, Mattingly 1992, Trudell & Schroeder 2008). In other words, the ODH states that readers adapt their use of route according to the orthographic properties of the language (Lima & Castro 2009). In a shallow orthography, readers rely more heavily on the phonological route because mappings between letters and sounds are transparent and consistent, whereas readers in deep orthographies would also make use of the lexical route,

accessing meaning via the word's visual orthographic structure, because of opaque and equivocal grapheme-to-phoneme mappings (Katz & Frost 1992, Frost 1994, Ziegler et al. 2001).

The Orthographic Depth Hypothesis (ODH) was supported by the findings that, firstly, learners of transparent orthographies are better able to read nonwords than learners of deep orthographies. As mentioned above, according to the ODH, learners of transparent orthographies rely on the phonological route, thus approaching word reading through the use of grapheme to phoneme mappings. They are thus able to successfully decode pseudowords, which by definition can only be read through grapheme-to-phoneme decoding strategies. Learners of inconsistent, deep orthographies encounter difficulties in the reading of pseudowords when applying lexical strategies, because the decoding of pseudowords cannot be accessed via the mental lexicon. Learners of German (Wimmer & Goswami 1994) and Spanish (López & González 1999) were able to read nonwords better than learners of English (Rack, Snowling, & Olson 1992). Secondly, learners of transparent and opaque orthographies produce different patterns of reading errors. According to Ellis *et al.* (2004) adherence to an alphabetic decoding strategy produces errors of mispronunciation, whereas orthographic reading strategies generate visually similar, real-word substitution errors. This was supported by the findings that the majority of the reading errors made by German (Wimmer & Hummer 1990) and Welsh (Ellis & Hooper 2001) speaking children were nonwords, whereas young English-speaking children made frequent reading errors that were actual words (Seymour & Elder 1986, Stuart & Coltheart 1988). Finally, a stronger relationship between word length and reading latency is found in transparent orthographies. Ellis and Hooper (2001) showed that word length determined 70% of the difference in reading times when reading words in Welsh, but only 22% in English, which suggests that Welsh pronunciations were assembled by means of a left-to-right parse of the written string, suggesting the use of grapheme-to-phoneme mappings as their reading strategy, with longer words consequently requiring more time to recognize (Ellis *et al.* 2004).

Further support for the ODH comes from the study by Frost *et al.* (1987) which compared lexical decision and speeded pronunciation performance across three languages which varied on a continuum of orthographic depth (Serbo-Croatian, English and unvowelized Hebrew respectively). Frost *et al.* (1987) is the most frequently cited study in support of the ODH. Results indicated that the various lexical factors affected speeded pronunciation in the order which was predicted in the ODH. Frequency and lexicality were shown to affect the three languages differently, with lexicality effects being the highest for Hebrew, followed by English, and with

Serbo-Croatian having no significant effect (Frost *et al.* 1987). Lexicality effect refers to word naming being read faster than non-word naming (Rastle & Coltheart 1999). This supports the prediction of the ODH that the deeper the orthography, the more lexical mediation there is (Frost *et al*. 1987). Thus readers of deep orthographies rely on the lexical route when approaching word reading. In a second experiment, Frost *et al*. (1987) found that semantic priming effects were larger in Hebrew than in English with no effects found in Serbo-Croatian. This confirms the prediction of the ODH that semantic priming is greater in orthographies which depend more heavily on lexical information, i.e. in deep orthographies. In the third experiment, participants were discouraged from using lexical strategies in speeded naming by an increase in the number of nonwords presented in the stimulus. Results showed that only readers of Serbo-Croatian were affected, which suggests that in deeper orthographies there is a greater reliance on lexical strategies, while in the shallow orthography, a nonlexical strategy pertains (Frost *et al.* 1987).

More recently Probert (2013) provided support for the ODH through examining the reading strategies of emergent isiXhosa bilingual learners and the transfer of these strategies to an additional language, English. The transfer from English to isiXhosa was also examined. The results support the contention that reading strategies and metalinguistic skills are fine-tuned to particular languages. It was shown that transfer of skills takes place to a limited extent when the language of first literacy uses a transparent orthography (isiXhosa), but that transfer is less predictable when the language of first literacy uses an opaque orthography (English). Learners who received first literacy in a transparent orthography approached isiXhosa real-word reading using sublexical reading strategies. Similarly, the English LoLT learners also approached isiXhosa real-word reading using sublexical reading strategies, which is consistent with the ODH. Likewise, learners from the isiXhosa LoLT School used sublexical strategies when approaching pseudowords, whereas in the English LoLT School, learners approached pseudoword reading differently, using lexical reading strategies. Furthermore, it was shown that for the reading of English words a combination of both sublexical and lexical reading strategies was used. These findings provide challenges for the applicability of the ODH to the South-Bantu languages. "It is evident from the data that learners are bringing other information to the table when they decide on which strategy to use, but what is it?" (Probert 2013: 18).

There are currently two versions of the ODH found in the literature: the strong and the weak ODH. The strong ODH states that, "phonological representations derived from assembled phonology alone are sufficient for naming and lexical decisions in shallow orthographies" (Katz

& Frost 1992: 72). Therefore, according to the strong version, word decoding in shallow orthographies does not involve pronunciation which is obtained from the mental lexicon. Readers of shallow orthographies rely purely on grapheme-to-phoneme correspondences in decoding (Katz & Frost 1992). This version is the strict version. It does not allow for the use of mixed or alternative decoding strategies.

The strong version of the ODH however gave way to a weaker version as it became apparent that readers of shallow orthographies rely not only on grapheme-to-phoneme correspondences but are able to use the stored phonology from the lexicon, particularly when approaching unfamiliar or less transparent words (Probert 2013, Katz & Frost 1992, Besner & Smith 1992). The weak version of the ODH states that the phonology needed for pronunciation when decoding comes not only from grapheme to phoneme mappings but is also accessible from memory (i.e. the stored lexicon) and that the degree to which each route, lexical and sublexical is activated, is a function of the orthographic depth (Katz & Frost 1992). This is the version of the ODH most commonly referred to in the literature. In the weak ODH, therefore, shallow orthographies favour sublexical decoding strategies due to the consistency of the mappings of grapheme to phonemes. However, whether or not sublexical decoding is dominant is attributed to the demands the two kinds of processes (sublexical and lexical) make on the readers' processing recourses (Katz & Frost 1992). Thus the weak ODH makes provisions for the use of lexical decoding strategies by readers of shallow orthographies, as well as for the use of phoneme to grapheme mappings in deep orthographies. Decoding in shallow orthographies is therefore not exclusive on phoneme to grapheme mappings, lexical access is also feasible. The extent to which lexical or sublexical routes of word recognition are dominant depends on the structural relationship between orthography and the lexical entry which the learner is attempting to read. Similarly, word recognition in deep orthographies is also possible via phonologically-mediated access (Frost & Katz 1992).

Although these views of reading remain the most prominent in literature on studies concerning differences in reading cross-culturally, their fundamental predictions do not remain unchallenged. Firstly, the prediction that phonological effects are reduced in deep orthographies was challenged by the findings of Rayner, Sereno, Lesch and Pollatsek (1995) who found strong phonological priming effects in an eye-movement study in English. This provided evidence of activation of the phonological route when reading in a deep orthography. Secondly, these frameworks predict binary outcomes, the use of either a lexical or sublexical route in the decoding of words, which

has been attributed to orthography. However, it has been found that readers tend to use a number of strategies, and that these not only differ in the same orthography, but may even differ in individuals themselves, depending on the type of word being approached (Seidenberg 1992, Probert 2013). The use of multiple reading strategies; a mixture of both small and larger grain sizes, was first put forward by the flexible-unit hypothesis (Brown & Deavers 1999).

2.4.1.2 The Psycholinguistic Grain Size Theory (PGST)

The Psycholinguistic Grain Size Theory (PGST) was established to build upon the assertions of the ODH. The PGST proposes that due to the fact that languages vary in the consistency with which the phonology is represented in the orthography, there are developmental differences in the grain size of lexical representations (Ziegler & Goswami 2005). In other words, the grain size of psycholinguistic units used in decoding differs with orthographic consistency. The PGST thus considers reading development to depend upon the notion of optimal mappings between sounds of a language and its orthographic units (Ziegler & Goswami 2005). According to the PGST, readers are faced with three contributory factors which influence and explain their reading development. These are availability, consistency and granularity of spelling-to-sound mappings (Ziegler & Goswami 2005).

- Availability refers to the accessing of sound units prior to reading. It is unclear in the literature as to what this availability actually refers to, but it may be stipulated that this availability could refer to atypical children versus typical children, in which the former would not have all units of sound readily available to them due to some deficiency or difficulty. It could also refer to prominence. The syllable may be the most prominent unit in a specific language, but phonemes are also available. The syllable is more available due to its prominence in the language, for example in Tigrinta and Tigre, which employ an alphasyllabic script (Asfaha *et al*. 2009). If availability refers to prominence, the role of morphemes in the Southern-Bantu languages needs to be considered in word-reading. In other words, the question of whether the morpheme is a prominent reading unit available to readers needs to be explored. This availability problem could also be situated within Markedness Theory (Jackobson 1932), a theory commonly used with phonology. According to this theory, some phonemes or types of phonemes are inherently more difficult to produce because they are rare or "marked", meaning they do not exist in most languages of the world, regardless of whether a speaker's first-language includes a given

phoneme or not. Thus the availability of some grain sizes in a language may have to do with their markedness in the language.

- Consistency refers to the degree of association between the sounds and symbols of a given language. Consistency therefore has to do with the uniqueness of pronunciations of orthographic units. Some orthographic units have multiple pronunciations while some phonological units have multiple spellings (Glushko 1979, Seidenberg & McClelland 1989, Ziegler, Stone & Jacobs 1997). Inconsistencies in orthography are believed to slow down reading. For example, the letter cluster –IND in English is considered inconsistent, for example, wind (a gust of air) and wind (to follow a course that is not straight). These two words are spelled similarly but pronounced differently (referred to as homographs). The consistency of the morpheme has not yet been fully established in the literature. It is therefore unclear on how to evaluate the consistency of the morpheme as a grain-size unit in languages. This is particularly interesting for the Southern-Bantu languages where morphemes are not always consistent, as with vowel coalescing and tense or noun class variants. What constitutes consistency of morphemes in orthographies needs to be determined. This question falls outside the scope of this investigation, but researchers and the PGST framework should take it into consideration.

- Granularity refers to the level of mappings between sound and symbol, whether they are smaller or bigger grain sizes (Ziegler & Goswami 2005). Mappings range from phonemes to whole-words. This is illustrated in the Figure 2 below. As seen below the morpheme has not yet been emphasised as a grain-size. Given the morphologically rich nature of the Southern-Bantu languages, this needs to be explored.

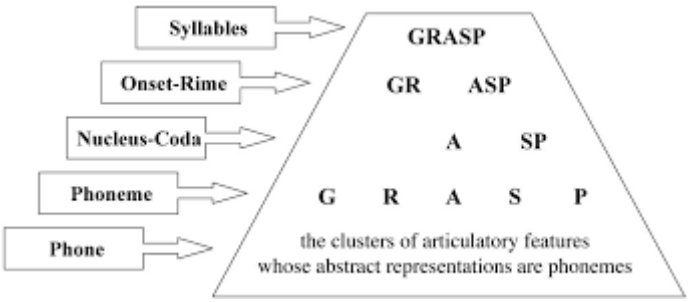


Figure 2. Schematic depiction of the different grain sizes according to the PGST

The PGST assumes a continuous differentiation of the phonological units which are involved in reading, as opposed to a binary opposition between the reading routes (whole-word versus grapheme-to-phoneme conversion) (Lima & Castro 2009). The main word recognition differences between deep and shallow orthographies therefore relates to the varying sizes of processing units that are necessary for successful decoding of textual puzzles and to the need to "switch" between grain-sizes (Aro 2004).

While PGST is relatively a new theory, evidence in support of it is accumulating. In a study on German and English, Ziegler, Perry, Jacobs and Bruan (2001) compared English and German adults reading identical words and nonwords in their own languages. Results showed that there was a preference for small-unit grain-size units (graphemes, phonemes) when decoding in German and a preference for larger-sized units (bodies, rhymes) among English readers. For effect of length, the number of letters was manipulated for grapheme-to-phoneme conversion, and the body-rhyme units manipulated for the conversion of larger units. Results showed that length effects were stronger in German than in English and the reverse was found for the body-rhyme effects. Similar findings were mirrored in Ellis and Hooper (2001) in their comparison of Welsh and English. Therefore, as stated in Ziegler and Goswami (2006), readers learning to read in shallow orthographies rely on phonological recoding at the grapheme-to-phoneme level because of the direct and transparent correspondences which are found between graphemes and phonemes. In deep orthographies, however, readers rely more on larger chunks such as patterns of letters, rhymes, syllables or whole-words (Lima & Castro 2009, Ziegler & Goswami 2005, Ziegler *et al*. 2001). This idea that whole-word reading strategies are more prominent for users of opaque orthographies was also proposed by the Orthographic Depth Hypothesis (Katz & Frost 1992). However, this does not mean that larger grain sizes are never processed by readers of shallow orthographies, as pointed out by Paulesu (2006), who reported frequency effects in nonword reading among Italian readers.

Thus the PGST argues that readers with consistent orthography-to-phonology mappings use smaller grain sizes than those reading in more inconsistent orthographies, but neither group is restricted to a specific grain (Ziegler & Goswami 2005). In other words, readers of irregular orthographies are obliged to develop orthographic units of varying sizes, whereas readers of transparent orthographies, such as Italian or German, can rely on phoneme-to-grapheme correspondences due to their orthographic consistency. However, evidence from acquisition shows that this does not mean that larger grain sizes never flourish in readers of shallow

orthographies (Ziegler & Goswami 2006). The PGST is more advantageous for cross-linguistic comparisons than the ODH as readers adapt to the demands of their orthography instead of adapting to different routes in determining their reading strategies (Probert 2013). This predicts that readers of isiXhosa and Setswana should rely more on smaller grain sizes due to the consistency of the orthographies, but that they are not restricted to only using phoneme-to-grapheme mappings in decoding.

The PGST is also more flexible than the DRC and ODH as it is continuous and fine-grained rather than being dichotomous. It also allows for integration of the other models of word recognition. The PGST and morphological and orthographic transparency differences in languages emphasize the necessity for more cross-language research. The PGST is specific to the sound-symbol learning processes involved in learning to read. It does not emphasise the morphemes in explaining the grain sizes which are used in decoding (Burani *et al.* 2008). However, it is more advanced than the other models of word recognition in that it allows for the possibility of a morpheme level, as it does not confine decoding strategies to the use of either a sublexical or lexical route. Both the DRS and strong ODH predict binary outcomes for word recognition, either whole-word or grapheme-to-phoneme conversion, which is assumed to be at a phonological level. It is naïve to think of word recognition in this way, as previous studies have found that words can be broken down in different ways (Probert 2013). Thus, in order to be a more universal and fully rounded model of word recognition, the PGST needs to acknowledge that the purpose of reading is for understanding and hence knowledge of morphology is also important to reading development. In addition, the medium of instruction can also contribute to changing the developmental pathways into literacy.

2.5 Conclusions of the Literature Review

In conclusion it has been shown that compared to English and other European languages, there is little research which has been done on word recognition in the Southern-Bantu languages. The section below will provide a summary of the main arguments from the literature review, specifically relating to how each research question develops from these arguments.

- LoLT:

This section outlined the language policy and discussed the research on literacy in South Africa, in addition to the research conducted on the transfer of first-language reading skills to second-language reading. The majority of the research focuses on transfer from a first-language to a

second-language. This study will be focusing on first-language reading. Learners in South Africa have the option to learn in their first-language (L1) in the Foundation Phase, making a transfer to English as LoLT in Grade 4. The implications of this are that teachers are required to have an understanding of how to address literacy, not only in different languages, but also in second language learners. Unfortunately many learners have not yet fully mastered their L1 before entering the formal school setting (Lemmer 1995), leading to reading strategies that are unsolidified in the child's L1. According to Cummins (1979), for children who are not exposed to a literate environment, the initial language of instruction is crucial in determining their reading strategies. In the South African context, it is thus necessary to look into the effect which language of first literacy has on word recognition strategies, i.e. are reading strategies determined by the child's L1 or the LoLT?

- Orthography:

An overview was presented of the Southern-Bantu language structure as well as a discussion of the differences in the conjunctive orthography of IsiXhosa and disjunctive orthography of Setswana. The main question which arises from this is whether these different writing systems will have differential influences on determining grain size units in word recognition strategies of isiXhosa and Setswana readers. Research on orthography focuses on comparisons of deep and shallow orthographies and it has been shown that word recognition and reading development differs across orthographies. Furthermore, studies on orthography have provided evidence that reading strategies are dependent on orthography. However there is a lack of research on how word recognition develops in orthographically transparent orthographies with agglutinating morphology. This study will be focusing on two transparent orthographies which vary in their degrees of shallowness in order to develop a more comprehensive understanding of the influence of how the differences in orthography may influence reading strategies.

- Metalinguistic skills:

The role of Phonological Awareness in reading development and success has been emphasised in the literature. Phonological Awareness skills vary from language to language depending on the saliency of the phonological aspects of the language. There is not much research on the role of Phonological Awareness in South Africa. This study will contribute to this. Less is known of the contribution of Morphological Awareness to reading; however, there is a growing body of research which shows evidence that Morphological Awareness promotes literacy development and success. Research on the metalinguistic skills is often in isolation from one another. Thus the

interaction between the two and relative contribution of each to word recognition needs to be explored. Furthermore, research in the area of the metalinguistic skills hold a degree of Anglo-centric bias leading to a gap in the research concerning the role of the metalinguistic skills in the Southern-Bantu languages.

- Models of Word Recognition

Three models of word recognition were discussed; the Dual-Route Cascaded (DRC) Model of word recognition, Orthographic Depth Hypothesis (ODH) and Psycholinguistic Grain Size Theory (PGST). The DRC postulates that reading takes place via two routes; the lexical and sublexical route. The ODH extended this by attributing the use of the different routes to orthographic depth. Readers of shallow orthographies rely more on the sublexical route, through grapheme-to-phoneme mappings, whilst readers of deep orthographies rely more on the lexical route. The PGST built on these predictions and proposed that there are development differences in grain size of lexical representations which differ across orthographies. None of these models emphasise the role of the morpheme as a strategy used in word recognition. Furthermore, research in support of these models has focused on comparisons of English to other European languages or non-alphabetic scripts. This study investigates which word recognition model is best suited towards understanding reading in the Southern-Bantu languages.

2.6 RESEARCH GOALS

There are two major goals of this study, firstly to investigate the effect of Morphological and Phonemic grain sizes on reading in conjunctive and disjunctive orthographies respectively and secondly, to determine the relationship between L1 and LoLT and their relevant contributions to word recognition strategies, thus introducing L2 transfer into the study.

These two major goals can be further divided according to the following five research questions:

1. What is the relevant contribution of Phonological Awareness and Morphological Awareness in determining grain size when reading sentences in isiXhosa and Setswana respectively?
2. (a). What effect do the disjunctivism and conjunctivism of an orthography have on word recognition strategies?

(b). How do the types of grain sizes differ between children learning in a conjunctive orthography and those learning in a disjunctive orthography?

3. When children approach word recognition tasks, are the grain sizes used in recognition strategies determined by their L1 when it is aligned with their LoLT or by their L2 LoLT?
4. How do the three themes (metalinguistic skills, orthography and language of learning and teaching) interact with each other in word recognition?
5. What models of word recognition are best suited to orthographic words in the Southern-Bantu languages?

CHAPTER 3: METHODOLOGY

There are two major goals of this study, firstly, to investigate the effect of Morphological and Phonemic grain sizes on reading in conjunctive and disjunctive orthographies and secondly, to determine the relationship between L1 and LoLT and their relevant contribution to word recognition strategies, thus introducing L2 transfer into the study. To answer these questions, a number of linguistic measures were used, namely an open-ended decomposition task, a Phonological Awareness task, a Morphological Awareness task and an independent reading measure. Each measure was designed specifically for this study according to the linguistic characteristics of the Southern-Bantu languages under investigation (isiXhosa and Setswana). These tasks were designed by the author, Maxine Diemer and Sian Rees as part of a combined linguistic research group investigating literacy skills in the foundation phase in the Southern-Bantu languages (see Diemer 2015, Rees 2015) [6].

The methodology was predominantly quantitative with the addition of a qualitative linguistic analysis for the discussion of the results. The findings of this study are interpreted within a linguistic literacy research paradigm.

3.1 Participants and Schooling Context

Seventy-four primary school children participated in this study. The sample set was from four schools which differ with regard to their LoLT. Learners either received schooling in their first-language from Grade 1 to 3 (isiXhosa or Setswana), or were taught in English from Grade 1 to 3. In some cases, more than one classroom was sampled from a single school. The sample of learners tested was chosen based on their home-language. Thus all children were first-language speakers of either isiXhosa or Setswana. Children who did not have isiXhosa or Setswana as a first-language were excluded from the study. Due to the time constraints of working with four different schools, two of which were in different provinces, the data was collected at different times. Data was collected from Grade 3 as well as Grade 4 pupils. However, every effort was made to ensure that the data collection was done within a specific time frame (a period of 6 months) so as to rule out any variables which may have affected the outcome of the results.

[6] Although the tasks were designed in a combined effort, each of the contributors wrote independent theses. The contribution of each researcher to the tasks will be discussed under the measures and procedures section. It must also be noted that although each researcher utilized the same tasks and at times the same participants (ONLY for the isiXhosa-LoLT school), the data was coded independently.

To protect the anonymity of the schools and for ease of reference, each school will be referred to by group code. The four Schools which were involved in this study all served socioeconomic disadvantaged communities. All of the schools had a feeding scheme for the learners. The first school, Group X.EC, is an isiXhosa-medium school in a small coastal town in the Eastern Cape. The school is a well-run and well-resourced public school on the outskirts of a township. The second school, Group E.EC, is a small English-medium school, also from a small town in the Eastern Cape. The majority of the children at this school are isiXhosa first-language speakers and come from middle to upper middle class areas. For the isiXhosa sample the learners tested were in their second half of Grade 3 (Term 3 and 4).

The third school, Group T.NW, is a Setswana-medium based school in a small district in the North West Province. The fourth school, Group E.NW, is an English-medium school in the same district. All four schools were comparable in terms of resources, management and the children's socio-economic status. The Setswana sample comprised learners in the first half of their Grade 4 year (Term 1).

The table below (Table 5) presents a summary of the coded schools at which research was conducted, with regard to language of learning and teaching (LoLT) and first-language of the learners. As mentioned earlier, learners are taught in their first-language (either isiXhosa or Setswana) from Grades 1 to 3 at two of the schools and in English (their additional language) at the other two schools. Learners in Group X.EC are isiXhosa first-language speakers who received schooling from Grades 1 to 3 in isiXhosa. Learners from Group E.EC are isiXhosa first-language speakers who are taught in English from Grade 1. Group T.NW comprises Setswana first-language speakers at a school where Setswana is the medium of instruction from Grade 1 to 3. Group E.NW includes Setswana first-language speakers who receive schooling in English.

Table 5: Summary of the Schools at which research took place

GROUP X.EC - isiXhosa LoLT - L1 isiXhosa speakers	**GROUP E.EC** - English LoLT - L1 isiXhosa speakers
GROUP T.NW - Setswana LoLT - L1 Setswana speakers	**GROUP E.NW** - English LoLT - L1 Setswana speakers

Participants comprised those children who had returned consent forms giving permission from their parents/caregivers for participation in this study. Originally, Grade 3 was specifically chosen as it was assumed that children would have had experience with both spoken and written word recognition by this stage in their literacy development. Also these children would not yet have made the "switch" to English as their LoLT. Their LoLT would thus be either in their first-language (either isiXhosa or Setswana) or in their L2 (English). However, not all participants could be tested in Grade 3. The Setswana learners were tested in the first term of their Grade 4 year. Their exposure to English however was still minimal during this early stage of the school year and was therefore not deemed a significant problem in its potential to skew the results on assessing the effects of LOLT.

3.2 Ethics

This study received ethical clearance from the Rhodes University Ethical Standards Committee. The study was therefore designed in order to minimise the risks of harm or discomfort to participants. In order to ensure autonomy within this study, informed consent forms were obtained from the parents/guardians of the learners. The informed consent provided parents/guardians with full disclosure about the nature of the study and an opportunity to ask questions before deciding whether or not to allow their child to participate. In addition to this, permission was obtained from the Principals at each of the Schools involved in this study, as well as from the class teachers. Furthermore, verbal assent was obtained from each of the learners before participating in each of the tasks. All participants were given full explanation of the process involved in the testing and given the opportunity to ask questions and withdraw from the study at any point.

As alluded to in the previous section (see section 3.1), ethical care was undertaken regarding the well-being of the participants. This included, ensuring that learners were not out of the class for too long and using codes to ensure personal identity remained confidential. In addition to this, beneficence was carefully monitored. All learners received appraisal for their participation in the form of stickers. Furthermore at no point was it indicated to learners whether their responses were incorrect. Finally each school is to receive a copy of the thesis for full disclosure on the outcome of the study.

3.3 Measures and procedures

Each participant completed four independent tasks. All tasks were conducted in the learners first-language (isiXhosa or Setswana), over a period of two days, with each participant spending 30 minutes out of the classroom at a time. On the first day the children completed the decomposition task, the Oral Reading Fluency (ORF) and Silent Reading Fluency (SRF) tasks and a portion of the Morphological Awareness (MA) task. On the second day they completed the remainder of the MA task and the Phonological Awareness (PA) task. This order was chosen so as to avoid priming effects which may occur when the children completed the open-ended decomposition task. The Phonological Awareness Task was not paired with the decomposition task to prevent the children from breaking up the sentences according to syllables or phonemes, based on which task they were exposed to before completing the open-ended decomposition task. This study focuses specifically on the results of the Decomposition Task, Phonological Awareness Task, a portion of the Morphological Awareness Task (oral manipulation of singular and plural morphology and identification) and Oral Reading Comprehension. The section below discusses each of these in greater detail, alluding to the other tasks completed by the learners as part of the battery of tests undertaken by the research group.

The table below (Table 6) provides a summary of the different tasks completed by the learners, the type of words used (real vs. pseudo) and the subtasks of each.

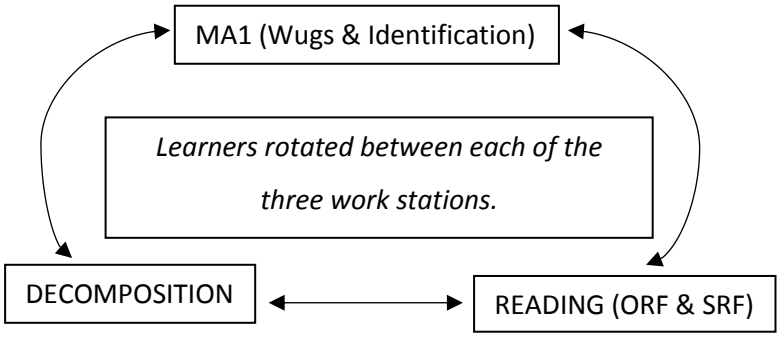
Table 6: Summary of the tasks undertaken in this study

OPEN ENDED DECOMPOSITION (Probert) • **20 Sentences**	**PHONOLOGICAL AWARENESS (PA) (Diemer & Probert) (Probert)** • **3 Tasks** • **Pseudowords** • **Syllables and Phonemes**	**MORPHOLOGICAL AWARENESS (MA) (Rees) (Probert)** • **4 Tasks** • **Pseudo- and real words**	**INDEPENDENT READING MEASURE & COMPREHENSION (Diemer) (Probert)** • **Silent Reading Passage** • **Oral Reading Passage**
Learners asked to break down sentences as they would do when reading	1. Segmenting	1. Oral manipulation of singular and plural morphology task - "Wugs"	Each passage was read for one minute followed by five comprehension questions which were administered and answered orally by the learners.
	2. Identification	2. Word/Sentence building	
	3. Deletion	3. Morpheme identification	
		4. Written morphological analogy and production	

The diagram below (Figure 3) attempts to conceptualise the testing procedure. Three learners were brought in for testing throughout the school day for approximately 30 minutes each. On day one of testing, the learners rotated between three testing stations: MA1 ('wugs' and identification), Decomposition and Reading. Each participant spent approximately ten minutes at each of the testing stations. The order of rotation was not always the same, hence the use of the double arrows which point both ways. The rotation of stations depended on where the participant had started and which station was available next. On day two of testing, the participants completed the second half of the MA task (MA2 – word building and analogy) and the PA task, which was split between two testing stations, with syllables at one and phonemes at the other. Again, participants rotated between these three stations. The order of rotation was not fixed. This

diagram shows how an effort was made to avoid priming effects and to maximize the data output, but minimalize the amount of time each child spent away from class.

DAY 1:



DAY 2:

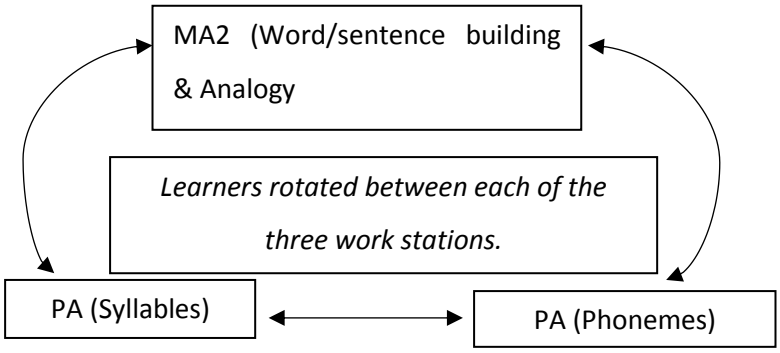


Figure 3: Conceptualisation of the testing procedure

3.4 Administration

All tasks were administered individually by trained research assistants who were either isiXhosa or Setswana first-language speakers. The tasks took the form of word games, with the learners being tested individually in one session lasting approximately 30 minutes. The Phonological Awareness task, the ORF and parts of the Morphological Awareness task were recorded using a Dictaphone and Marantz recorder. Each of the participants was given codes in order to ensure anonymity. Once each task was completed the participants were given a sticker in appreciation for their participation in the study. All tasks were done in the learner's first-language (either isiXhosa or Setswana).

3.5 Differences between the isiXhosa and the Setswana tests

Every effort was made to keep the isiXhosa and the Setswana tests similar to ensure that the results would be comparable according to linguistic and task difficulty. The stimuli were kept similar between both languages so as to ensure that differences in results would not be due to task

effects based on the stimuli used in either of the languages. Differences of each are discussed under each of the respective tasks.

3.6 Data Scoring

All tasks were coded on an ordinal scale to allow for accurate and valid comparisons. Scores were converted to percentages in an effort to normalise the data, and allow for accurate comparisons. The data scoring for each task is discussed in more detail under each of the respective tasks.

3.7 Open-Ended Decomposition Task

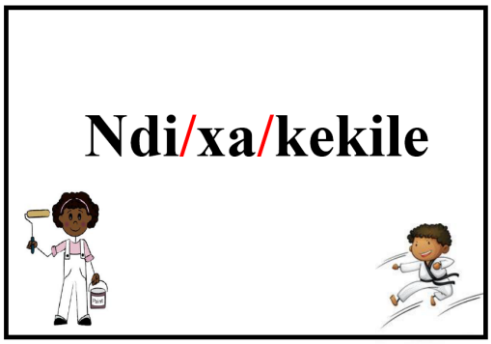
The children completed an open-ended decomposition task, the first of its kind, which was developed specifically for this study. Goswami *et al*. (2003) tested grain size in a cross-language comparison of German and English. They used a method of non-word reading with the idea that, if English children used a mixture of grain sizes in decoding then the reading of non-words would benefit provided all non-words could be successfully decoded through the use of only one strategy at a time. Furthermore, if non-words contained familiar large-unit patterns then only the use of a large grain-size strategy would be successful. If non-words did not contain familiar large-unit patterns, a small-unit strategy would be applicable. Thus if both types of non-words were mixed, a variety of large and small size units would be required. German children should prefer small grain sizes. There would thus be no effect on accuracy when reading mixed lists (Goswami *et al.* 2003). This type of task was useful for this type of study in that the grain-size units for these languages were already known, whereas the aim for this study is to determine the size of the units which isiXhosa and Setswana learners attend to in decoding. Other tests of grain size included a comparison of letter knowledge, word reading and spelling across languages (Ge'ez & Latin, Asaha *et al.* 2009). The results of the decomposition task will be in a similar way compared to Phonological Awareness, Morphological Awareness and Comprehension.

The open-ended decomposition task required the participants to break down sentences as they would do when reading. The participants were given instructions in their respective first-language by a first-language speaker of the language (see compact disc, Appendix A for isiXhosa example). The participants were not given any example of how to break up the sentences, hence the open-ended nature of this task. No examples were given to the learners as it was felt that this would prime them in breaking down the sentences. If the learner was given an example of how to break up sentences according to phonemes, syllables or morphemes, they may base their

responses on the last or on the best explained example. The sentences appeared in large print on A4 paper which had been laminated and the participants used a whiteboard marker to indicate where they would break up the sentences.

23) Example of card shown to participant,

24) Example of card with participant's response,



(isiXhosa)

A research assistant then replicated how the child had broken up the sentence on a separate list with the sentences which were presented to the child. Only the child's code appeared at the top of the page in order to ensure confidentiality and anonymity of the participants (see compact disc, Appendix B).

The open ended decomposition task was administered in order to determine the relative grain size unit which children attend to during word recognition. The specific focus was on whether the child breaks up sentences according to the morphology or according to the phonology of the language, specifically looking at the question of whether they are breaking up sentences according to morphemes or syllables. Thus an effort was made to ensure that the words which were used contained both a rich morphological structure as well as a complex syllable structure. The sentences contained both derivational and inflectional morphology with a focus on suffixes as it is already known that prefixes are parsed as a unit.

3.7.1 Process of assembling the Decomposition Task

For the isiXhosa decomposition task, in collaboration with a first-language speaker of isiXhosa, a list of sentences was compiled in isiXhosa. The sentences used morphemes which were causative, applicative, negated, past tense etc. The original list of 36 sentences was reduced to 20 which were checked by another two first-language speakers of isiXhosa. The process itself was not difficult, but a number of linguistic decisions needed to be taken in order for this task to be reliable.

One such decision was to ensure the use of the CV (consonant-vowel) construction, specifically with the use of morphemes. A list of the types of morphemes which adhered to this construction was used when compiling sentences. Furthermore, simple sentences were used as the stimuli for the open-ended decomposition task, following the SOV word order of the South-Bantu Languages. Sentences which could be written in more than one way were excluded.

For the Setswana decomposition task, the English sentences were translated into Setswana, in order to ensure that the tasks were comparable between the two languages, with consistent stimuli. Using the same English sentences eliminated the chance of the influence of task difficulty on the results. Translations were checked with three first-language speakers of Setswana.

3.7.2 Differences in isiXhosa and Setswana Decomposition Tasks

For both the isiXhosa and the Setswana decomposition tasks, the same English sentences were used. There was therefore no difference in the stimuli. However, closer observation of the sentences reveals orthographic differences, with Setswana being written disjunctively and isiXhosa conjunctively. There are many more digraphs and trigraphs in the Setswana sentences and more ‘obvious’ morphemes. By ‘obvious’ it is meant that they stand independently and are not attached to words as in the isiXhosa sentences.

The table below (Table 7) presents two examples of sentences used for both the isiXhosa and Setswana Decomposition Task. The top column presents the English translation, underneath this is the isiXhosa translation and below this the glossing for each sentence.

Table 7: Example sentences from the Decomposition Task

English	They help each other	The learners are not learning it
isiXhosa	Bayancedisana	Abafundi abayifundi
	3rd P.pl-tense-HELP-causative-reciprocal-fv	NC2-LEARNERS-neg-NC2.SM-NC9.OM-LEARN-neg
Setswana	Bana ba a ratana	Baithuti ga ba ithute yone
	NC2-PresT-HELP-reciprocal-ve	3rdper.NC2-LEARNERS-neg-SubjConc-LEARN-ve-IT

3.7.3 Data Coding for open-ended decomposition task

Model answers were created according to whether the sentences were broken up into syllables or morphemes (see compact disc, Appendix C). Each participant's answers were then judged against this model. The correct, incorrect and total number of syllable/morpheme boundaries identified was counted. The model answers were checked with a first-language speaker of the language, with two linguistic lecturers from Rhodes University (one of whom specialises in morphology and the other in phonology), as well as with a lecturer from the African Languages Department at Rhodes University.

The scale used for the scoring of the decomposition task was ordinal, comprised of intervals. Below is an example of the coding used for the Decomposition task, as well as an example from the data set. There are three sentences presented, each broken up according to morphemes and syllables. The participant PA2-011 in the example given scored one out of two for correctly identified morpheme boundaries and four out of four for syllable boundaries for the first sentence. From this sentence it can be assumed that the learner is able to more accurately identify syllable boundaries than he/she is able to identify morpheme boundaries.

Table 8: Example of the Decomposition coding (isiXhosa)

English	I am busy	The children love each other
IsiXhosa	Ndixakekile.	Abantwana bayathandana
Broken up according to MORPHEMES	Ndi-xakek-ile	Aba-ntwana ba-ya-thand-an-a
Score in BLUE	**2**	**5**
Broken up according to SYLLABLES	Ndi-xa-ke-ki-le	A-ba-ntwa-na ba-ya-tha-nda-na
Score in RED	4	7
Overlap between syllable and morpheme boundaries	**1**	**3**
PA2-011	Ndi-xa-ke-ki-le.	Aba-ntwa-na ba-ya-tha-nda-na
Morphemes	**1**	**3**
Syllables	**4**	**6**
Overlaps	**1**	**3**

3.8 Phonological Awareness Task

Phonological Awareness has been tested through the use of many different measures at differing levels of linguistic complexity (Anthony and Lonigan 2004, Scheule and Boudreau 2008, Stahl & Murray 1994). Stahl and Murray (1994) identified four different types of tasks: isolation (what is the first sound of mat?), blending (what does m-a-t say when put together?), deletion (say mat without /m/) and segmenting (m-a-t). Children may have a high awareness in one measure and a low awareness in another due to the diversity of these tasks (Stahl & Murray 1994). Using a range of task types enables the effect of cognitive task on performance to be addressed (Kilpatrick 2012, Stahl & Murray, 1994). In other words, the use of a range of tasks allows one to determine how task difficulty affects the results for each linguistic unit being studied.

The Phonological Awareness task developed for this study consisted of three independent tasks, each varying in linguistic and task difficulty to ensure that all aspects of Phonological Awareness were covered. The three tasks which participants were required to complete included a segmenting, a deletion and an identification task which were developed by Diemer & Probert. The Phonological Awareness task was based on one developed by Diemer (2013). It was shown by Diemer (2013) that for isiXhosa learners in Grade 4, phonological blending tasks were too easy and substitution tasks too difficult. Blending was deemed too easy as all participants reached the ceiling. The more complex substitution task was too difficult because it required the children

to hold the word in their short term memory, identify the relevant unit, remove the relevant unit and then replace it. The cognitive load of such a task was too demanding for young learners. Also Diemer (2013) used real words as opposed to pseudowords which resulted in added semantic effects influencing the results. In other words, if a child knows a word he/she could more easily manipulate it, thus affecting the outcome of the results (Diemer 2013). These were therefore not included in this study. Instead an identification task was included. An identification task is not suitable when using real word nouns because of semantic and morphological effects. For this study however pseudowords were used which took on the shape of verbs, thereby eliminating the prefix elements and semantic influences. All tasks were deemed appropriate for the Southern-Bantu Language structure by adhering to the language's phonological structure and orthography.

For the segmenting task, participants were given a whole word and asked to segment it into relative phonological units (i.e. the syllable or the phoneme), for example, /gefɪnɐ/ segmented according to syllables would be /ge-fɪ-nɐ/. The identification task required participants to identify a specific phonological unit within a whole word, for example 'what is the first sound in /jɔnɐlɐ/, for syllables, the correct response would be /jɔ/. The final task was a deletion task in which participants were asked to delete a specific phonological unit from a word, for example, say /setɪrɐ/ without /s/. The correct response being /etɪrɐ/ (phonemes).

For each Phonological Awareness task (see compact disc, Appendix D), the two sound units chosen for analysis were the syllable and the phoneme. These were chosen in consideration for the CVCV syllable structure of the Southern-Bantu Language Group. The testing of syllables and phonemes was done separately so as to avoid priming effects as well as to avoid confusion for the participants. Pseudowords were chosen for the stimuli for the Phonological Awareness tasks. According to Siegel (1993), pseudoword reading is the best measure of phonological processing, thus pseudowords are a commonly used measure of Phonological Awareness across diverse fields of reading research (Thomson *et al*. 2006). The pseudowords adhered to the orthographic and phonological properties of the language and were all pronounceable. They would thus not have been seen by the participants prior to testing.

Furthermore, shorter words were used as stimuli because the longer the word the more difficult the task and the greater the cognitive load (Anthony *et al*. 2003). Two- and three- syllable pseudo verbs were therefore used. Verbs were chosen in particular, as the use of nouns requires noun class morphemes to be attached to the root, whereas for pseudowords of verbs there is no need for

added morphemes and the manipulation can take place on the root alone. All words were checked by first-language speakers of the language to ensure that they were in fact 'nonsense' words. Prenasalised phonemes [nd, mb] were avoided, as were words which contained labialisation [w]. This was done as prenasals tend to be controversial with regard to their phonemic status. The two conflicting views which can be found in the literature are whether prenasals form a single segment (Ewin 1982, Herbert 1975 cited in Mwita 2007.) or whether they are in fact a sequence of segments (Ewin 1982, Anderson 1974, 1976 cited in Mwita 2007). These were not included as they would merely complicate the results.

Table 9: Breakdown of the Phonological Awareness task

TASK *2 practice items *8 test items	Segmenting	Identification - Only looked at the first, second and third sound	Deletion
Syllables	2 and 3 syllables long	3 syllables long	3 syllables long
Phonemes	3 syllables long	3 syllables long	3 syllables long

As with the decomposition task, instructions were given to the children in their first-languages by a first-language speaker of the language. Once instructions were understood, the children were given two practice items to familiarise themselves with the task. The tasks were set up as individual games with the aid of pictures in order to assist with the understanding of what was expected of them. For example, for the syllable segmentation the children were told to speak like a tortoise and for the syllable and phoneme identification tasks they treated it like a game of 'hop scotch' (see compact disc, Appendix D). The children were not primed in any way by the research assistant and were not given the correct answer if they were incorrect in their response. All tasks were administered orally and recorded using a Dictaphone and a Marantz recorder. The results were transcribed into an excel document.

According to Moll *et al*. (2014), Phonological Awareness in a consistent orthography should be an easy task. In order to control for ceiling effects, they chose to time tasks as the best measure of Phonological Awareness in transparent orthographies. For this study it was decided however to do a range of tasks, varying in linguistic difficulty as well as using pseudowords to control for this.

3.8.1 Differences in isiXhosa and Setswana Phonological Awareness Tasks

Both the isiXhosa and the Setswana Phonological Awareness tasks used pseudowords and tested both Syllable and Phoneme Awareness. The isiXhosa task was developed first. The Setswana stimuli were then adapted from the isiXhosa stimuli to fit the Setswana phonological inventory. This made the test comparable but linguistic specificities of Setswana were taken into account. For example there are no clicks in Setswana so pseudowords which contained clicks needed to be replaced with others suitable for Setswana. See below the table which illustrates which sounds were adapted from isiXhosa to Setswana. Most of the stimuli were kept the same so that the task was of equal linguistic and task difficulty for both languages.

Table 10: Illustration of the sounds which were changed from isiXhosa to Setswana for the PA

Xhosa sounds (Not found in Setswana)	**Setswana sounds (not found in Xhosa)**
/hl, dl, rh, v, z, c, x, q, gc, gx, gq, c^h, x^h, q^h, ty, dy, kr/	/tl, tl^h, ts, ts^h, kg, p^h, t^h,k^h/
How stimuli (pseudowords) were adapted from isiXhosa to Setswana: • Turned all clicks into aspirated stops, e.g. k^h, t^h etc. • Devoiced fricatives • Replaced laterals with fricatives • Replaced palatals with alveolar fricatives. **<u>The following sounds were changed from isiXhosa into Setswana: (isiXhosa → Setswana)</u>** /hl → ts, dl → tlh, rh → kg, bh → r, d → tl, v & z → f & s, ty → tsh or ts, k → kg, c → p^h, q → t^h /	

3.8.2 Data Coding: Phonological Awareness

For the Phonological Awareness tasks, each task was coded separately on a different ordinal scale. Phonemes and syllables were also done separately and each scale customised to fit the types of errors which occurred. See below a table (Table 11) with a summary of the scales used for both phonemes and syllables. A three-point ordinal scale was used for the scoring of phonemes and syllables. A score of 2 was given for the correct answer, a score of one for a partially correct answer, and a score of 0 for incorrect answers.

Table 11: Example of the PA coding: Syllables and Phonemes

SYLLABLES		
Segmenting	Identification	Deletion
2 Correct	2 Correct	2 Correct
1 Correct segmenting: incorrect sound used e.g. le-tso-za for le-tse-za	1 Identified correct syllable but at a larger grain size, e.g. said tuka – should have said ka	1 Deleted correct syllable but also deleted more than necessary e.g. bhubeka, said bhu instead of bhuka when asked to delete 'be'
0 Incorrect	0 Incorrect	0 Incorrect

PHONEMES		
Segmenting	Identification	Deletion
2 Correct	2 Correct	2 Correct
1 Combination of phonemes and Orthographic/Spelling, e.g. Said: s-a-k-g-e-s-a, should be s-a-kg-e-s-a. OR Mixture of phoneme and syllables e.g. f-u-l-u-tsa	1 Said correct phoneme but as a syllable e.g. answer should've been 's' but child said 'su"	1 Deleted correct phoneme but as a syllable e.g. Rhubekga should've been 'ubekga', child said 'bekga'.
0 Incorrect	0 Incorrect	0 Incorrect

3.9 Morphological Awareness Task

As with Phonological Awareness, different methods are employed to assess Morphological Awareness which differs across several dimensions (Apel *et al.* 2013, Kirby *et al.* 2012) Morphological Awareness tasks can include a) judgement, b) production and/or c) decomposition measures and are found in oral, written, or combined oral and written form.

3.9.1 Types of MA tasks

In a judgement task, the participant does not manipulate the structure of a word by applying morphological rules, but instead makes a semantic decision regarding the morphology of a word,

for example, ‘Does corn come from corner?’ (Berninger *et al.* 2010, Ku & Anderson 2003, Nagy *et al.* 2006). A production task requires the participant to produce words by applying morphological rules to words, for example, ‘Farm. He was a hardworking ___’, correct response being ‘farmer’ (Apel & Lawrence 2011, Casalis & Cole 2009, McCutchen *et al*. 2008, Wolter, Wood, & D’zatko 2009). In contrast to the production task, a decomposition task requires participants to identify the correct root of a given derivation or inflection, for example, ‘Dancer. How well can she __?’ with the correct response being ‘dance’ (Carlisle 2000.).

In the literacy studies there is a wide diversity in the tasks used to measure Morphological Awareness. There is no consistent measure with each task tapping into different aspects of Morphological Awareness. Therefore, for this present study, it was decided to incorporate all measures of Morphological Awareness with both production and decomposition as well as derivational and inflection morphology included in the designing of the Morphological Awareness tasks.

3.9.2 Description of MA tasks for this study

The Morphological Awareness task for this study consisted of four separate tasks (see compact disc, Appendix E). They were 1) an oral manipulation of singular and plural morphology task, more commonly known in the literature as the “wugs” test, 2) a word/sentence building task, 3) a morpheme identification task and lastly, 4) a written morphological analogy and production task. Each task will be discussed in turn below with reference to literature upon which each task was based. The Morphological Awareness Task encountered translating issues for the Setswana test since the original pedagogical theme was lost with translation. For the results section of this study only the results for the ‘wugs’ and morpheme identification are reported. Time constraints at the English LoLT school of the isiXhosa leaners (Group E.EC) meant that the testing of the remaining Morphological Awareness Task (Task 2) could not be completed.

3.8.2.1 Task 1: Oral manipulation of singular and plural morphology task

This task is an adaptation of the traditional Test of Inflectional Awareness (‘Wugs Test’) (Berko 1958, Carlisle 2000) which requires learners to perform inflections on pseudowords. It is a production morphological task which aims to test children’s’ inflectional Morphological Awareness, specifically their understanding of the noun classes in the language being tested. This test is ideal for the Southern-Bantu Languages where inflections of the morphemes for plural and singular appear as prefixes. Pseudowords rather than real words were used in order to avoid the

potential effects of intervening lexical-semantic variables which can arise when using real words (Berko 1958). Before testing, children were given an example to ensure understanding of the task. Participants were given an example pseudoword accompanying a picture of a 'creature-like' character and asked to perform inflections going from either singular to plural or from plural to singular. This was an oral task with responses being recorded on a Dictaphone and transcribed by the research assistant.

The tables below (Table 12) provide an example of the format of the 'wugs' test in both Setswana and isiXhosa. The left-hand column, labelled 'presented with,' shows the stimuli presented to the participants, along with an accompanying picture (see Figure 4 below). The participants were either asked to go from singular to plural or plural to singular. The middle column, 'expected answer,' is the correct answer, depending on the direction (singular to plural or plural to singular). The direction of this manipulation is shown in the right-hand column, along with the respective noun classes with which the manipulation takes place. For the first example the participant was presented with a pseudoword containing the singular morpheme /le/ which is found in noun class five. In order to make this word plural, the participant would need to replace the noun class morpheme /le/ with the plural noun class /ma/ from noun class six.

Figure 4. Example of isiXhosa 'wugs': Isipuka (sg) → Izipuka (pl).

Table 12: Example of stimuli from the isiXhosa and Setswana 'wugs' MA measure

Presented with	Expected answer	**ISIXHOSA**
isipuka →	**izi**puka	Sg→pl 7→8
abaZonko →	**um**Zonko	Pl→sg 2→1

Presented with	Expected answer	**SETSWANA**
Lemparu →	Maparu	Sg → pl NC5 →NC6
Mora →	Mera	Sg → pl NC3 → NC4

3.9.2.1.1 Data Coding 'Wugs'

The 'wugs' task consisted of ten questions and required the children to convert from plural to singular or singular to plural. In order to do this, children needed to be aware of the Setswana/isiXhosa noun classes as well as the difference between singular and plural morphemes which attached to words. All words were pseudowords which were ideal as they ensured that the task tested the child's ability to attach the correct morphemes (noun classes specifically) to words. For each answer there were two criteria according to which the learners were assessed, 1) faithfulness to noun class (whether they used the correct noun class) and 2) singular to plural/plural to singular (whether they were able to go from singular to plural/plural to singular). Under each of these, the learners received a score of 1 if correctly identified and 0 if incorrect. An example is presented in the Table 13.

The top row indicates the number and correct response, the second row shows the criteria against which participants responses were recorded. The row below that, MP29 presents an example from the data set, showing the participants' responses. Below the participant responses are the scores, either 0 or 1 which this participant received.

Table 13: Example of the coding for the 'wugs' MA task (Setswana)

Wugs: MP	No.2	Le-->Ma (5-6)	No.7	Se-->Di (7-8)
Participation code	Faithfulness to NC	Sg --> Plural	Faithfulness to NC	Plural <--> Sing
MP29	Ma	Plural	Di	Singular
	1	1	1	1
MP34	Ba	Plural	Di	Singular
	0	1	1	1

3.8.2.2 Task 2: Morpheme Identification Task

The morpheme identification task designed for this study differs to those in the literature on Morphological Awareness. Those in the literature test the ability to distinguish different meanings across homophones (McBride-Chang 2005, 2003). This task views Morphological Awareness as involving an understanding that different meanings can be attributable to phonologically identical words (McBride-Chang 2005, 2003). Therefore, what is referred to as morpheme identification in the literature appears to be more phonological. However, for this study, the Morphological Awareness tasks were designed to tap only into morphology, excluding Phonological Awareness. The idea of morpheme identification was therefore taken from the literature but from a different angle and design.

The morpheme identification task consisted of two parts; the first required the children to identify the parts of sentences which meant negative. The second part asked them to identify past tense morphemes. It was chosen to look specifically at negation and past tense morphemes as it was found that these contained a range of allomorphs, for example negation in the passive form, negation in the past tense etc. This was a written task and the participants were asked to highlight the morphemes which correspond to negative/past tense in each of the respective languages. The children were given examples with different versions of the morphemes under investigation to avoid them replicating the example to every sentence. Morpheme identification is a decomposition task and tested both derivational and inflectional morphology. Real sentences were used, with morphemes at different positions in the sentences.

The tables below provide an example of the type of stimuli used in the identification task: identification of the past tense, and negation. The second column presents an example sentence for each of these, along with the correct morpheme underlined.

Table 14: Example from the Setswana and IsiXhosa Identification MA task

Task	Morpheme tested	Stimuli presented with underlined correct morpheme	English Translation
Task 1	Past Tense	Mosetsana o bin**ile** bontle	The girl sang beautifully
Task 2	Negation	**Ga** ke a ya sekolong	I could not go to the school

(Setswana)

Task 1	Negation	**A**sitheti	We aren't speaking
Task 2	Past Tense	Umama akaphek**anga**	Mother didn't bake

(isiXhosa)

The identification task works well for isiXhosa due to the conjunctive writing system. However in Setswana it is less successful because the morphemes stand on their own and so are easily identifiable; the writing system marks the morphology. Furthermore, they are always at the beginning of a sentence. In isiXhosa prefixes, suffixes or both, indicate negation making it a more complicated task. This may affect the findings. Comparing the two would thus be inappropriate.

3.8.2.2.1 Identification Data Coding

The identification task was scored on a three-point ordinal scale. The learners received a score of 2 if they identified at least one correct morpheme. A score of 1 was given when the learners highlighted the orthographic word where the morpheme rests, for example the entire verb. Thus for the sentence, 'Umama akaphekanga' the child highlighted 'phekanga,' rather than 'anga.' A score of 0 was given when the child completely failed to identify the correct morpheme. Using the same example the child may have highlighted 'umama,' or 'aka.'

It is expected that the Setswana learners will have a higher Morphological Awareness score for this task, in particular for the negation task, as negation morphemes in Setswana are discrete orthographic words and thus easily identifiable. The score for the Setswana negation task is binary, with the child receiving a 2 if he/she has correctly identified the negative morpheme and a score of 0 if not. There is no intermediate level because the negation morpheme is discrete.

The table below (Table 15) provides an example from the data set of the types of responses given by participants as well as the score for each type of response on the scale outlined in the section above.

Table 15: Example of the coding for the Identification MA task (Setswana)

Identification: Task 1 (Past Tense)	**1. itse**	**2. ile**	**3. e**	**4. ere**
MP08 responses	ela	ile	ame	lai
	0	1	1	0
MP21 responses	ela	ile	me	ere
	2	2	1	2
Identification: Task 2 (Negation)	**Ga**	**Se**	**sa**	**ga**
MP08 responses	ga	o	o	ga
	2	0	0	2
MP21responses	ga	o	rethabile	mohau
	2	0	0	0

3.8.2.3 Task 3: Word/sentence building task

This was a morphological production task which required the children to build words or sentences using morphemes, similar to that employed by Ortner (2013), the first of which was an adaption of the Morpheme Building and Attentiveness Test, developed and used by McBride *et al*. (2005). It comprised nouns, verbs, noun classes and subject/object agreement morphemes, prefixes (reflexive, present tense, progressive, negation etc.) and suffixes (verb final vowel, causative, applicative, passive, perfective etc.). This task was either derivational or inflectional depending on the word/sentence which the child built. Real suffixes, prefixes and roots were laid out on a table for the participants to use in building words and/or sentences. The suffixes, prefixes and roots were all on different coloured paper to order to help the learners distinguish them from one another, although they were not explicitly told what each colour represented. Three of each of the prefixes and suffixes were printed in order to not limit the participant from only being able to build one word/sentence with that specific morpheme. The writing system has an influence on this task (see coding limitations, section 3.10.1).

Below is an example of words built by the participants:

25) Bon-a – ‘see’
SEE-present

26) Di-jo – ‘food’
NC9-FOOD

27) Tshamek-ile – ‘played’
PLAY-past

(Setswana)

3.8.2.3.1 Data Coding Word-Building

For the word-building task, one cannot count the number of words built since there is no solid definition of what a word is in the Southern-Bantu languages. Thus it makes more sense to count the number of morphemes used. The attempts/outputs were totalled in the first column where each item built was counted as one attempt, whether it was a word or a sentence. The incorrect items built were then totalled in a second column. Finally, the number of morphemes in each correct attempt was calculated.

Below is an example of the coding system used for the word-building task:

Participant code	Total attempts/outputs	Incorrect	Correct	No. of morphemes in correct attempts

3.8.2.4 Task 4: Written morphological analogy and production

Analogy tasks outlined in the literature which have been used to assess morphological skills, are typically presented orally and students are asked to complete either word analogies, for example, ‘anger: angry, strength: _____,’ (e.g. Nunes, Bryant & Bindman 1997, Kirby *et al*. 2012; Roman, Kirby, Parrila, WadeWoolley, & Deacon 2009), or sentence analogies, ‘Peter plays at school: Peter played at school, Peter works at home: _____’ (Bryant *et al.* 1997, Deacon & Kirby 2004) Analogy tasks have alternatively been referred to as ‘morphological structure awareness tests’ in the literature (Carlisle 2000).

The task created for this study was a sentence analogy task which was both a decomposition and a production task which tested children’s knowledge of derivational morphology. The task used

morphemes for negation, passives, tense, copulatives, adjectives, adverbs as well as opposites. The children were given examples which contained different morphemes so as to not prime them towards thinking that the words were all negative or past tense etc. This task was done orally and recorded with a Dictaphone.

An example is provided in the tables below for both isiXhosa and Setswana. The left-hand column presents an example which was given to participants in order to explain how the task worked. The middle column presents an example of the actual stimuli presented to the participants, with the right-hand column indicating the correct response to the stimuli.

Table 16: Example from the isiXhosa and Setswana Analogy MA Task

Example given	Presented with	Correct response
Ndisabaleka → Andisabaleka	Sisatheta	Asisatheti
I am walking → I am no longer walking	We are still speaking	We are no longer speaking

(isiXhosa)

Example given	Presented with	Correct response
Go tla → Go tlisa	Go reka	Go rekisa
To come → to bring	To buy	To sell

(Setswana)

The analogy task when translated into Setswana no longer functioned as a strict Morphological Awareness test. The Setswana analogy task allowed for semantic ambiguity. Furthermore, there were cases of syntactic manipulation rather than morphological changes, such as change in word order.

3.8.2.4.1 Analogy Data Coding

A 3-point ordinal scale was used for the coding of the analogy task. Learners were given a score of 2 if they were correct and a score of 0 if incorrect. A score of 1 was given when the child did not use the exact wording as seen on the memo, but said the same thing in a different way. Later the score of 1 was excluded as it shows that the learner has misunderstood the task, not answering the question through morphological manipulation but rather through a semantic decision which is not what this task is designed to test. By creating the intermediate level, the task would not be measuring Morphological Awareness. Therefore, the final score for the analogy task is binary, either correct or incorrect. These results are not discussed in the data analysis.

Table 17: Example of the Analogy coding (Setswana)

MA: Analogy	Q1		Q3	
Participant code	Go apola diaparo → à Go apara diaparo… Go bula → Go tswala		Go lwa à → Motlhabani … Go tsomo à → Motsomi	
MP14	Go tswala	**2**	Motlhabani	**0**
MP33	Go tswala	**2**	Ga o tsome	**0**

3.9.3 Differences between isiXhosa and Setswana Morphological Awareness Tasks

For the Oral manipulation of singular and plural morphology tasks (wugs), the isiXhosa pseudowords were adapted to fit the Setswana languages. Specifically, all the noun classes were changed to Setswana noun class prefixes. A balance between the number of singular to plural and plural to singular was also done as in the setting up of the isiXhosa task, there was a preference converting plural to singular with only 2 of the stimuli requiring the learners to go from singular to plural.

For the Identification task, the isiXhosa tests were not adapted for Setswana. Rather, new sentences were created using Setswana negation and past-tense morphemes. However, sentence length was controlled so as to keep the task difficulty similar for both languages. The identification task worked well in Setswana as the morphemes are more obvious than in isiXhosa. In Setswana the morphemes are written disjunctively and therefore easily identified by the learners, whereas this task seemed to create difficulty for the isiXhosa learners who struggled to pick out the morphemes in the conjunctively written sentences.

The written morphological analogy and production and the word/sentence building task used the same stimuli as the isiXhosa tasks. It was however found that the written analogy and production task was not suitable for Setswana. One cannot simply translate from isiXhosa to Setswana for such a morphological task. It appears that in Setswana the change is more syntactic than morphological. Such a task therefore tests different linguistic aspects in the two languages. For the word/sentence building task the same English words (nouns and verbs) were used for isiXhosa and Setswana as well as types of prefixes and suffixes.

3.10 Oral and Silent Reading Tasks and Comprehension

Oral reading fluency is measured in different ways, the most common being by timing a student reading one or more passages for one minute and subtracting the errors in order to calculate the number of words read correctly (Hasbrouck & Tindal 2006). Other ways include using reading passages which are taken from the reading curriculum used in the students' classrooms (Fuchs & Deno 1991) or using standardized passages which resemble grade-level readers (Good & Kaminski 2002). Reading measures are most commonly done in English. There is however no standardised reading measures in Southern-Bantu languages. An independent reading measure was therefore created specifically for this study with a set of comprehension questions. Oral reading tasks are common in the literature; however, less attention has been given to silent-reading fluency. According to Kim, Wagner & Foster (2011) silent reading is a primary mode of reading for proficient readers and it has been found that readers typically read faster in silent reading measures than in oral reading measures.

The Independent Reading Measure thus consisted of both an Oral and a Silent Reading Task (see compact disc, Appendix F). As with the other tasks, the reading measures were done only in learners' first-language. The stories chosen were fiction. The original title of the story used for the isiXhosa oral reading task was, 'Imokoro yemiLingo' (Hartmann, n.d.), but was changed to 'uSikihitshana somLingo' meaning 'the small magic boat'. The name of the river used in the story was also changed to the name of a local river so that it would be more applicable to the context with which the participants were familiar. The title of the isiXhosa silent reading passage was 'Linkonde ziyankqonkqoza' (Bester, n.d.) 'The old men who went knocking'. Both reading passages came from the Sunday Times reading supplement as part of the 'Nalibali reading campaign'. The Setswana stories 'Dinaka Fela,' (ORF) (Dada *et al*. 2004), meaning, 'horns only,' and 'O tla go nna' (SRF) (Oosthuizen 2007), which is 'coming to me/she is coming to me, were obtained from the Rhodes University Education Department's Resource centre.

IsiXhosa Oral Reading (extract)

uSikihitshana somLingo

Kudaladala, kwaye kukho ixhegwazana elisisilumko nelinobubele kakhulu. Lalihlala kwisiqithi esasiphakathi kulambokazi iNciba.

IsiXhosa Silent Reading (extract)

Linkonde ziyankqonkqoza

Kwakusekusasa kakhulu kwaye kusemnyama. Kuthe gqi izithunzi ezithathu zithe chu kancinane, zithoba indlela, zisingise elalini.

Setswana Oral Reading (extract)

Dinaka Fela *Pitse ya naga le Kgabo e ne e le ditsala tota. Ba ne ba ja mmogo. Ba opela mmogo. Go fetisa tsotlhe, ba ne ba rata go bina mmogo. Letsatsi lengwe ba bona diphologolo dingwe di ya moletlong.*

Setswana Silent Reading (extract)

O tla go nna *Mme le Rre ba tlhokafetse jaanong ke tshwanetse go tla go dula le Nkoko. Ke hutsafetse, le nkoko fela jalo. Re atlerelana thata, ke ikutlwa ke le botokanyana – go batlile go tshwana le pele AIDS e tsaya mme le rre.*

For both the Oral Reading Fluency (ORF) and the Silent Reading Fluency tasks the children were given one minute to read, and were asked to read from the title of the story. The ORF was recorded as the children read the passage aloud. The measurement of silent-reading fluency presents obvious challenges because silent reading is not an observable behaviour, thus for the silent-reading task, the children were asked to use their fingers when reading so as to keep track of where they were in the passage. Once the minute was up, the children were asked comprehension questions based on each line which they had read. There were five questions in total.

3.10.1 Data Coding Reading and Comprehension

For the coding of the Oral and Silent reading fluency tasks, the number of characters read accurately during the one-minute interval were calculated. This was done by subtracting the errors from the total number of characters read in a minute to get a score of characters read per minute (CRPM). The recordings were re-listened to, using a stopwatch to ensure that the child had read for exactly one minute. A mark was then made on their participant sheet after one minute. The number of characters to the minute mark was counted and the data was entered into an excel spreadsheet. The number of characters attempted was counted as well as the number of errors (mispronunciations, incorrect word used, skipped words, hesitations longer than 3 seconds etc.). From this the accuracy and fluency rates were calculated.

For the Silent Reading Task, the children were asked to use their fingers when reading so as to follow their progress. Once one minute was up, the child was asked to indicate the last word they had read. This was marked on the participation sheet with a line and the number of characters read to this point was recorded as the rate attempted. Due to the nature of this task, one cannot control for number of characters actually read.

For the scoring of the comprehension, the learners were asked a series of questions based on question per sentence read. In other words, if a child was able to read only the first sentence, he/she would be able to answer only the first comprehension question. Thus the score implicitly included speed. Answers were either received a score of 0 if incorrect, or a score of 1 if correct. Due to the timed nature of the task, however, learners were limited as to how far they could read, which negatively affected the outcome of their comprehension. Thus a second comprehension score was formulated (adjusted comprehension score) by removing this confounding variable of speed. The adjusted comprehension score measured comprehension as a ratio of how far they progressed in the reading passage. This score was calculated by taking the learners' raw comprehension score over their accurate[7] characters read per minute and multiplying this score by 100. [(raw comprehension/characters read per minute)*100]. It is thus a more accurate representation of their comprehension compared to their overall comprehension score. Both comprehension scores were calculated as raw scores.

3.11 Limitations of Methodology

I am not a first-language speaker of isiXhosa or of Setswana. Data collection was thus dependent on the use of research assistants whose first-language was isiXhosa or Setswana. These research assistants were trained to carry out the testing of the linguistic tasks. The quality of the research may therefore be an artefact of the quality of the testing done by the research assistants, such as prompting learners or not allowing them to get the answer incorrect. However, every effort was made to ensure that testing took place under the same conditions at each school.

Another note-worthy limitation is the environments in which data collection was conducted. In all four schools a room in which to conduct testing was allocated. Noise levels around and the acoustics in the room affected the quality of recordings as well as learners' attention span. However, a Marantz recorder was used for better quality of sound from the recordings. The Marantz recorder isolates the sound being recorded, blocking out background noise as best as possible. Working with children this type of limitation was unavoidable.

Furthermore, although all tests for isiXhosa and Setswana were carefully constructed, it is uncertain if their linguistic difficulty levels are similar. These differences have been alluded to throughout the methodology. The isiXhosa tests were constructed first with the Setswana tasks

[7] Number of characters read per minute was calculated as an accuracy score. It thus took into account the number of errors made and subtracted this from their total number of characters read.

being based upon the isiXhosa measures. This was done in order to ensure that all measures were comparable in terms of stimuli used.

Lastly, it was beyond the scope of the current study to assess the quality of children's education in general, and of literacy instruction in particular. Differences in quality of instruction may have influenced relations among literacy skills.

3.11.1 Data coding limitations

A number of factors were taken into consideration when coding the data. Ensuring that both the isiXhosa and the Setswana tasks had the same coding systems was difficult. In other words, the coding system which applied was applicable to both isiXhosa and Setswana. For example, for the word building task, the isiXhosa data had originally been coded according to the number of words built. However, this was problematic when applied to the Setswana word building as the learners were also able to build sentences and not only words. With the distinction of what a word is in the Southern-Bantu languages being blurred, it is difficult to code this task according to number of words built. Instead the number of morphemes used was assessed.

For the coding of the identification task of Morphological Awareness, the intermediate level which received a score of one captures instances in which the learners highlighted the orthographic word where the morpheme rests. This however is not applicable to the negative identification task in Setswana where the morpheme stands on its own as an orthographic word. Thus the scale for this had to be binary, with the learners either correctly or incorrectly identifying the negative morpheme. This may have influenced the outcome of the results. Perhaps testing the negative in a Morphological Awareness task does not accurately act as a measure of Morphological Awareness due to the nature of the disjunctive orthography of Setswana and the fact that the morpheme itself corresponds to the orthographic word.

For the Reading measures, the characters read per minute were calculated rather than the words read per minute, as the concept of what a word is differs from isiXhosa to Setswana. Thus coding it as words read per minute would result in an invalid comparison. The literature has always looked at words read per minute. Thus calculating the reading score as character read per minute makes it difficult for cross linguistic comparisons of studies already found in the literature.

3.11. Strengths of the study

A major outcome of this study is to develop a word recognition model which is suitable for the Southern-Bantu languages. This model will assist in a better understanding of how word recognition and reading works in these languages and could be used to inform teaching practices and development of reading programmes. It will also add to cross-linguistic research on word recognition.

The current research is relevant to the context of South Africa. In addition to this, this study looked not only at one Southern-Bantu language, but two languages, isiXhosa and Setswana. Furthermore, it looked at two different types of schooling environments, 1) where learners learn in their first-language and 2) where learners receive education in English from the onset of schooling. This gives the research depth and different angles to look into. This study is rich with diversity. The research does not focus specifically on one linguistic component of word recognition, but rather chose to look at multiple aspects of word recognition; orthography, metalinguistic skills and language of learning and teaching.

This study also used a number of theoretically relevant metalinguistic tasks which leads to a broader scope. These tasks were specifically designed for this study; thus they are language specific to the languages under investigation. This study developed and makes available a good set of linguistic measures for the Southern-Bantu languages: isiXhosa and Setswana. Furthermore, this study is novel. This type of research has not yet been done in South Africa.

CHAPTER 4: DATA ANALYSIS

The aim of this study is to investigate the effect of Morphological Awareness and Phonological Awareness on reading in conjunctive and disjunctive orthographies. IsiXhosa and Setswana, two Southern-Bantu languages differing in their writing systems, were chosen as the languages for comparison. In addition to this, the study set out to determine the relationship between L1-aligned LoLT and non-aligned L2 LoLT and their relevant contributions to reading strategies. In answering these two questions the goal was to determine how metalinguistic skills, LoLT and orthography interact in reading strategies. The intention was to establish a model of word recognition suited to orthographic words in the Southern-Bantu languages. This study focused specifically on the role of the syllable and morpheme as grain sizes in isiXhosa and Setswana.

As mentioned previously, there are two major goals of this study; firstly to investigate the effect of Morphological and Phonemic grain sizes on reading in conjunctive and disjunctive orthographies respectively and secondly to determine the relationship between L1 and LoLT and their relevant contributions to word recognition strategies, thus introducing L2 transfer into the study. These two major goals can be divided according to the following five research questions:

1. What is the relevant contribution of Phonological Awareness and Morphological Awareness in determining grain size when reading sentences in isiXhosa and Setswana respectively?
2. (a). What effect do the disjunctivism and conjunctivism of an orthography have on word recognition strategies?
(b). How do the types of grain sizes differ between children learning in a conjunctive orthography and those learning in a disjunctive orthography?
3. When children approach word recognition tasks, are the grain sizes used in recognition strategies determined by their L1 when it is aligned with their LoLT or by their L2 LoLT?
4. How do the three themes (metalinguistic skills, orthography and language of learning and teaching) interact with each other in word recognition?
5. What models of word recognition are best suited to orthographic words in the Southern-Bantu languages?

The data analysis will address each research question in succession. This chapter is therefore divided into four sections. Section one presents the literacy processing grain size unit/s in isiXhosa and Setswana; section two presents the effect of orthography; section three presents the

effect of LoLT on grain size unit and section four synthesizes the findings of the three sections in a proposed model of word recognition for the Southern-Bantu languages.

In order to answer research question one pertaining to the relative contribution of PA and MA in determining grain sizes when reading sentences in isiXhosa and Setswana, univariate statistics were conducted on the tasks undertaken by the learners. This was followed by sets of linear correlations between PA and MA. Furthermore the d-prime statistic method was run on the results of the open-ended decomposition task to test for grain size. Statistical differences between variables were tested using t-tests. In addition to this a multiple regression was conducted to establish the relationship between Syllable Awareness (dependent variable), Phoneme Awareness (dependent variable), and MA to Comprehension (independent variable).

For question two, which investigated the effect of orthography, comparisons between isiXhosa and Setswana univariate statistics for PA and MA as well as comprehension were done, with statistical differences calculated using a two-sample t-test. Furthermore, comparisons between the results for the open-ended decomposition task were conducted using d-prime.

The third question was addressed by analysing and comparing the results between schools for each language, those who received schooling in their L1 compared with those who received schooling in English. Again univariate statistics were run, along with linear correlations in order to determine the effect of LoLT on reading strategies. A multiple regression was also conducted to establish the relationship between Syllable Awareness (dependent variable), Phoneme Awareness (dependent variable), and MA to Comprehension (independent variable) for each school.

Research questions four and five were answered though a qualitative approach, drawing on the findings from the previous three research questions in order to establish the interaction between the themes (metalinguistic skills, orthography and language of learning and teaching) in word recognition and how this can be used to develop a model of word recognition best suited to orthographic words in the Southern-Bantu languages.

4.1 SECTION 1. Research Question 1: Grain Size literacy processing units in isiXhosa and Setswana

This section answers the question of the relevant contribution of Phonological Awareness and Morphological Awareness in determining grain size when reading sentences in isiXhosa and Setswana respectively. The results are presented in terms of univariate statistics. This section considers each variable in the data set independently (Phonological Awareness, Morphological Awareness and Comprehension), and investigates the relative importance of each to reading strategies. Conclusions drawn from the findings of the univariate statistics are explored by discussing the results of the decomposition task, using the d-prime statistical method. This section lays the foundations for the discussion on grain sizes used by isiXhosa and Setswana learners in reading strategies.

4.1.1 Relative importance of Phonological Awareness and Morphological Awareness to Reading: Univariate Statistics

Univariate statistics explore each variable in the data set on its own. This section aims to show the relative importance of Phonological Awareness, Morphological Awareness and comprehension in reading strategies. The results of each linguistic task are presented, Phonological Awareness, Morphological Awareness and for comprehension. The results for isiXhosa and Setswana are presented alongside one another for ease of comparison. However, a detailed discussion of the difference between the two is found in section 4.2, which examines the influence of orthography on word recognition strategies.

The Phonological Awareness Task measured both syllable and Phoneme Awareness. Each task was divided into three parts; deletion, identification and segmenting, to test learners' Phonological Awareness ability. The Morphological Awareness task included morpheme identification (both negative and past tense) and the traditional 'wugs' task. Results for both tasks were computed by adding up the total score for each with the total raw score then converted into a percentage.

The table below (Table 18) provides the descriptive statistics for isiXhosa and Setswana. This includes the mean scores, 25^{th} and 75^{th} percentiles and standard deviations for the metalinguistic tasks, oral reading task and comprehension scores for isiXhosa and Setswana. The results for Phonological Awareness and Morphological Awareness cannot be compared directly as they measured different metalinguistic skills and differed in terms of stimuli used and data scoring. Both MA and PA are metalinguistic tasks which are related to reading, but they are different

constructs and required different forms of linguistic tests. A two-sample t-test was conducted between the languages. The p- & t- scores are presented in the table. From left to right, the results for isiXhosa are discussed first, followed by Setswana.

Table 18: Descriptive Statistics, Phonological Awareness and Morphological Awareness, Oral Reading and Comprehension in isiXhosa and Setswana Learners

	isiXhosa (N=41)				**Setswana (N=33)**					
Measure	Mean	25th	75th	SD	Mean	25th	75th	SD	t-score	p-score
Syllable Total	72.40	59.17	86.67	16.30	87.53	83.33	95	10.98	4.56	<0.001**
Phoneme Total	44.39	28.33	61.67	18.99	56.06	40	75.83	19.63	-2.59	<0.05*
MA Total	57.36	48.61	68.75	15.02	43.28	38.75	48.13	8.20	-4.83	<0.001**
Comprehension (incl. reading speed)	18.30	0	40	21.19	35.46	20	60	27.35	3.60	<0.001**
Adjusted Comprehension (excl. Reading speed) [(comp/crpm)*100]	0.72	0	1.02	1	1.24	0.48	1.85	1.00	3.06	<0.05*
Characters Read Per minute (CRPM)	124.87	42	184	90.83	163.46	79.25	239.25	92.70	-2.20	<0.05*

4.1.2. IsiXhosa Results

The scatterplot in Figure 7 shows the linear correlation between Phonological Awareness and Morphological Awareness, conducted to determine the relationship between the two variables (Howell 1999). A linear correlation assumes that there are at least two variables present of metric scale (interval or ratio) and that the sample size is larger than 20 cases per variable. Secondly, a linear correlation requires the relationship between the independent variable and the dependent variable to be linear. A third assumption is that all variables are multivariate normal. Finally, all variables should have little or no multicollinearity. Multicollinearity refers to the phenomenon where two or more variables are highly correlated with each other, making it harder to determine the role of each since they provide redundant information about the response (Howell 1999).

These assumptions were tested against the data sets under investigation to see whether the data fitted for the use of this statistical measure. Firstly, there were two variables (Phonological Awareness and Morphological Awareness) present for the linear correlation. Furthermore, the

sample size was also larger than 20 cases per variable (isiXhosa, N=41 and Setswana, N=33) and the data used from both variables were scored on a metric scale allowing for accurate comparison, with the measurement scale used being an interval scale. Secondly, a linear relationship was found between the two variables, as evidenced on the scatterplots below (see Figure 7). The third assumption of multivariable normality was multivariate normal. This assumption was checked using a histogram and a best fitted curve as well as the Probability Plot Correlation Coefficient (PPCC), as seen below (See Figures 5 & 6). Finally, there was little multicollinearity as little correlation (correlation coefficients were below 1) between the variables was found.

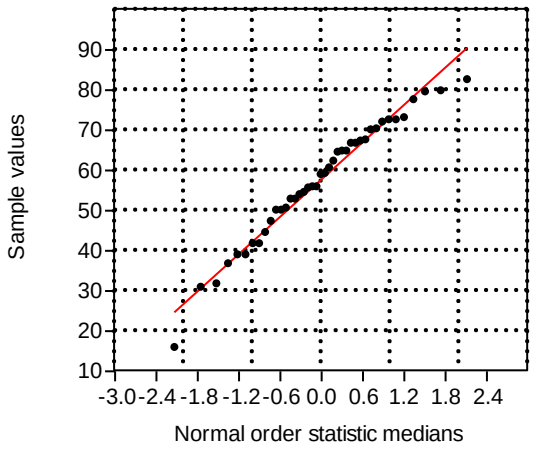


Figure 5. Normal Probability for Morphological Awareness of IsiXhosa learners. PPCC=0.9864

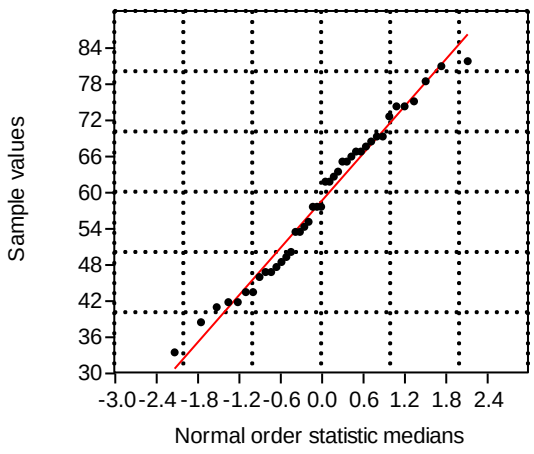


Figure 6. Normal Probability Plot for Phonological Awareness of IsiXhosa learners. PPCC=0.9905

4.1.2.1 Relationship between Phonological Awareness and Morphological Awareness: Linear correlation

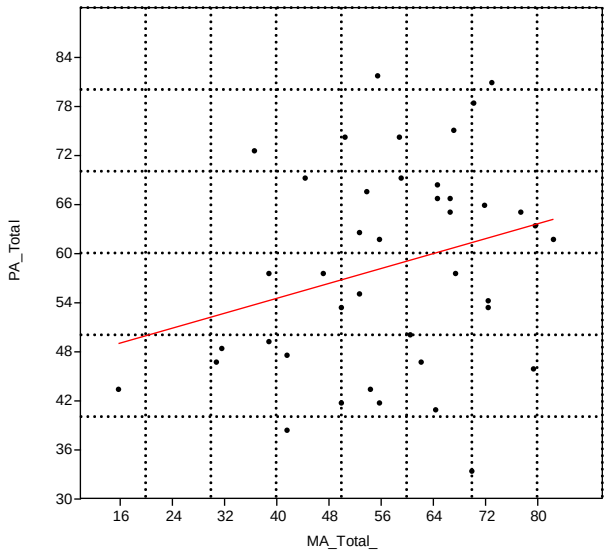


Figure 7. Linear Correlation for isiXhosa Phonological Awareness and Morphological Awareness, r= 0.27, p<0.001

The linear correlation above (Figure 7, r=0.27) shows a weak positive correlation between Phonological Awareness and Morphological Awareness in these isiXhosa learners. This correlation is, however, highly significant, p<0.001. Both the Phonological Awareness and Morphological Awareness Tasks contained oral components resulting in some correlation between the two. Furthermore, Morphological Awareness is at some level the relationship between structure and phonology. Thus some correlation is found between the two, although this is not larger because the two variables are different metalinguistic skills and do not measure the same thing.

4.1.2.2 Relationship of Syllable Awareness and Phoneme Awareness to Morphological Awareness: Linear correlations

A further step which was conducted to determine the extent of the relationship of each construct of Phonological Awareness (Syllable Awareness and Phoneme Awareness) to Morphological Awareness.

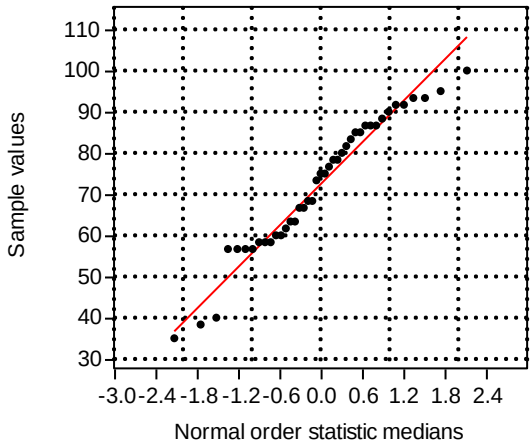


Figure 8. Normality Plot for Syllable Awareness of isiXhosa Learners, PPCC= 0.98

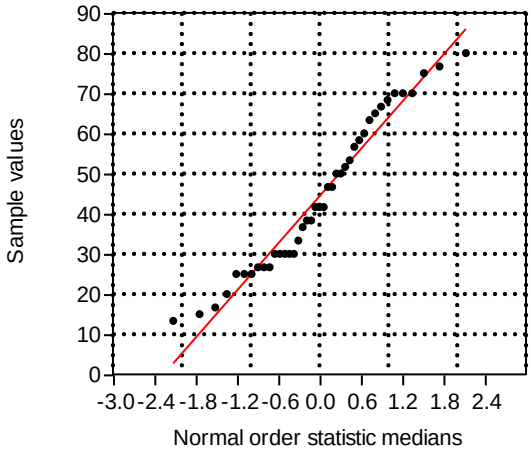


Figure 9. Normality Plot for Phoneme Awareness of isiXhosa Learners, PPCC=0.9809

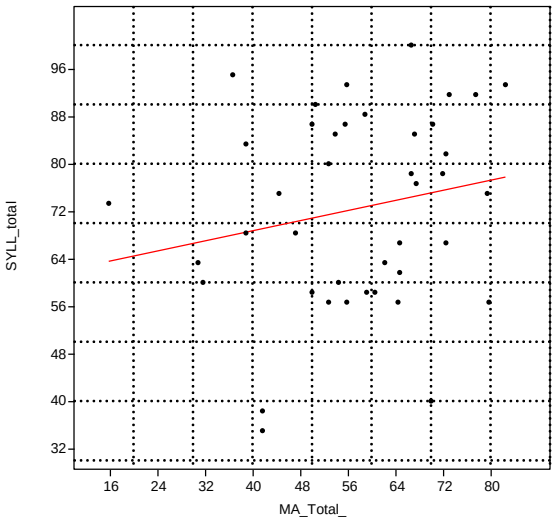


Figure 10. isiXhosa correlation between Morphological Awareness and Syllable Awareness, r=0.2, p= 0.22

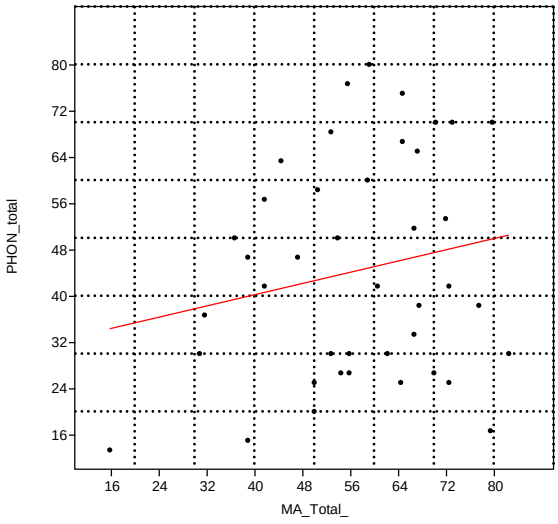


Figure 11. IsiXhosa correlation for Morphological Awareness and Phoneme Awareness, r = 0.19, p= 0.23

4.1.3 Setswana Results

The table with the mean scores and standard deviations for the metalinguistic tasks for isiXhosa and Setswana, is repeated below (Table 19) for ease of reference. The section focuses on the Setswana results, the right side of the table.

Table 19: Phonological Awareness and Morphological Awareness in isiXhosa and Setswana Learners

IsiXhosa (N=41)					**Setswana (N=33)**		
Measure	Mean	SD	t-score	p-score	Mean	SD	Measure
Syllable Total	72.40	16.30	4.56	<0.001	87.53	10.98	Syllable Total
Phoneme Total	44.39	18.99	-2.59	<0.05	56.06	19.63	Phoneme Total
MA Total	57.36	15.02	-4.83	<0.001	43.28	8.20	MA Total

4.1.3.1 Relationship between Phonological Awareness and Morphological Awareness: Linear Correlation

As with the isiXhosa results, a linear correlation was conducted using the total Phonological Awareness score and the Morphological Awareness score of all learners to test whether these two types of metalinguistic skills are related amongst Setswana learners. This type of statistical measure was suitable in that the data fitted all statistical assumptions. The data for Phonological Awareness and Morphological Awareness for the Setswana learners was normally distributed as seen in the Normality Plot's below (Figure 12 &1 3). A relatively weak positive correlation (r=0.24) was found amongst these two skill sets in Setswana learners. This correlation was found to be statistically significant, p<0.05. This shows that Morphological Awareness and Phonological Awareness are significantly related to one another in Setswana learners, but this relationship is a relatively weak one.

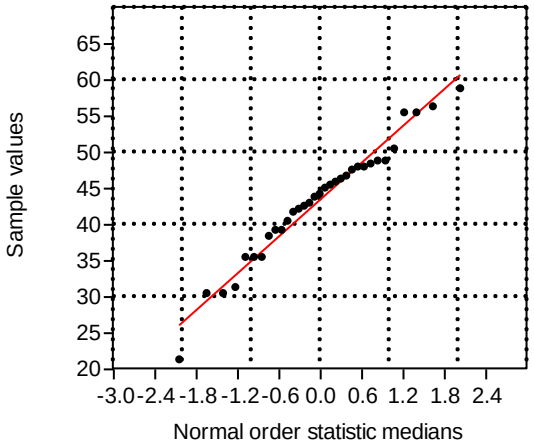


Figure 12. Normality Plot for Morphological Awareness of Setswana learners, PPCC = 0.9839

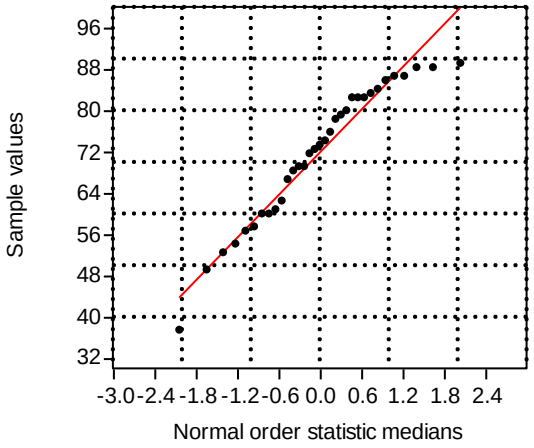


Figure 13. Normality Plot for Phonological Awareness of Setswana learners, PPCC = 0.9734

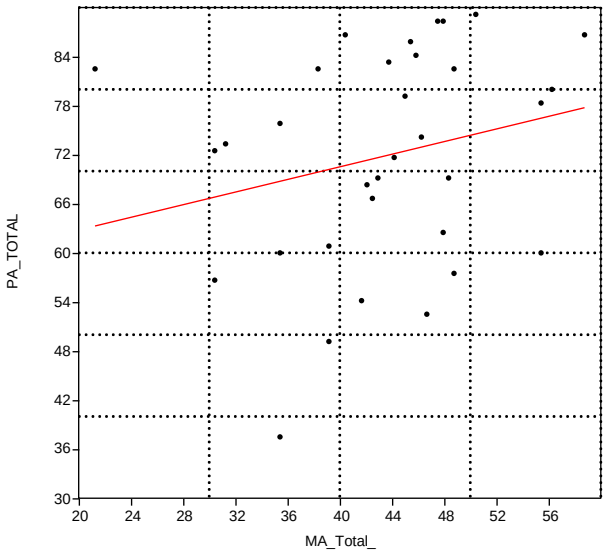


Figure 14. Setswana linear correlation Phonological Awareness and Morphological Awareness, r=0.24, p= 0.04

4.1.3.2 Relationship of Syllable Awareness and Phoneme Awareness to Morphological Awareness: Linear Correlations

The scatterplots below show the results of the correlations between Morphological Awareness and Syllable and Phoneme Awareness. The data fitted all statistical assumptions necessary for a linear correlation, as mentioned in the above Section 4.1.3.1.

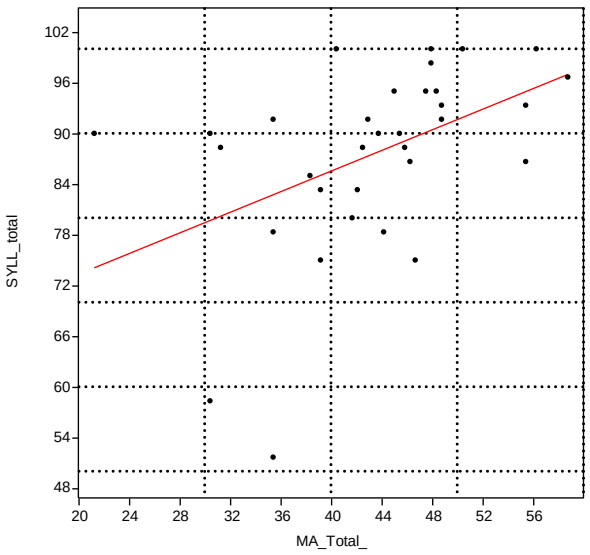


Figure 15. Setswana Correlation between Morphological Awareness and Syllable Awareness, r = 0.46, p<0.05

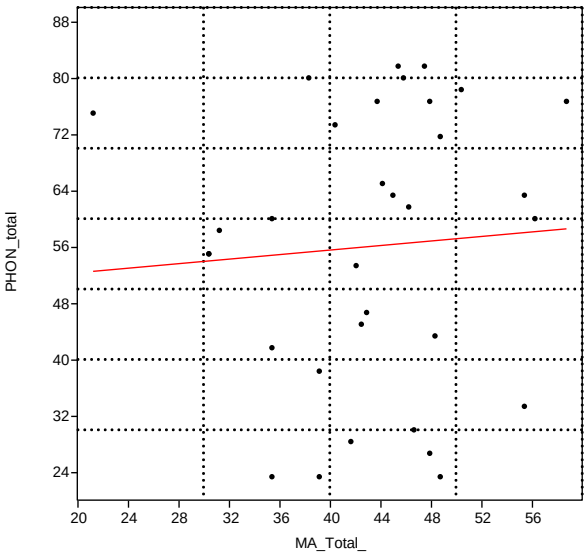


Figure 16. Setswana Correlation between Morphological Awareness and Phoneme Awareness, r = 0.07, p= 0.70.

The correlations above show that only the Syllable Awareness part of phonological awareness correlates to Morphological Awareness for Setswana learners. Phoneme Awareness does not correlate to Morphological Awareness. This could be attributed to task effects, raising the questions of the manner in which the Morphological Awareness Task was conducted, specifically relating to the use of a CV structure of morphemes, thus leading to a correlation between syllables and morphemes. Thus it appears that good Syllable Awareness correlates to good Morphological Awareness. A possible reason for this could be the disjunctive orthography of Setswana Furthermore, in some instances the CV structure of morphemes corresponds to the syllable (particularly in the prefix domain), which creates an unconscious connection between Syllable Awareness and Morpheme Awareness.

4.1.4 Comprehension as it relates to the metalinguistic skills: isiXhosa and Setswana

Reading is the process of understanding speech written down, with the ultimate goal being access to meaning. Hence, it is important to ask whether learners' Syllable Awareness and/or their Morpheme Awareness relates to their comprehension. A multiple regression was conducted to establish the relationship between Syllable Awareness, Phoneme Awareness, and Morphological

Awareness to Comprehension. Comprehension is the independent/criterion variable, with MA and PA as independent/predictor variables.

Two comprehension scores were calculated, due to the nature of the task and the way in which the data was coded. As described in the Methodology chapter, learners were asked to read from a text for one minute. They were then asked a series of comprehension questions. The questions were formulated with one question per sentence read. In other words, if a child was only able to read the first sentence, he/she would only be able to answer the first comprehension question. Thus the comprehension score implicitly included speed. Due to the timed nature of the task, however, learners were limited as to how far they could read, which negatively affected the outcome of their comprehension score. A second comprehension score was formulated by removing this confounding variable of speed. The adjusted comprehension score measured comprehension as a ratio of how far they reached in the reading passage. This score was calculated by taking the learners raw comprehension score over their [8]accurate characters read per minute and multiplying this by 100, [(raw comprehension/character-read-per-minute)*100]. This yielded more accurate representation of their comprehension (understanding of the text) as opposed to their overall comprehension score (reading speed). According to this original score, if they read more, they would comprehend more.

The table below (Table 20) presents the results; mean scores and standard deviations, for comprehension for both isiXhosa and Setswana learners.

Table 20: Comprehension in isiXhosa and Setswana learners

	isiXhosa (41)		**Setswana (33)**			
Measures	Mean	SD	Mean	SD	t-value	p-value
Comprehension (incl. reading speed)	18.30	21.19	35.46	27.35	3.60	<0.001
Adjusted Comprehension (excl. Reading speed) [(comp/crpm)*100]	0.72	1	1.24	1.00	3.06	<0.05
CRPM	124.87	90.83	163.46	92.70	-2.20	<0.05

[8] Number of characters read per minute (crpm) was calculated as an accuracy score. It thus took into account the number of errors made and subtracted this from total number of characters read. Algorithm of calculation, [(comprehension/crpm)*100].

4.1.4.1 IsiXhosa

For isiXhosa it was found that only Syllable Awareness was significantly correlated to total comprehension. A linear correlation was conducted in order to determine this correlation, *r*=0.38, *p* (a=1) <0.001. This moderate positive correlation is statistically significant which suggests that Syllable Awareness is related to comprehension when it includes reading speed. This correlation however became insignificant once the factor of speed was removed, thus the adjusted comprehension score was not found to be related to Syllable Awareness, *r*=0.11, p=0.76. This finding suggests that Syllable Awareness aids reading speed, but not necessarily access to meaning. However a linear correlation between Syllable Awareness and a speed matrix (number of characters read per minute) showed that although there is a correlation between the two variables, r=0.311, this correlation is not significant, p=0.37.

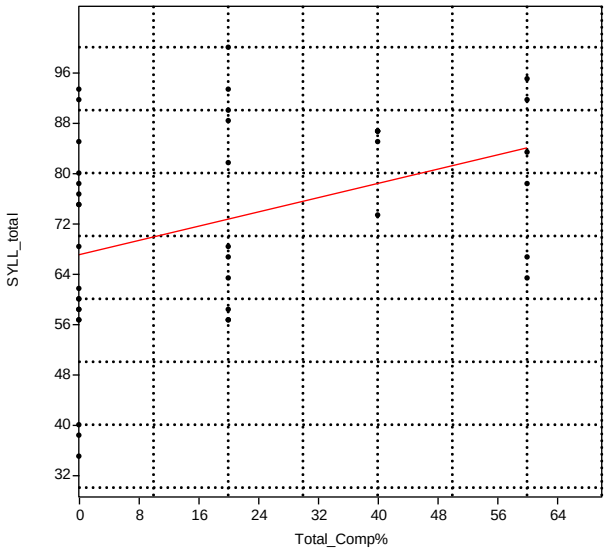


Figure 17. Linear correlation for Total Comprehension and Syllable Awareness for isiXhosa learners, r=0.38, p<0.001.

4.1.4.2 Setswana

For Setswana, it was found that both phoneme and Syllable Awareness were correlated to total comprehension, but not Morphological Awareness. Syllable Awareness was shown to be the most closely correlated with total comprehension, *r*=0.5, *p*<0.05. Again, as with isiXhosa, once the factor of speed is removed from the equation, both phoneme and Syllable Awareness no longer became significant for comprehension, *p* (a=1) = 0.69 & *p*=0.19. This implies that Phonological Awareness is to some extent related to reading speed, but again, not access to meaning. As was

done with isiXhosa, a linear correlation was done to establish the relationship between Syllable Awareness and speed (calculated as characters read per minute) as well as Phoneme Awareness and speed. This revealed that Phoneme Awareness and characters read per minute were moderately correlated, r=0.45, but this was non-significant, p=0.65. In addition, a very weak, non-significant correlation was found for Syllable Awareness and the speed matrix, r=0.03, p=0.66.

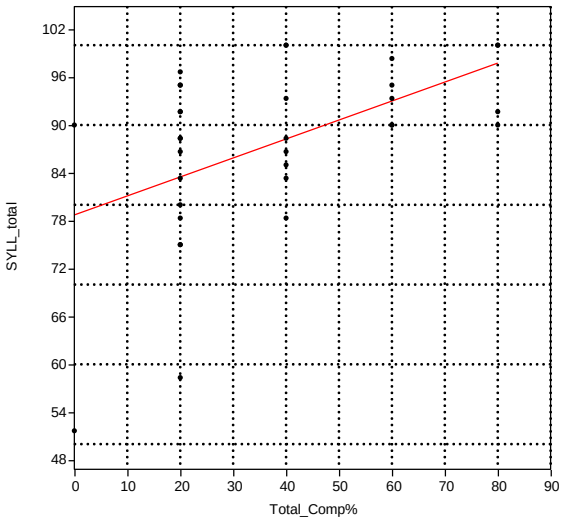


Figure 18. Linear correlation for Total Comprehension and Syllable Awareness for Setswana learners, r=0.38, p<0.001.

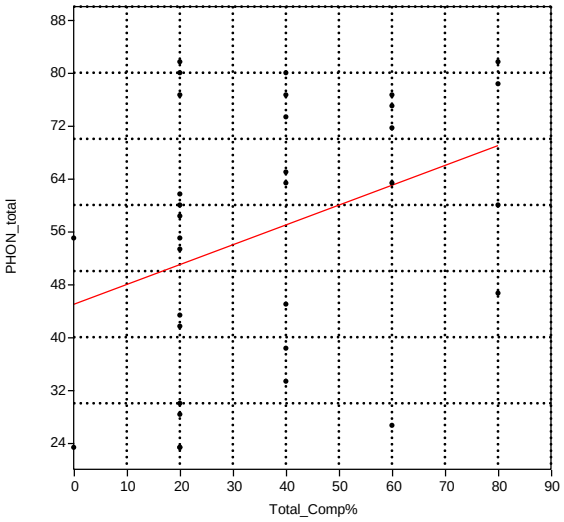


Figure 19. Correlation between Phoneme Awareness and Total Comprehension, r=0.35, p<0.05

4.1.5 Decomposition: Determining grain size unit in isiXhosa and Setswana (D-prime)

This section explores the conclusions from the univariate statistics using the d-prime method based on the results of the decomposition task, where learners were asked to divide a given stimulus sentence into smaller parts as they would do when reading the sentence. For example, the learners were given a sentence and asked to break it up as they would when reading. This is illustrated below.

1) Ke tlhatswitse dijana (Stimuli as presented to participant)
   Ke tlhatsw- itse di- jana (Broken up according to morphemes – 2 boundaries)
   Ke tlha- tswi- tse di- ja- na (Broken up according to syllables – 4 boundaries)

-Setswana

2) Ndixakekile (Stimuli as presented to participant)
Ndi- xakek- ile (Broken up according to morphemes- 2 boundaries)
Ndi- xa- ke- ki- le (Broken up according to syllables- 4 boundaries)

-IsiXhosa

The decomposition task was administered to test the relative grain size unit which learners use when reading. Words in the Southern-Bantu languages are generally long. If a child approached word reading via phoneme-to-grapheme decoding, the cognitive load would be too large, due to the length of the word/sentence. This is equally true for whole-word recognition. The question to be answered is; what unit do they use when breaking up the long words. The role of the syllable and morpheme as literacy processing units was selected. The results were coded according to a model answer of whether they had broken up the sentence according to the morphemes and/or according to syllables. These results were then computed with d-prime. D-prime was used as it uses a filter out effect, penalizing guess work, as well as taking non-decisions and word breaks into account.

D-prime was originally developed within signal detection theory (SDT). It is a measure of sensitivity, computed on a basis of hit and false alarm rates (Kataoka & Johnson 2007). D-prime has been commonly used among recognition memory researchers (Green & Swets 1966). In this theory, sensitivity is believed to detect a signal and model by which a perceiver decides whether the signal is present or not. Formally, the d-prime statistic is a measure of the difference between the means of the signal and the noise distributions, compared to the standard deviation of the noise distributions.

The starting point for signal detection theory is that nearly all decision making takes place in the presence of some uncertainty (Kataoka & Johnson 2007). As seen in the diagram below (Figure 20), there are two factors which influence the decision, namely, the criterion response and internal response. The criterion response is the criteria/bias upon which the learner based his/her decision in choosing whether or not a syllable/morpheme boundary should or should not be marked. The internal response is the learner's own intuition of whether there is a syllable/morpheme boundary which should or shouldn't be present. The learner needs to pick a criterion along an internal response axis when making a decision. When the internal response is greater than the internal criterion the learner marks a syllable/morpheme boundary. For both hits and alarms, the internal response is higher than the criterion response. A 'hit' was when a learner

correctly identified a syllable or morpheme boundary where there is one present. A 'false alarm' was when a learner incorrectly identified a syllable or morpheme boundary where there was not one. This is shown in the Figure 20 below.

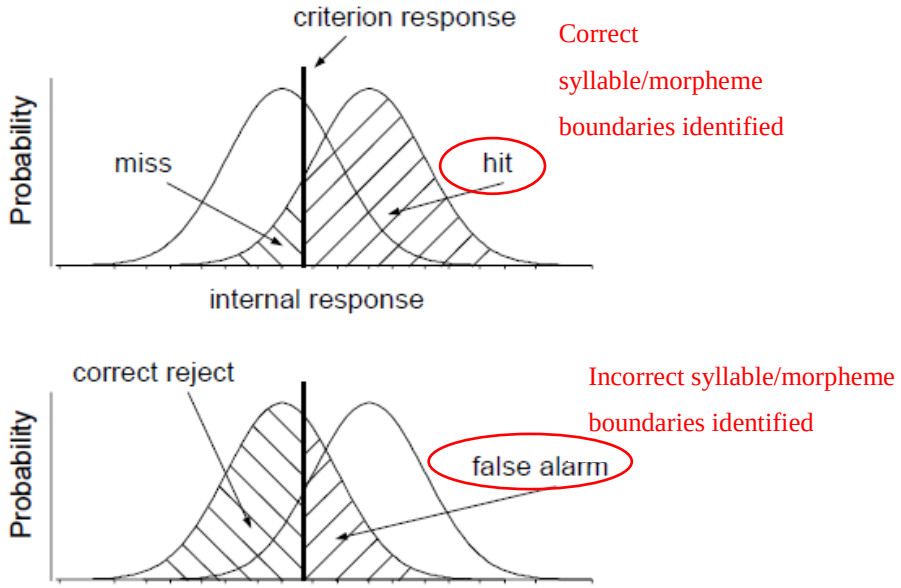


Figure 20.D-prime: Hit and False Alarm Rates

The following formula was used when calculating d-prime in excel, =NORMSINV (HR)-NORMSINV (FA).[9] The hit rate and false alarm rates were first transformed to their z-scores before calculations were made. Z-scores are the statistical measurement of a score's relationship to the mean in a group of scores (Howell 1999).

The tables below (21 & 22) provide a summary of the d-prime means and the average percentage hit rate and false alarm rates for both syllables and morphemes. A higher d-prime score indicates that the signal under investigation can be more readily detected.

[9] The standardised formula for calculating d-prime is; d' = z (H) - z (F). Calculating d-prime does not simply mean subtracting the number of false alarms from the number of hits. It is the difference between the z-transformations of these 2 rates (Keating 2004).

4.1.5.1 IsiXhosa Results

Table 21: Decomposition Task (d-prime) results for isiXhosa

Grain Size	Average d-prime	Hit Rate	False Alarm
Syllables	1.20	71%	29%
Morphemes	0.58	60%	40%

For the isiXhosa learners the average d-prime is much higher for syllables (*M*=1.20) than for morphemes (*M*=0.58). This is further illustrated in the hit rate and false alarm rate means, with the hit rate for syllables being 71%, whereas the hit rate for morphemes is only 60%. Furthermore, the false alarm rate for syllables is a low 29%, but 40% for morphemes. This shows that when children break up sentences according to syllables they do it correctly 71% of the time, which shows a strong awareness of the syllable as a unit of literacy processing as part of a word recognition task. The column for morphemes reveals that both the hit rate (60%) and the false alarm rate (40%) are relatively high numbers. This suggests that these learners also break up sentences according to morphemes but are not always able to do so correctly.

The difference between the raw scores for syllables and morphemes for all participants was compared using a paired t-test to test for statistical significance. A paired t-test measures whether two means from within-subjects test group are related. The assumptions in conducting a t-test are: that only matched pairs are used, data is normally distributed, the variance of the two samples is equal and the cases are independent of each other (Howell 1999). The t-test was thus appropriate for this data comparison, as the raw scores for syllables and morphemes of the same learner were compared, the samples were therefore matched. The data used for comparison were normally distributed, using a normal probability plot (seen below, Figure 21 & 22). The cases (syllables versus morphemes) were also independent of one another. Furthermore, the measurement of scale was continuous, as well as logarithmic.

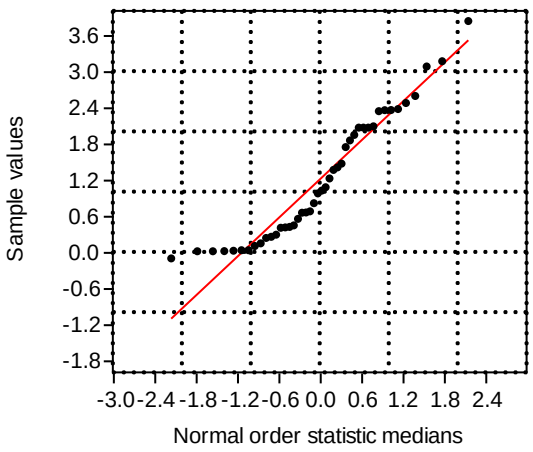


Figure 21. Normal probability Plot for Syllables (decomposition task), PPCC=0.963

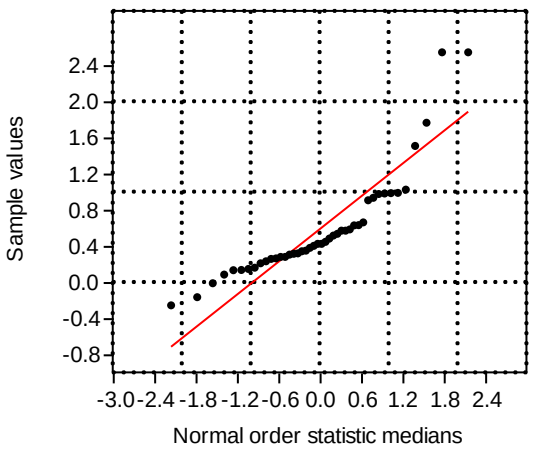


Figure 22. Normal probability Plot for Morphemes (decomposition task), PPCC=0.8965

Results of the paired t-test showed that the difference between syllables (M=1.20) and morphemes (M=0.58) of isiXhosa learners (N=41) was statistically significant, t (40) = 4.134, p<0.001. This suggests a significant difference in the use of the syllable and morpheme as grain size units in reading by these isiXhosa learners.

4.1.5.2 Setswana Results

Table 22: Decomposition Task (d-prime) results for Setswana

Grain Size	Average d-prime	Hit rate	False Alarm
Syllables	1.49	75%	25%
Morphemes	-0.21	45%	55%

As with the isiXhosa results, the Setswana learners also scored much higher with syllables (*M*=1.49) than with morphemes (*M*=-0.21). The hit rate for syllables is 75% which shows that when children break up sentences according to syllables, they do so correctly most of the time. They therefore have a strong awareness of the syllable as a unit of literacy processing when

breaking up sentences as part of a word recognition task. However, the hit rate for morphemes is a low 45%, and the false alarm rate is higher than the hit rate for morphemes, resulting in a negative score. Hence it appears that the Setswana learners place morpheme boundaries incorrectly more than they are correctly. The negative score also points to the possibility that learners do not try to identify morpheme boundaries when breaking up sentences. Instead as seen with the high hit rate score for syllables, these learners may put in syllable boundaries, which happen to coincide with some of the morpheme boundaries. As a result, it would appear that they identify some of the morpheme boundaries correctly. The isiXhosa learners however display a greater ability to correctly point out morpheme boundaries as they score more right than wrong. The isiXhosa learners identify morpheme boundaries more successfully than the Setswana learners.

Again, as with isiXhosa, the difference between the raw scores for syllables and morphemes for all participants was compared using a paired t-test. The difference between morphemes (M=-0.21) and syllables (M=1.49) for the Setswana learners (N=33) was statistically significant, t (32) = 10.15, p<0.001. This indicates a significant difference in the use of the syllable and the morpheme as literacy grain size units used by Setswana learners.

The d-prime statistic thus revealed that the dominant grain size for both isiXhosa and Setswana is the syllable. The hit rate for both isiXhosa and Setswana was above 70%. The hit rates for morphemes however dropped significantly for both isiXhosa and Setswana (60% and 45% respectively). The higher hit rate for morphemes for isiXhosa points towards the use of the morpheme as a secondary grain size unit for these learners. Setswana learners received a higher false alarm rate than they did hit rate for morphemes.

The results of the decomposition task, through the use of d-prime, confirm the findings of the univariate statistics. The syllable was shown to play a larger role than the morpheme for both isiXhosa and Setswana. This is supported by the fact that for both isiXhosa and Setswana the learners did well with Syllable Awareness in comparison with Morphological Awareness. Furthermore, the d-prime pointed towards the use of the morpheme as a secondary grain size in isiXhosa, but not in Setswana. This is consistent with the learners' scores on the Morphological Awareness Task, where the isiXhosa (M=56.17) learners scored higher than the Setswana learners (M=43.37). This difference was found to be highly significant, p<0.001 using a t-test, t (72) =4.2451, p<0.001.

4.1.6 Discussion of Results: Grain size literacy processing units in isiXhosa and Setswana

***Secondary grain**: The grain size unit which learners use in combination with their primary grain, or as an alternative literacy processing unit in word recognition.*

From the above findings it can be concluded that the syllable is the dominant grain size for both isiXhosa and Setswana and that the morpheme acts as a secondary grain in isiXhosa, but not in Setswana. The PGST by definition assumes that readers will use multiple grain size strategies and the dominant grain will be influenced by the task or reading experience. The concept of a secondary grain has not been explicitly mentioned in the literature and is therefore a term coined in this study. The primary grain is the dominant grain which is used in word recognition by readers. It is the grain size which the reader will rely on most of the time when decoding. The secondary grain is the grain size unit which learners use in combination with their primary grain, or as an alternative literacy processing unit in word recognition.

The univariate statistics show that both isiXhosa and Setswana learners scored higher with Syllable Awareness than they did for Phoneme Awareness. This suggests the dominance of the syllable in both these languages. This finding can be situated in the hierarchical model of word structure (Ziegler & Goswami 2005, Anthony and Lonigan 2004, Scheule and Boudreau 2008), (shown in Section 4.1.5.1, Figure 23), which states that children generally master word-level skills before they master syllable-level skills, syllable-level skills before onset-rime skills and onset-rime skills, before phoneme-level skills (Ziegler & Goswami 2005). It is thus logical that these learners do better with Syllable Awareness than Phoneme Awareness. Due to the availability of the syllable in the Southern-Bantu languages it follows that these learners remain at the syllable level.

As discussed in section 2.4.1, similar results have been found across many different languages, even when there are differences in the phonological structure of the languages being learned (Ziegler & Goswami 2005). According to Ziegler & Goswami (2005) Syllable Awareness is acquired pre-literacy, usually around the ages of 3 and 4, with Phoneme Awareness only developing once children are explicitly taught to read (See also, Goswami & Bryant 1990). This has been confirmed by a number of studies across different languages (Turkish, Durgonglu & Oney 1999; Italian, Cossu *et al*. (1988), Greek, Harris & Giannouli (1999); French, Demont & Gombert 1996 & English, Liberman *et al.* (1974)). Furthermore, it has been found that the most

accessible phonological grain size units used by beginner readers are larger units (i.e. whole-words, syllables, body units, and rimes) (Stanovich 1992, Anthony *et al.* 2003). These learners, although in Grade 3 and 4, could still be considered beginning readers as a result of their low reading rates and poor comprehension scores.

The finding that learners do better with Syllable Awareness than with Phoneme Awareness provides further support for Diemer (2013) who investigated Phonological Awareness in isiXhosa learners. Results from this study indicated that isiXhosa learners attend more to the syllable as a phonological unit than the phoneme. Considering the consistency of the orthography of both isiXhosa and Setswana, one would expect the phoneme level to be good. However as shown there is preference toward the syllable as a grain size which is highlighted though their strong Syllable Awareness. Thus, irrespective of the salience of the phoneme in the orthography of both isiXhosa and Setswana, it appears that these languages privilege the syllable. The use of the syllable as a grain size is also highlighted in studies on Greek (Adinis & Nunes 2001) and Chinese (McBride-Chang *et al*. 2005) where the syllable played a significant role in word recognition.

According to the PGST as well as other models of reading, as discussed in section 2.4.1, in alphabetic languages, readers of consistent orthographies (e.g. Turkish, Spanish, and Italian) rely on grapheme-to-phoneme correspondences, whereas readers learning to read in inconsistent orthographies (e.g. English) need to use a variety of grain sizes in recoding strategies. Thus readers develop both large and small units in parallel, supplementing grapheme-to-phoneme correspondences with recognition of letter patterns and attempts at whole-word recognition. (Goswami *et al.* 2001, Ziegler & Goswami 2005). However, as seen in the results above, both learners of isiXhosa and Setswana showed a preference towards the syllable as a grain size, as opposed to the phoneme. Furthermore, the isiXhosa children also showed an interaction with the morpheme as a grain size, pointing towards the use of more than one grain size, despite the consistency of the orthography. The saliency of the linguistic unit in a language thus can be seen to determine the unit size which learners pay attention to when decoding (Bruck and Genesee 1995).

4.1.6.1 Argument for the morpheme as a grain size

The results of the present study showed that for Morphological Awareness, the isiXhosa learners scored higher than the Setswana learners. This suggests that the morpheme plays a more dominant role in isiXhosa than in Setswana. The use of the morpheme as grain size is supported by the weak ODH, as discussed in section 2.4.1.1.3. According to this hypothesis, phonology needed for pronunciation of printed words comes both from sublexical, grapheme-to-phoneme mappings as well as from stored lexical phonology. The latter comes about though a process of matching the spelling of a whole word or morpheme with its stored phonology. The degree to which this process is activated is a function of the orthographic depth (Katz & Frost 1992). This weak version of the ODH thus acknowledges the use of a mix of more than one grain size in reading strategies. For isiXhosa learners there appears to be a mix of the use of both the syllable and morpheme as grain sizes used as literacy processing units in reading.

Further support for the use of the morpheme as a grain size is supported by Elbro & Arnbak (1996), who stated that reading strategies which involve morpheme recognition provide to some extent a direct mapping onto the lexicon of spoken words. For example, the mental lexicon may be organised in terms of stems and their endings rather than as whole words (e.g. Dutch, Jarvella & Meijers 1983; English, Henderson 1985; and Italian, Caramazza, Luadanna & Romani 1988). Due to the nature of the conjunctive orthography, words in isiXhosa are particularly long, thus it follows that learners break up words into meaningful sections rather than to attempt whole word recognition. Using a grapheme-to-phoneme approach to recoding also proves a cognitively heavy task. Studies across many different languages support the view that morpheme analysis and recognition contribute to word decoding and comprehension. (Dutch (e.g., Libben 1994), English (e.g., Taft and Forster 1975, Bradley 1980, Marslen-Wilson *et al*. 1994), Italian (e.g., Caramazza, Laudanna, and Romani 1988), and Serbo-Croatian (e.g., Feldman and Andjelkovic 1992).

It was found, in particular for isiXhosa, that learners use multiple grain sizes. Using multiple grains in reading can be situated in the flexible-unit-size hypothesis (Brown & Deavers 1999, Ziegler & Goswami 2005), which states that English readers use a mixture of small and large grain size units in recoding strategies (Pae 2014, Ziegler & Goswami 2005). This hypothesis however has been limited to English word identification. The findings of this study show that it can be extended and applied beyond English. In particular, even readers of a consistent orthography make use of more than one grain size. In the Southern-Bantu languages, there is

often an overlap in syllables and morphemes in the prefix domain. It is thus logical for these learners to develop syllable and morpheme sized units in parallel.

The use of the syllable as a grain size was situated in the hierarchy of acquisition, as confirmed by the learners doing better with Syllable Awareness than Phoneme Awareness. The hierarchy of acquisition (seen in Figure 23) is also a depiction of the different psycholinguistic grain sizes outlined by the PGST. This model does not emphasise a morpheme level. The PGST focuses on phonological recoding, but the question is whether the morpheme is subject to the hierarchy of acquisition. This study indicates that the role of the morpheme as a grain in a language which is agglutinative and morphologically rich (isiXhosa), cannot be discounted. The morpheme appears to feature as a grain size unit, as highlighted above. What still needs to be considered however is the question of the consistency of the morpheme in the orthography as well as its availability in the language.

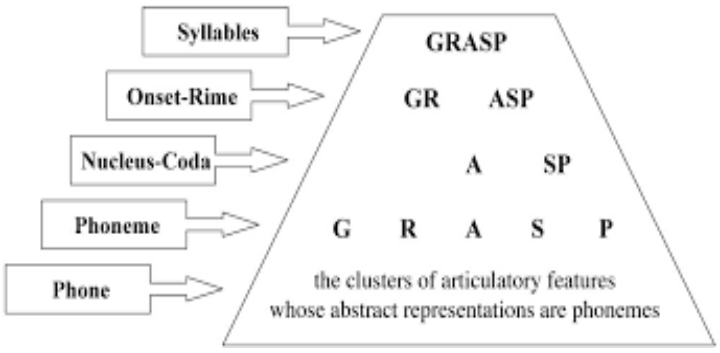


Figure 23. Hierarchy of Acquisition: A schematic depiction of the different psycholinguistic grain sizes. (Ziegler & Goswami 2005)

(Ziegler & Goswami 2005)

4.1.5.2 Situating the findings in the PGST

The Southern-Bantu languages under investigation are both examples of orthographies which have a high availability of sounds and are consistent in their mappings. The syllable unit is prominent and readily available in both isiXhosa and Setswana as a grain size used in reading strategies. The findings show that both isiXhosa and Setswana learners fared better at Syllable Awareness than Phoneme and Morphological Awareness. Learning these larger sized units' aids reading speed in these learners. According to the PGST, as outlined in section 2.4.1.2, consistency refers to the correspondences between grapheme and phonemes. This might be extended to a description that includes mappings at larger levels, i.e. the syllable or morpheme. Furthermore, according to this theory (Ziegler & Goswami 2005), grain size in alphabetic writing

systems refers to either small (phoneme to grapheme mappings) or larger (chunks of letter strings) with consistent orthographies favouring use of small grain size units in reading. The findings presented above however suggest the use of larger grain size units, i.e. the syllable and morpheme (which can be considered chunks of letter strings if using this classification), despite the consistency of the languages under study.

The PGST states that initial reliance on small grain sizes does not necessarily mean that it is impossible for readers in more transparent orthographies to develop ability to use larger grain sizes (Rubinov 2015). This study showed the use of the morpheme and syllable as grain sizes used by isiXhosa and Setswana speakers.

Davies, Cuetos, and Glez-Seijas (2007) provided further motivation for the use of large grain size units in consistent orthographies. According to these authors, the use of larger grain size units involving morphological or lexical units provides preassembled units for orthography-to-phonology coding which improves reading speed in readers of transparent orthographies. Syllable Awareness correlated with reading speed in isiXhosa and Setswana learners

4.1.6.3 Conclusion

This chapter answered the question of the relevant contribution of Phonological Awareness and Morphological Awareness in determining the grain size unit used in reading strategies in children learning to read in isiXhosa and Setswana respectively.

Results showed that;

- The syllable is the dominant grain size for isiXhosa and Setswana.
- The morpheme is a secondary grain in isiXhosa, but not in Setswana.
- For Phonological Awareness, both isiXhosa and Setswana learners did better on the Syllable Awareness task than they did with Phoneme Awareness.

These findings were situated in the hierarchical model of word structure Ziegler & Goswami 2005, Anthony and Lonigan 2004, Scheule and Boudreau 2008). IsiXhosa and Setswana, both with alphabetic transparent orthographies which express a salience of the phoneme, nevertheless privilege the syllable. The saliency of the linguistic unit in a language determines the unit size which learners pay attention to when decoding (Bruck and Genesee 1995). Moreover, their higher Syllable Awareness may contribute to the use of the syllable as a grain-size unit used in

reading strategies. Alternatively, the use of the syllable as grain could have contributed to their higher Syllable Awareness.

Considering the length of words in the Southern-Bantu languages, (see section 2.2.1 for an overview of the Southern-Bantu language structure), it is more economical for readers to store words in their orthographic lexicon by either their syllables or by their morphemes than as whole words or attempting to break up these long words via a grapheme-to-phoneme recoding strategy.

The use of the morpheme as a secondary grain size in isiXhosa was further supported by the findings that the isiXhosa learners did better with Morphological Awareness than the Setswana learners. Thus use of both the syllable and morpheme as grain sizes points towards the use of multiple grain sizes in the flexible unit hypothesis (Brown & Deavers 1999, Ziegler and Goswami 2005). As with the syllable, there is a link between metalinguistic skill and grain size.

The fact that the learners in this study did not do as well on the phoneme awareness task as they did on the syllable awareness task does not ipso facto mean that the phoneme is not as important at the syllable in agglutinating languages. As shown with Zulu readers in Pretorius (2015), even weak readers did well on syllable awareness tasks. It was the performance on phonemic awareness that distinguished the good from the weak readers. More research is thus needed with regard to the roles of phonemic and morphological awareness in good readers of the Southern-Bantu languages.

Different languages require different metalinguistic skills when reading. These along with the grain size unit to which learners pay attention to as literacy processing units is conditioned by the orthography in which the learner is reads. The following section provides comparison of isiXhosa and Setswana in order to establish how differences in writing systems influence their metalinguistic skills and grain size units.

4.2 SECTION 2. Research Question 2: Effect of orthography on grain sizes in determining word recognition strategies

This section explores the effect that disjunctivism and conjunctivism of an orthography has on reading strategies, to establish how the types of grain sizes differ between children learning to read in a disjunctive orthography (Setswana) and those learning to read in a conjunctive orthography (isiXhosa). This section draws on the results from Section 1 above, with a specific focus on directly comparing the results of Setswana and isiXhosa. According to a study by Greenop (2004), differences in English and Zulu orthographies produce differences in Phonological Awareness abilities and reading strategies. The aim is to establish whether differences in writing systems of isiXhosa and Setswana similarly produce differences in metalinguistic awareness and grain size unit in reading strategies.

4.2.1 Comparing metalinguistic skills for isiXhosa and Setswana: Univariate statistics

Section 4.1 showed that multiple grain sizes are used by both isiXhosa and Setswana learners, but the use of these different grain sizes appears to be language specific. The table (Table 23) below has been repeated for ease of reference. It provides a summary of the results on the metalinguistic tasks by isiXhosa and Setswana learners.

Table 23: Summary of the results for Phonological and Morphological Awareness: isiXhosa and Setswana.

IsiXhosa (N=41)					**Setswana (N=33)**		
Measures	Mean	SD	t-score	p-score	Mean	SD	Measures
Syllable Total	72.40	16.30	4.56	<0.001	87.53	10.98	Syllable Total
Phoneme Total	44.39	19	-2.56	<0.05	56.06	19.63	Phoneme Total
MA Total	57.36	5.02	-4.83	<0.001	43.28	8.20	MA Total

The Setswana learners did better with Phonological Awareness (Syllable and Phoneme Awareness). This is shown through the higher mean scores for these tasks for the Setswana group. The isiXhosa learners do better with Morphological Awareness (M=57.36). Using a two-sample t-test it was found that the difference for Syllable Awareness t (72) =4.5604, p<0.001, and Phoneme Awareness, t (72) =2.5882, p<0.05, between the isiXhosa learners and the Setswana learners was statistically significant. The difference in scores on the Morphological Awareness task was also found to be significant, t (72) =-4.8299, p<0.001.

4.2.2 Decomposition: Grain size differences between isiXhosa and Setswana

The table below (Table 24) provides a summary of the results on the decomposition task for isiXhosa and Setswana learners. The decomposition task required learners to break up sentences as they would when reading. This study specifically examined the use of syllable and morphemes in doing so.

For the coding of the decomposition of Setswana, the focus fell specifically on the suffixes, which in Setswana are conjunctively written. This makes the domains comparable, but detracts from the writing system comparison. Future research should perhaps recode the isiXhosa decomposition model to focus solely on suffixes. Thus the focus would shift to grain size in the suffix domain.

Table 24: Decomposition Task (d-prime) results for isiXhosa and Setswana

isiXhosa				**Setswana**			
Grain Size	Average d-prime	Hit Rate	False Alarm	Average d-prime	Hit Rate	False Alarm	Grain Size
Syllables	1.20	71%	29%	1.49	75%	25%	Syllables
Morphemes	0.58	60%	40%	-0.21	45%	55%	Morphemes

The table (Table 24) above showed that the Setswana learners (*M*=1.49, *HR*=75%) did better with breaking up sentences into syllables more correctly than the isiXhosa group (*M*=1.20, *HR*=71%) This is indicated by the mean scores and hit rates. The difference found was however not statistically significant as calculated by a two samples t-test, t (72) = -1.64, p=0.11. For morphemes, the isiXhosa learners (*M*=0.58, HR=60%) did better than the Setswana learners (*M*=-0.21, *HR*=45%). This difference was statistically significant=7.22, p<0.001.

The results of the decomposition task support and are consistent with the findings from the univariate statistics for the results on the metalinguistic tasks. The Setswana learners displayed higher levels of Phonological Awareness. They also did better with syllables on the decomposition task. The isiXhosa learners showed higher levels of Morphological Awareness and similarly did better in morphemes on the decomposition task than the Setswana learners. Morphological Awareness evidently plays a greater role for learners of a conjunctive orthography than the learners of a disjunctive orthography.

Both isiXhosa learners and Setswana learners do better with Syllable Awareness and with breaking up syllables overall on the decomposition task. It would appear that conjunctivism sets up the need for Morphological Awareness. Both languages are consistent with regards to syllables.

In comparison to isiXhosa, Setswana orthography tends to breaks up the linguistic word into syllables. Furthermore, some morphemes in Setswana are syllabic. Thus the syllable and morpheme are confounded. For this reason, when referring to grain size used by these learners, it may appear that they use the syllable as the dominant grain, but the morpheme cannot be excluded. A possible explanation for the use of the morpheme being higher in isiXhosa as well as the isiXhosa learners showing a higher level of Morphological Awareness is that they need to know where the morphological segments are when breaking up sentences. They therefore may pay more attention to the morpheme which holds meaning.

According to the study by Burani *et al*. (2008) the morpheme is useful as a grain size for readers who have not yet fully mastered whole-word processing. This is particularly useful where "whole-words" are a) long and b) characterised by high levels of orthographic neighbourhood effects. Morphemic processing thus aids grapheme-to-phoneme decoding. Using the morpheme as a grain size also provides a lexical reading unit larger than the grapheme, but smaller than the whole-word, which reduces the limitations owed to the analytical process of reading. This explanation by Burani *et al.* (2008) is important in explaining why the morpheme acts as a grain size in isiXhosa more than in Setswana. Setswana readers can rely on whole-word (lexical) parsing due to the disjunctive orthography which splits up the linguistic word. However, due to the conjunctive script, readers of isiXhosa cannot rely on whole-word (lexical) parsing due to the length of the words. They would thus need to use another grain-size in decoding.

Studies on grain sizes in different orthographies have focused on a comparison of orthographic depth, comparing transparent to opaque orthographies, as seen in section 2.2.2. This study looked at two languages with similar orthographic depth, but different writing systems. Comparing isiXhosa and Setswana in the same light, Setswana appears to have a more transparent orthography. This would be consistent with the literature which highlights that less transparent languages, such as English have higher Morphological Awareness. Furthermore the use of the morpheme is prevalent in non-consistent orthographies, whilst Phonological Awareness is higher in more transparent orthographies. This is consistent with the Setswana

learners who display higher levels of Phonological Awareness than the isiXhosa learners. This suggests a difference in the transparency of the two languages.

IsiXhosa has more digraphs and trigraphs than Setswana, with Setswana having a number of digraphs of affricates, such as 'tsh,' which isiXhosa also has. Setswana also has affricates, including, /tl/ and /tlh/ which isiXhosa doesn't have, but isiXhosa has the lateral fricatives /hl/ and/dl/, which are not found in Setswana. They therefore appear to be similar. However, the clicks in isiXhosa highlight that isiXhosa has more di/tri-graphs than Setswana. Thus, although isiXhosa is consistent, it is a more complex orthography.

4.2.3 Comparison of comprehension between isiXhosa and Setswana

Table 25: Comprehension in isiXhosa and Setswana learners

	isiXhosa (41)		**Setswana (33)**			
Measures	Mean	SD	Mean	SD	t-value	p-value
Comprehension (incl. reading speed)	18.30	21.19	35.46	27.35	3.60	<0.001
Adjusted Comprehension (excl. Reading speed) [(comp/crpm)*100]	0.72	1	1.24	1.00	3.06	<0.05
Characters Read Per minute (CRPM)	124.87	90.83	163.46	92.70	-2.20	<0.05

The above table (Table 25), shows from the mean score (M=18.3) for isiXhosa that these learners scored poorly in comprehension. The comprehension score for Setswana learners is also low (M=35.45), but higher than the isiXhosa score. This difference is significant, using a t-test (two samples), t (72) =3.4289, p<0.001. This difference remains statistically significant when removing the speed factor, t (72) = 3.0502, p<0.05, using the adjusted comprehension score, isiXhosa (M=0.67); Setswana (M= 1.24).

The range in ability amongst isiXhosa and Setswana learners is relatively similar as shown by the standard deviations in the above table (Table 25). This shows that the tasks are comparable between both languages.

The results from the univariate statistics for comprehension show that both the isiXhosa and Setswana learners have poor comprehension, as shown by their low performance on the comprehension task. The Setswana learners however score much higher than the isiXhosa learners for comprehension as well as slightly higher for the adjusted comprehension. The Setswana learners scored higher for Phonological Awareness than isiXhosa learners, while isiXhosa learners scored higher on the Morphological Awareness Task. This suggests that Phonological Awareness contributes more to comprehension than Morphological Awareness. The Setswana learners read faster because their Phonological Awareness is better. Thus because they read faster it appears that they do better with comprehension than the isiXhosa learners, but if the adjusted comprehension score is taken into account, this is not necessarily the case. Phonological Awareness in this way is found to aid reading speed but does not provide access to meaning. Comprehension rests on higher order cognitive processing.

For both isiXhosa and Setswana learners, Syllable Awareness was correlated to total comprehension, which included speed. Once speed was removed there was no longer a statistically significant difference. For Setswana, Phoneme Awareness was correlated to total comprehension. Morphological Awareness was not correlated to comprehension for either isiXhosa or Setswana. The syllable was the dominant grain size overall with isiXhosa and Setswana learners scoring highest on the Syllable Awareness task. This translates into their comprehension score, but is not significant for adjusted comprehension. Syllable Awareness is therefore related to reading speed than to accessing meaning from text. The use of the morpheme as a grain size in isiXhosa learners does not necessarily require understanding of the meaning of the morphology. These learners may recognize morphemes as sections which they use when breaking down sentences. This does not transfer to their comprehension. The use of the morpheme in isiXhosa may therefore relate to fluency but not to an understanding of the text.

4.2.4 Conclusion: Effect of orthography on grain sizes

This section explored the effect that disjunctivism and conjunctivism of an orthography has on reading strategies, to answer the question of whether grain sizes differ between children learning to read in a disjunctive orthography (Setswana) and in a conjunctive orthography (isiXhosa).

The results of this section showed that;

- Setswana learners did better with Phonological Awareness than the isiXhosa learners.

- The isiXhosa learners did better with Morphological Awareness than the Setswana learners.
- On the decomposition task, Setswana learners scored higher for syllables, with isiXhosa learners scoring higher for morphemes.

Transparency aside it thus appears that Morphological Awareness plays a greater role for learners of a conjunctive orthography than the learners of a disjunctive orthography, with isiXhosa learners expressing higher levels of Morphological Awareness than the Setswana learners. Furthermore the isiXhosa learners used the morpheme as a secondary grain in decoding.

4.3 SECTION 3. Research Question 3: Effect of LoLT on determining grain sizes

This section investigates the role which language of learning and teaching (LoLT) has on grain sizes used in reading. The question of whether grain sizes are determined by L1 or by LoLT (when in a learners L2) is explored. This study focuses specifically on reading in one's first-language, despite the literature placing emphasis on second-language reading, (see section 2.1.4 & 2.1.5). Results from learners learning in their L1 is compared those who learn in an additional language (English) to establish whether there is a difference between and how this difference is influenced by the language of learning. Comparisons are indirectly made between IsiXhosa and Setswana drawing on findings from Section 1.

4.3.1 IsiXhosa Results

4.3.1.1 Comparison of Phonological and Morphological Awareness in IsiXhosa: Univariate Statistics

The table below (Table 26) provides a summary of the mean scores and standard deviations for the isiXhosa learners on the metalinguistic tasks; Syllable Awareness, Phoneme Awareness and Morphological Awareness.

It is shown that the scores on the metalinguistic tasks were not significantly different between the two schools. For comprehension, a statistical significant difference is shown between the two schools, with the L1 LoLT Group scoring higher than the L2 Group. However, this difference is not statistically significant once the variable of speed is removed.

Table 26: Phonological Awareness and Morphological Awareness in isiXhosa L1 & L2 LoLT Schools

IsiXhosa L1 LoLT (Group X.EC) (N= 27)					**IsiXhosa L2 LoLT (Group E.EC) (N= 14)**		
Measure	Mean	SD	t-value	p-value	Mean	SD	Measure
Syllable Total	74.81	15.57	1.40	0.17	67.5	17.64	Syllable Total
Phoneme Total	41.47	20.94	-1.16	0.25	49.17	14.83	Phoneme Total
MA Total	56.78	15.80	0.01	0.99	57.38	14.05	MA Total

The L1 LoLT (Group X.EC) scores higher for Syllable Awareness than the L2 LoLT School (Group E.EC). The isiXhosa LoLT learners therefore have higher Syllable Awareness than the English LoLT group. This difference is not statistically significant when using a two samples t-test, t (39) =1.40, p=0.17.

For Phoneme Awareness, the L2 LoLT (Group E.EC) scored higher than the L1 LoLT School (Group X.EC). This difference is not significant, *t* (39) = -1.16, *p*=0.25. Furthermore, for Morphological Awareness, the English LoLT School (Group E.EC) did better than the isiXhosa LoLT School (Group X.EC). This is not a statistically significant difference, *t* (39) =-0.01, *p*=0.99.

A set of linear correlations was conducted to establish the relationship between Morphological Awareness and Phonological Awareness (a combined score of Syllable and Phoneme Awareness). The scatterplots below show the correlations for each group, isiXhosa LoLT and English LoLT. The red line shown on the scatterplot shows the strength of the correlation.

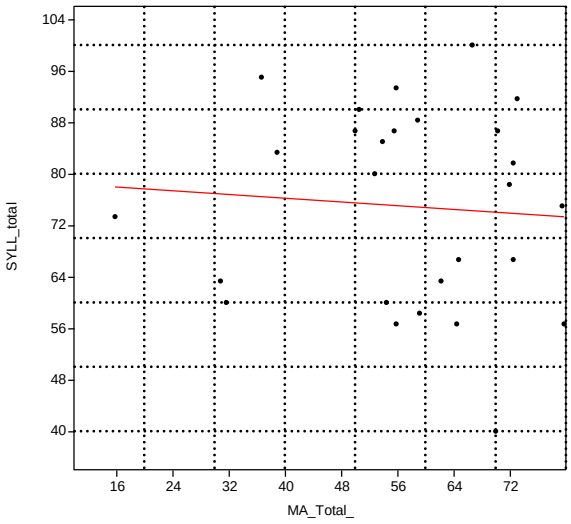


Figure 24. Linear Correlation for MA and PA of Group X.EC (L1 LoLT), r=-0.07, p<0.001

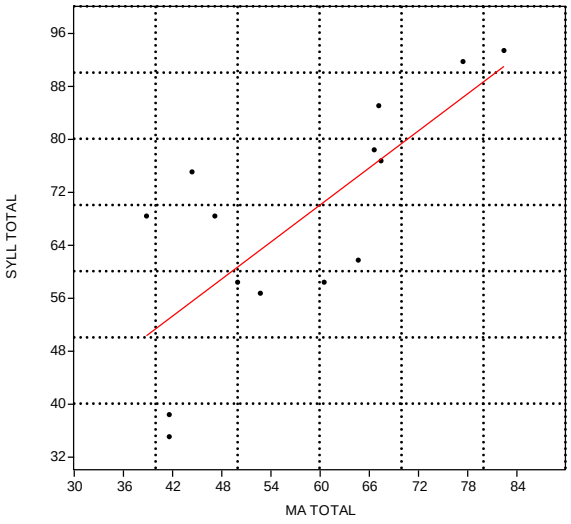


Figure 25. Linear Correlation for MA and PA of Group E.EC (L2 LoLT), r=0.74, p=0.79

For Group X.EC there is a weak positive correlation between Phonological Awareness and Morphological Awareness. This correlation is statistically significant, *p*<0.001. For Group E.EC, the English LoLT learners, there is a strong positive correlation, *r*=0.74 which can be found between PA and MA. This correlation is not significant, p>0.05.

4.3.1.2.1 Group X.EC (L1 LoLT)

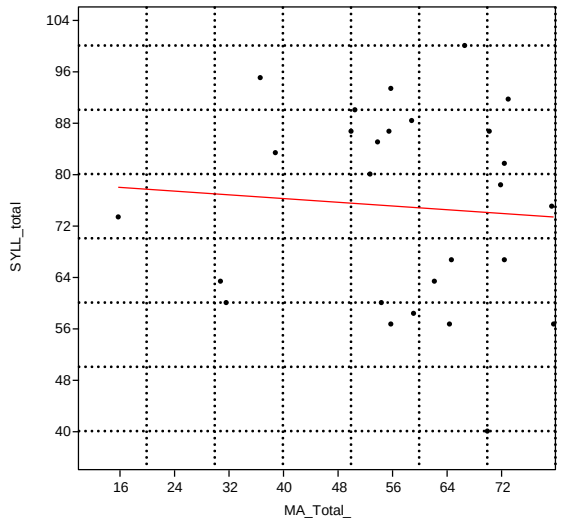


Figure 26. Correlation between MA and Syllable Total , r=-0.07, p=0.71

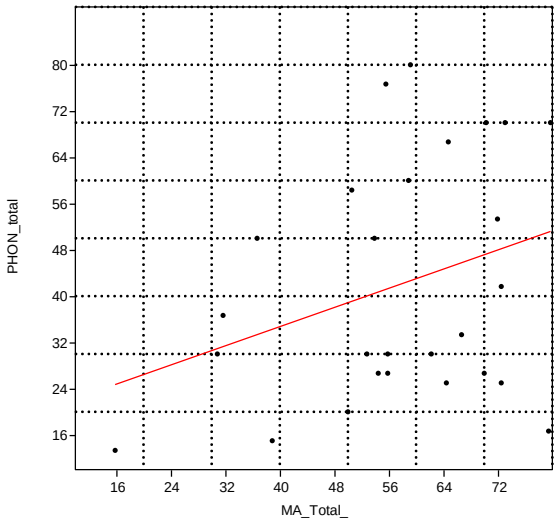


Figure 27. Correlation between MA and Phoneme Total (indep), r=0.32, p=0.11

For the Group X.EC (L1 LoLT) learners, there is a negative correlation between Syllable Awareness and Morphological Awareness. This correlation is not significant, $p>0.05$. For Phoneme Awareness and Morphological Awareness, a weak correlation is found, $r=0.32$. This correlation is not significant, $p>0.05$. Thus both syllable and Phoneme Awareness are not significantly correlated to Morphological Awareness in these learners.

4.3.1.2.2 Group E.EC (L2 LoLT)

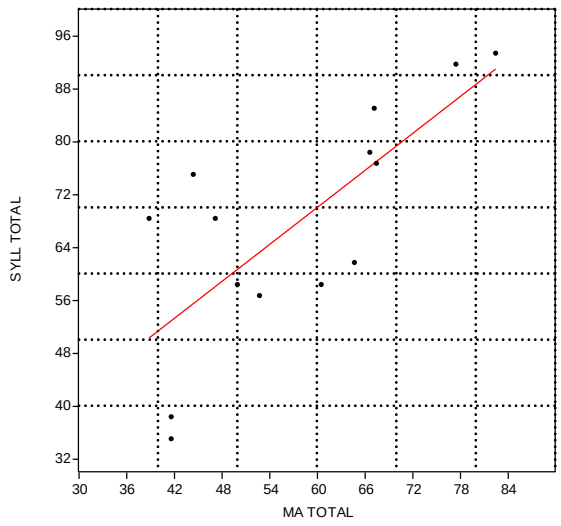


Figure 28. Linear Correlation for MA and Syllable Total, r=0.74,p<0.05

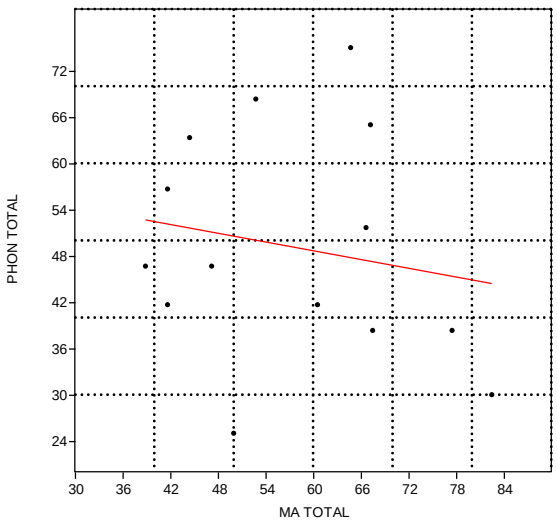


Figure 29. Linear Correlation for MA and Phoneme Total, r=-0.18, p=0.54

Syllable Awareness and Morphological Awareness are found to be highly correlated, r=0.74 for the English LoLT Group. This correlation is statistically significant, p <0.05. Thus for these learners, (Group E.EC- English LoLT), Syllable Awareness and Morphological Awareness are related. Learners with high Syllable Awareness will also have increased morphological Awareness. Phoneme Awareness is not statistically correlated with Morphological Awareness.

4.3.1.3 Comprehension between the isiXhosa schools

To re-illustrate, there are two comprehension scores which were calculated. The first score; the comprehension score, implicitly includes reading speed. The second score; the adjusted comprehension, eliminates this variable of speed. This score is termed the adjusted comprehension score. The adjusted comprehension score was calculated by dividing the comprehension score by the number of characters read per minute. It is important to discuss both comprehension scores as each demonstrates different components. The table below (Table 27) presents a summary of the comprehension scores for both groups of isiXhosa learners.

Table 27: Comprehension for isiXhosa L1 LoLT and L2 LoLT

	Group X.EC (N=27)		**Group E.EC (N=14)**			
Measure	Mean	SD	Mean	SD	t-value	p-value
Comprehension (incl. reading speed)	26.15	21.74	2.86	7.26	4.68	<0.001
Adjusted Comprehension (excl. Reading speed) [(comp/crpm)*100]	0.76	0.60	0.58	1.52	1.03	0.31
Characters Read Per minute (CRPM)	167.2	84.40	50.18	39.00	-5.38	<0.001

The isiXhosa LoLT (Group X.EC) learners score higher with comprehension (*M*=26.15), than the L2 English LoLT School (*M*=2.86). This difference is statistically significant according to the two samples t-test, *t* (39) =4.68, p<0.001. Once the variable of speed is removed, the difference in scores for the two schools is less pronounced. Using the two-sample t-test, the difference between the two groups for the adjusted comprehension was nonsignificant, *t* (39)=-1.03,p=0.31 The isiXhosa LoLT learners performed better with reading speed (implied) but not necessarily for accessing meaning from text (adjusted comprehension), than the English LoLT group.

A multiple regression was conducted to investigate whether there was a relationship between the three metalinguistic skills (Syllable Awareness, Phoneme Awareness and Morphological Awareness) to comprehension. For the L1 group, Syllable Awareness was the only variable significantly correlated to comprehension, *r*=0.45, *p*<0.05. This is shown in the scatterplot below.

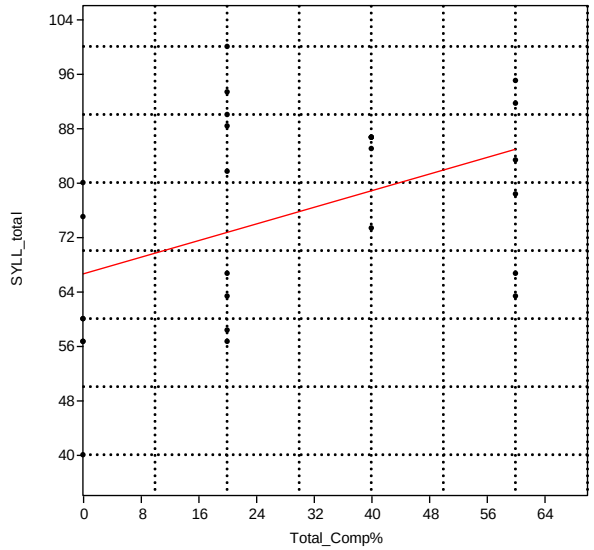


Figure 30. Syllable Awareness & Total Comprehension, r=0.45, p<0.05.

Despite Syllable Awareness being the only significant correlation to comprehension, all three metalinguistic skills when placed together are significantly related to comprehension, +MANOVA, R^2=0.098 and *p* (regr) <0.05. The multiple regression for the adjusted comprehension was however not significant, R^2=0.05, *p* (regr) =0.26. Results on the multiple regression for the English LoLT school shows none of the metalinguistic skills to be significantly correlated to comprehension (including speed), R^2=0.037, *p* (regr) =0.79, or the adjusted comprehension score, R^2=0.03, *p*=0.81. The implication of this is that Syllable Awareness is related to reading speed for the isiXhosa LoLT learners, but not access to meaning. Awareness of syllables helps learners read faster because, as already shown, they read with a syllable grain size. This larger grain size makes decoding faster. There was no correlation between the metalinguistic skills and reading comprehension for the English LoLT learners.

4.3.1.4 Summary of the isiXhosa Results: Effect of LoLT

The results for the isiXhosa schools revealed the following;

- The isiXhosa LoLT (Group X.EC) learners scored higher for Syllable Awareness than the L2, English LoLT (Group E.EC) learners.
- The Group E.EC learners performed better on both Phoneme Awareness and Morphological Awareness than the learners from Group X.EC.
- A weak, but significant correlation between PA and MA for the isiXhosa LoLT learners.

- A strong, but non-significant, correlation between their MA and PA scores for the L2 LoLT (Group E.EC) learners.
- For comprehension, the isiXhosa L1 LoLT (Group X.EC) did significantly better than the L2 English LoLT (Group E.EC) learners for both comprehension and adjusted comprehension.

4.3.2 Setswana Results

4.3.2.1 Comparing Phonological and Morphological Awareness between the Setswana schools: Univariate Statistics

As with the isiXhosa learners, univariate statistics were run on the metalinguistic skills in order to establish the patterns of each variable independently. Using the mean scores and standard deviations for each, comparisons are made between the two schools.

As with isiXhosa, the difference in scores on the metalinguistic tasks is not statistically significant between the two schools. The L2 Group display higher levels of Phonological Awareness with the L1 Group displaying higher Morphological Awareness. Furthermore, there was no statistical significant difference between the two schools for comprehension. However, this difference became statistically significant once speed was factored out, with the L2 Group performing better than the L1 Group.

Table 28: Phonological Awareness and Morphological Awareness: isiXhosa and Setswana.

Setswana L1 LoLT (Group T.NW) (N=12)					**Setswana L2 LoLT (Group E.NW) (N=21)**		
Measure	Mean	SD	t-value	p-value	Mean	SD	Measures
Syllable Total	85	12.85	-0.998	0.33	88.96	9.80	Syllable Total
Phoneme Total	50.14	23.23	-1.33	0.19	59.44	16.93	Phoneme Total
MA Total	44.20	7.45	-0.38	0.71	42.76	8.73	MA Total

From Table 28, it is seen that the Setswana L2 LoLT (Group E.NW) learners scored higher for both Syllable Awareness (*M*=88.96) and Phoneme Awareness (*M*=59.44) than the Setswana L1 LoLT (Group T.NW) learners (*M*=85, *M*=50.14). These differences are not statistically different (Syll: *t* (31) =-0.998, *p*=0.33), Phon: *t* (31) = -1.33, *p*=0.19). For Morphological Awareness, the Setswana L1 (Group T.NW) LoLT learners scored (*M*=44.20) higher than the L2 LoLT (Group E.NW), (*M*=42.76). This difference is not significant according to the two samples t-test, *t* (31)

=0.48, *p*=0.63. It appears that L1 promotes Morphological Awareness in these learners, with the English LoLT group having higher Phonological Awareness.

Linear correlations were conducted to establish the relationship between MA and PA for both schools. The red lines on the scatterplots below indicate the strength of the correlation.

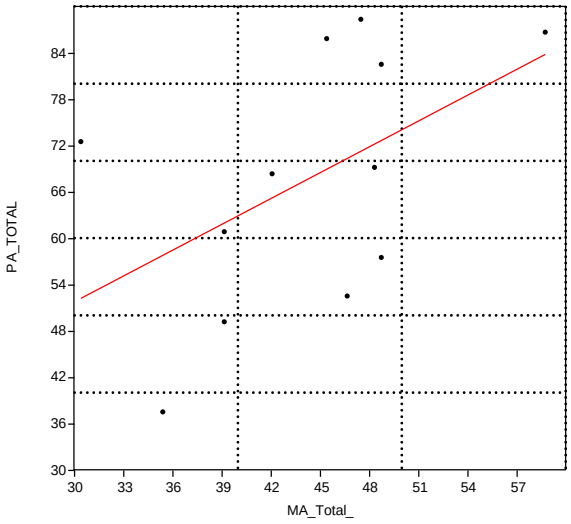


Figure 31. Linear Correlation for MA & PA of Group T.NW (L1 Setswana LoLT), r= 0.50, p=0.85

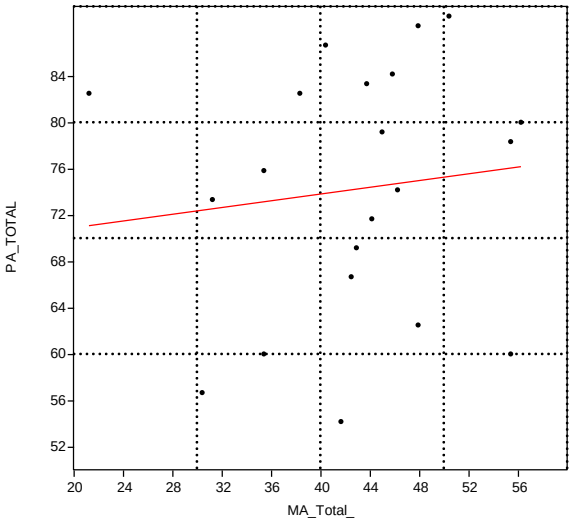


Figure 32. Linear Correlation for MA & PA of Group E.NW (L2 Setswana LoLT), r=0.12, p<0.05

The linear correlation reveals that there is a strong correlation (*r*=0.50) between MA and PA for the L1 LoLT group (Group T.NW). This correlation is not significant, *p*>0.05. For the L2 LoLT (Group E.NW) learners, the correlation between MA and PA is weak (r=0.12), yet statistically significant, *p*<0.05.

A set of linear correlations were run to test whether there was a relationship between Syllable Awareness and Phoneme Awareness to Morphological Awareness.

4.3.2.2 Relationship between Syllable and Phoneme Awareness to Morphological Awareness: Linear Correlations

4.3.2.2.1 Setswana LoLT

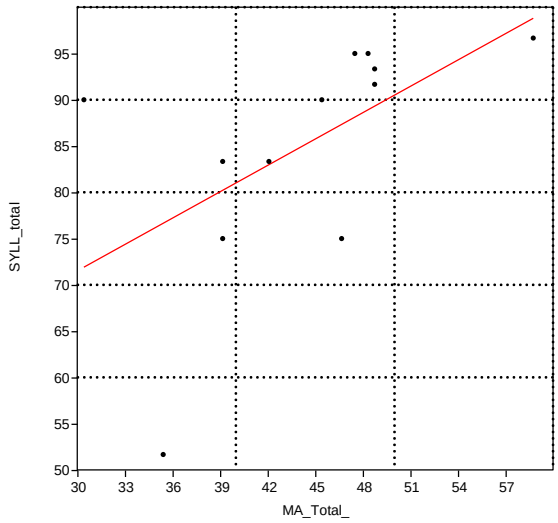


Figure 33. Linear Correlation for MA and Syllable Awareness, r=0.55, p=0.06

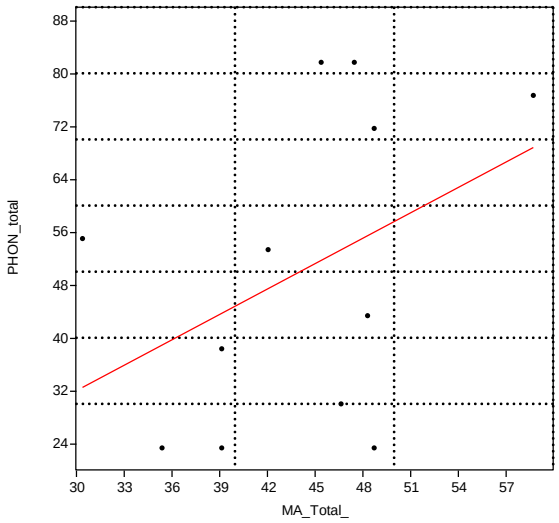


Figure 34. Linear Correlation for MA and Phoneme Awareness, r=0.41, p=0.18

The linear correlations for the Setswana LoLT (Group T.NW) indicates a correlation between Syllable Awareness (r=0.55) and MA, this correlation is not significant. There is also a correlation between Phoneme Awareness and MA, (r=0.41), but this is not statistically significant, p>0.05.

4.3.2.2.2 Setswana L2 LoLT (Group E.NW)

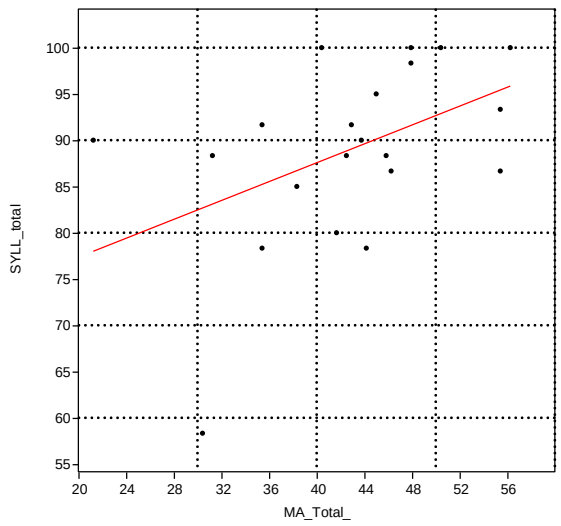


Figure 35. Linear Correlation for MA and Syllable Awareness, r=0.45, p<0.05

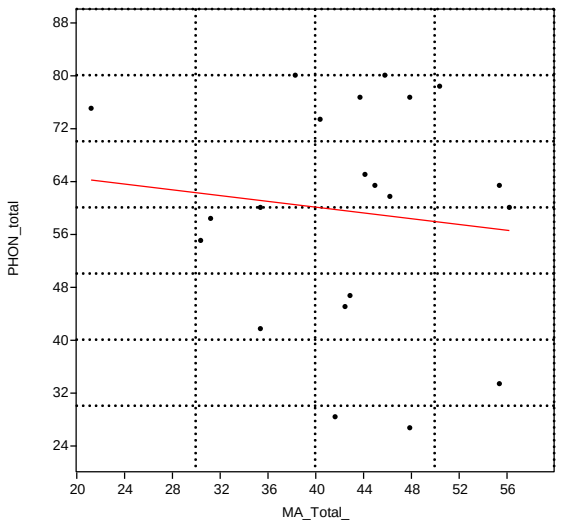


Figure 36. Regression for MA and Phoneme Awareness, r=-0.11, p=0.63.

For the L2 LoLT (Group E.NW) learners, there is a positive correlation (r=0.45) between Syllable Awareness and Morphological Awareness. This correlation is statistically significant, p<0.05. This suggests that for these learners' Morphological Awareness and Syllable Awareness are related thus with increased Syllable Awareness comes increased Morphological Awareness. The correlation between Phoneme Awareness and MA is weak (r=0.11), but statistically significant, p>0.05.

Following on from the earlier argument that Setswana syllables and morphological units are confounded, the disjunctive orthography helps learners become aware of syllables (and then morphemes), or both simultaneously. The correlations between Syllable and Morpheme Awareness support this.

4.3.2.3 Comprehension between the Setswana schools

For comprehension, univariate statistics and a set of multiple regressions were conducted to establish whether there is a relationship between the metalinguistic skills (Syllable Awareness, Phoneme Awareness and Morphological Awareness) to comprehension.

Table 29: Comprehension for Setswana LoLT and English LoLT

	Group T.NW (N=12)		**Group E.NW (N=21)**			
Measures	Mean	SD	Mean	SD	t-value	p-value
Comprehension (incl. reading speed)	26.67	23.09	42.86	21.25	-1.82	0.07
Adjusted Comprehension (excl. Reading speed) [(comp/crpm)* 100]	0.56	0.41	1.96	0.97	4.27	<0.001
Characters Read Per minute (CRPM)	208.21	99.65	137.90	78.82	3.16	<0.05

From the above table (Table 29) it is shown that the L2 LoLT learners (Group E.NW) did better with comprehension than the Setswana L1 LoLT learners. The difference between the comprehension scores (including speed) was not significant, t (31) =-1.82, p=0.07. The difference in the scores for adjusted comprehension for the two schools was however highly significant using a two samples t-test, t (31) =-4.27, p<0.001.

A multiple regression was conducted in order to establish the relationship between the three metalinguistic skills and comprehension. For the Setswana learners it was found that there was no correlation between the three metalinguistic skills (Syllable Awareness, Phoneme Awareness and Morphological Awareness) to comprehension (speed factor included), R^2=0.21, p(regr)=0.45. Similarly, for the adjusted comprehension (removes speed variable), there was no significant correlation found, +MANOVA, R^2=0.15, p (regr) =0.57. The English LoLT (Group E.NW) showed a significant correlation between Syllable Awareness and total comprehension, r=0.57, p<0.05. This is shown in the scatterplot below (Figure 37). Phoneme Awareness was correlated with adjusted comprehension, however this was a negative correlation, r=-0.57, p<0.05, see Figure 38 below. The negative relationship which exists between phonemes and access to meaning in these learners could be attributed to the use of grapheme-to-phoneme mappings, which adds to the cognitive load on learners when decoding thereby placing extra demands on the learners' short term memory. The overall combination of the three metalinguistic skills was shown to be significant, R^2=0.23, p (regr) <0.05.

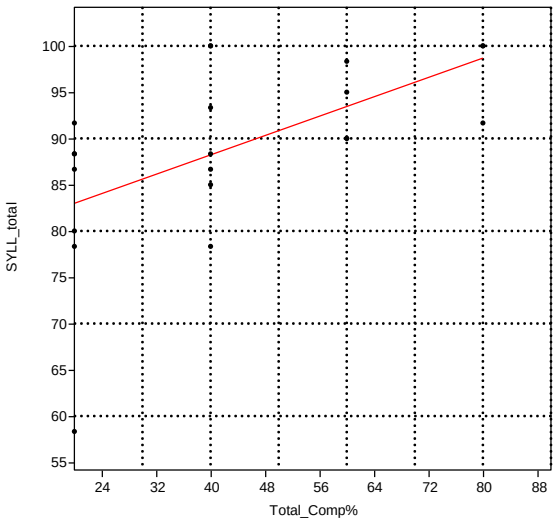


Figure 37. Syllable Awareness and Total Comprehension L2 LoLT, r=0.57, p<0.05.

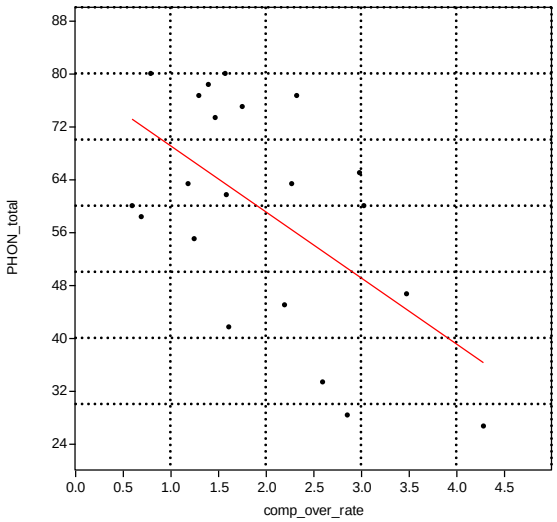


Figure 38. Phoneme Awareness and Adjusted Comprehension L2 LoLT r=-0.57, p<0.05.

4.3.2.4 Summary of Setswana results: Effect of LoLT

The results for Setswana showed that;

- The L2 LoLT learners (Group E.NW) have higher levels of Phonological Awareness than the L1 LoLT group. The L1 learners (Group T.NW) did better on the Morphological Awareness Tasks. The differences between the scores between the two groups was however not significant.
- A strong but non-significant correlation between MA and PA for the L1 Setswana LoLT (Group T.NW) school
- The L2 LoLT (Group E.NW) learners showed a weak, but significant correlation between MA and PA.
- For comprehension, the L2 LoLT learners (Group E.NW) scored higher for comprehension as well as for the adjusted comprehension score in comparison to the L1 Setswana learners (Group T.NW). These differences were found to be statistically significant. (p<0.05 and p<0.001 respectively).

4.3.3 Decomposition Results: Grain size differences between schools

A summary of the decomposition results for each school is presented below. Each table includes the average d-prime score, hit rate and false alarm rate. The hit rate is the number of correctly identified syllable/morpheme boundaries, whilst the false alarm rate is the number of incorrect syllable/morpheme boundaries identified.

4.3.3.1 IsiXhosa

4.3.3.1.1 IsiXhosa L1 LoLT (Group X.EC)

Table 30: Decomposition Task (d-prime) results for isiXhosa LoLT

Grain Size	Average d-prime	Hit Rate	False Alarm
Syllables	1.20	73	27
Morphemes	0.60	62	38

4.3.3.1.2 English LoLT (Group E.EC)

Table 31: Decomposition Task (d-prime) results for English LoLT

Grain Size	Average d-prime	Hit Rate	False Alarm
Syllables	1.06	70	30
Morphemes	0.40	59	42

Table 32: Paired t-test for Decomposition, isiXhosa

Grain size	T-value	p-value
Syllables	-1.02	0.31
Morphemes	0.96	0.34

From the tables (30 &31), it is shown that the isiXhosa LoLT School (Group X.EC) scored higher for both morphemes and syllables (M=1.20, M=0.60) than the English LoLT School (M=1.06, M=0.40). These isiXhosa LoLT learners are able to identify morpheme and syllable boundaries more accurately than the English LoLT (Group E.EC) learners. In addition to this, the hit rate averages for both groups is higher for syllables than for morphemes, which indicated that learners at both schools are able to identify syllable boundaries more correctly than they are morpheme

boundaries. The results for Setswana pattern in a similar way to the isiXhosa results for syllables. However, there is a slight difference in morpheme identification. For the isiXhosa children the L1 LoLT Group X.EC scored higher than the English LoLT Group (Group E.EC). Using a t-test between the two schools it was shown that there was no significant difference. The opposite is true of Setswana.

4.3.3.2 Setswana

4.3.3.2.1 Setswana LoLT (Group T.NW)

Table 33: Decomposition Task (d-prime) results for Setswana LoLT (Group T.NW)

Grain Size	Average d-prime	Hit Rate	False Alarm
Syllables	1.56	78	22
Morphemes	-0.37	43	57

4.3.3.2.2 English LoLT (Group E.NW)

Table 34: Decomposition Task (d-prime) results for English LoLT (Group E.NW)

Grain Size	Average d-prime	Hit Rate	False Alarm
Syllables	1.14	71	29
Morphemes	-0.06	49	51

Table 35: Paired t-test scores for Decomposition Task, Setswana

Grain size	T-value	p-value
Syllables	4.0092	<0.05
Morphemes	5.9664	<0.001

For the Setswana learners, both groups scored higher with syllables than with morphemes. The scores for morphemes are negative for both groups; the false alarm rate is higher than the hit rate. This indicates that the learners are placing morpheme boundaries incorrectly more often than they are correctly. The English LoLT (Group E.NW) learners do better with morphemes than the L1 LoLT Group, with the hit rate for correctly identified morpheme boundaries being higher for Group E.NW (*HR*=49), than it is for Group T.NW (*HR*=43). As can be seen in Table 35, the differences in scores between the two schools are statistically significant for both syllables and morphemes. This difference in use of grain size between the two schools could be an artefact of

the teaching method. Teachers may choose to place emphasis on different grain sizes in their teaching, highlighting the use of this unit as a grain sizes in the language.

4.3.4 Discussion: Effect of LoLT on determining grain sizes in isiXhosa and Setswana

Reading in a second language involves the interplay of two language systems. The question which arises from this is whether reading strategies are determined by the learner's first-language or by the language in which he/she received schooling. In particular, when a learner receives schooling in an additional (second) language, does this influence reading strategies in their first-language? Much of the research has focused on the transfer of reading strategies from a learner's first-language to reading in their second language. These studies are limited in that they only examine the effect of L1 on L2 reading, thus ignoring the impact that second language reading may have on first-language reading. For this reason, the current study chose to look into this side of the spectrum, focusing on whether learning to read in a second language influences learners' reading strategies in their first-language. Comparison studies on second language reading will however be drawn upon to see whether the results on first-language reading support or contradict what the literature says on second language reading.

According to the interdependence model (Cummins 1979, 1999), it is believed that literacy instruction in a child's first-language facilitates development of cognitive academic skills which are necessary for successful development of those skills in their second language. In the context of South Africa, the question which arises from this is whether literacy instruction in a child's second language will also play a similar role in facilitating the cognitive academic skills necessary for reading in their first-language.

4.3.4.1 Differences in metalinguistic skills

For the metalinguistic tasks it was found that the isiXhosa LoLT (Group X.EC) learners did better with syllables than the English LoLT group with the English LoLT group performing better on the Phoneme Awareness and Morphological Awareness task, shown through the mean scores on each task. The differences between the two groups were however not statistically significant. This finding is supported by the findings of Wilsenach (2013) who in her study on Phonological Awareness in emergent Northern Sotho/English learners found that the learners who received schooling in their L1, Northern Sotho, had better Phonological Awareness skills on the syllable level than the learners who had received schooling in English. The results of the Setswana learners however contradict this. For Setswana it was found that the learners who received first

literacy in English had higher Phonological Awareness than those who received first literacy in their first-language, Setswana. Alcock *et al*. (2010) provides further support for the higher levels of Syllable Awareness in the L1 learners. According to Alcock *et al.* (2010), phonological skills are shaped by the phonological structure of a language. Thus children who learn in consistent languages with a simple CV syllable structure, such as Italian or Turkish, show better Syllable Awareness than children learning to read in English. The same is true for the isiXhosa learners.

For Morphological Awareness in isiXhosa the English LoLT group had higher awareness than the L1 isiXhosa LoLT group. Deacon *et al.* (2007) provided evidence of bidirectional transfer of Morphological Awareness. This study looked at French and English. They found that Morphological Awareness transferred from English to French and from French to English. Thus Morphological Awareness in these learners, transferred to their L1. Although the current study did not look at English Morphological Awareness, the children who attended school in English displayed higher Morphological Awareness than those who attended school in isiXhosa.

Metalinguistic skills in Setswana showed the English LoLT (Group E.NW) learners to do better with syllable and Phoneme Awareness, with the Setswana LoLT learners (Group T.NW) doing better with Morphological Awareness. This was shown using univariate statistics and comparing the mean scores. For Setswana the English LoLT learners do better with Phonological Awareness and the Setswana learners with Morphological Awareness. This contradicts the findings of Wilsenach (2013) who found that the L1 learners had better Syllable Awareness than the English group. A similar finding for Setswana should follow given that both Northern Sotho and Setswana comprise the Sotho Group of the Southern-Bantu language family. Furthermore both are disjunctively written. Morphological Awareness is higher in the L1 Setswana learners because of the language's rich morphology. Thus it is expected that the learners who engage in Setswana rather than in English in schools have higher awareness of the morphemes in their language.

Phoneme Awareness was shown to be higher for both English LoLT schools. This can be attributed to English learning, where there is a preference towards a phonics-teaching method. It is thus assumed that in the teaching of English there is greater emphasis placed on the phoneme, whereas in the teaching of isiXhosa and Setswana the syllable and morpheme play greater roles. The emphasis on the phoneme level transfers to greater Phonological Awareness in their first-language.

All results for the metalinguistic skills for isiXhosa and Setswana were not significant according to a two-sample t-test. This suggests that LoLT has no significant effect on the first-language metalinguistic skills of isiXhosa and Setswana learners. A possible suggestion which is implied by this is that it is the learner's first-language which is the primary factor that determines performance on metalinguistic skills. This suggests that the first-language may be more important than LoLT. However, this study did not look into the influence on English reading. This remains to be investigated. If this is true, the learners' linguistic background is important. Teachers would need to take into account that the learners' first-language may influence their literacy. It is important that teachers are equipped to deal with this considering the multilingual classrooms found in the South African context.

4.3.4.2 Grain size differences

The syllable is the dominant grain size unit in isiXhosa and Setswana learners. This was revealed in the decomposition task results and the higher levels of Syllable Awareness in comparison to Phoneme and Morphological Awareness. These results are consistent with the previous sections (4.1 & 4.2). These languages are considered syllable-timed languages. The syllable is thus readily available to the reader and is relatively consistent throughout. The consistency of the syllable in these languages makes recognition of the syllable a simple task which translates into the use of the syllable as a literacy processing unit in reading. According to Asfaha *et al*. (2009), when the syllable is a salient feature of a language and is not represented in the orthography, but is included as a unit in teaching then the use of this unit size in teaching leads to better decoding.

Reading in the early years cannot be divorced from its classroom context. The syllable plays a strong role in the teaching of isiXhosa and Setswana, referred to as the 'ba,be,bi,bo,bu/ma,me,mi,mo,mu' method which is used in African classrooms. The use of the syllable in teaching may be the reason for its dominance as a grain size in these languages. Learners are therefore very tuned into syllables. This makes sense given the syllabic nature of these languages and this has implications for literacy instruction. As mentioned by Asfaha *et al.* (2009) it may be most productive to teach reading and writing in the Latin alphabet using the easy to access syllable as a starting point in simple syllable structured languages, but how does it impact on the development of fast and accurate reading instruction in these languages? Cana syllabic approach on its own make for effective instruction and how much variance does it account for in skilled reading in conjunctive/disjunctive orthographies?

Comparisons between the schools for the decomposition tasks show that, for the isiXhosa group, the isiXhosa LoLT (Group X.EC) learners did better with both syllables and morphemes than the English LoLT schools. This shows that the isiXhosa LoLT group did better with the decomposition task overall. For Setswana learners, the Setswana LoLT (Group T.NW) learners did better with syllables than the English group, whilst the English LoLT group did better with morphemes.

There is a contradiction between the results of the univariate statistics and the decomposition task for Setswana. This may be a discrepancy factor of the schools' quality and medium of instruction. However, it can also be attributed to the fact that these tasks are measuring different things. The decomposition task is not a task of awareness, but investigates grain size unit in decoding. The decomposition task revealed the use of the morpheme as a grain size was more dominant for the English LoLT (Group E.NW) learners, whilst the univariate statistics indicated that they have better Phonological Awareness than Morphological Awareness in comparison to the Setswana LoLT learners. In English it is difficult to break up sentences into syllables due to the large amount of possible syllables, hence these learners chose, an alternative method of using morphemes when breaking up sentences in Setswana. Furthermore, the disjunctive nature of the language makes this a simpler task.

The findings and discussion provide further evidence of the use of more than one grain size used by isiXhosa and Setswana learners in approaching reading in their first-language. This supports earlier conclusions from Section 4.1.

4.3.4.3 Comprehension

The comprehension scores revealed that for the isiXhosa learners, the isiXhosa L1 group did significantly better than the English LoLT group for comprehension (including speed) and adjusted comprehension (excluding speed). According to the multiple regressions the only metalinguistic skill to correlate to comprehension for the L1 group was Syllable Awareness. This correlation was only of significance when speed was included. There were no correlations between the metalinguistic skills and comprehension for the English LoLT group. This finding is consistent with Wilsenach (2013) who found that the Northern Sotho learners did better with reading than the learners who received literacy instruction in English. Wilsenach (2013) also found that Phonological Awareness was correlated to reading in the Northern Sotho learners. In this study, for isiXhosa, Syllable Awareness correlated to comprehension (including speed).

In contrast, the Setswana results showed that the English LoLT learners did significantly better for both comprehension (including speed) and the adjusted comprehension (excluding speed). This contradicts findings of Wilsenach (2013). Furthermore, there were no correlations between the three metalinguistic skills (Syllable Awareness, Phoneme Awareness and Morphological Awareness) to comprehension in the L1 LoLT learners. For the English LoLT group however, a correlation was found between Syllable Awareness and total comprehension (including speed), but not for adjusted comprehension (excluding speed). It was further found that there was a negative correlation between Phoneme Awareness and the adjusted comprehension score.

4.3.4.4 Conclusion: Effect of LoLT on Grain sizes

This section answered the question of whether reading strategies are determined by the learner's first-language or by the language in which he/she received schooling. In particular, when a learner receives schooling in an additional (second) language, does this influence reading strategies in their first-language? This was done by investigating the differences in metalinguistic scores and at grain size unit used in reading. Comparisons between schools were made for each language.

The results of this chapter revealed that for isiXhosa;

- The L1 LoLT learners scored higher for Syllable Awareness than the L2 English LoLT group.
- The L2 LoLT learners did better with Phoneme and Morphological Awareness.
- The L1 learners did better with comprehension than the L2 Group.

For Setswana it was shown that;

- The L2 learners did better with Syllable Awareness than the L1 LoLT group.
- The L2 group also did better on the Phoneme Awareness task.
- In addition, the L2 LoLT learners did better with comprehension than the L1 LoLT group.
- The L1 group scoring higher on the Morphological Awareness Task.

The isiXhosa and Setswana results for the two different types of schools contradict one another, with the exception of Phoneme Awareness. Phoneme Awareness was shown to be better in the English schools for isiXhosa and Setswana. This was attributed to an English teaching method,

where a phonics-teaching method is most often adopted. This transfers to their first-language skills.

Results on the metalinguistic tasks for isiXhosa and Setswana were not statistically significant. This suggests that LoLT has no significant effect on these linguistic skills. Furthermore, the dominant grain size for isiXhosa and Setswana between the different schools was the syllable. This is consistent with the findings of the previous sections (4.1 & 4.2). For the open-ended decomposition task, which measured grain size, it was shown that the L1 isiXhosa learners did better with both syllables and morphemes than the L2 group. In contrast the Setswana L2 group did better with morphemes than the L1 group.

As discussed in section 4.3.4.1 above, the findings imply that the learner's first-language is the primary factor that determines performance on metalinguistic skills. This suggests that the first-language may be more important than LoLT. However, this study did not look into the influence on English reading. This remains to be investigated

SECTION 4. Research Questions 4 and 5: Developing a model of word recognition applicable to the Southern-Bantu Languages

In the previous chapters I addressed the first three research questions relating to the contribution of Phonological Awareness and Morphological Awareness in determining grain size in isiXhosa and Setswana, the effect of orthography on grain sizes and the how LoLT influenced grain size in word recognition. These sections focused on each of these factors (metalinguistic skills, orthography and LoLT) individually. This section will synthesize the findings to establish a model of reading for the Southern-Bantu Languages.

This section will answer the remaining two research questions namely, (4) how the three themes (metalinguistic skills, orthography and LoLT) interact with each other in word recognition, and, (5) which model of word recognition is best suited to orthographic words in the Southern-Bantu languages.

A word recognition model best suited towards orthographic words in the Southern-Bantu languages needs to take into account the different writing systems, conjunctive and disjunctive. The use of grain-size in approaching word recognition may differ depending on the writing system in which the learner is reading. This is consistent with the finding that word recognition strategies differ across orthographies. Furthermore, a model of word recognition suitable to the Southern-Bantu languages needs to take into account word length, particularly in conjunctive orthographies where a whole sentence can form one orthographic word. Taking into consideration that the Southern-Bantu languages are morphologically rich, a word recognition model applicable to the Southern-Bantu languages needs to allow for a morphemic level. It needs to be continuous and not confined to an either/or strategy, as it has been proven that learners employ mixed strategies (see section 4.1.5.3, as well as Probert 2013 and Probert & De Vos 2014). Furthermore, in the context of South Africa, LoLT needs to be considered in the model of word recognition for the Southern-Bantu languages, and the transfer of these strategies across languages.

For isiXhosa and Setswana, grain size was dependant on orthography, particularly the conjunctive and disjunctive writing systems. Similarly, the levels of metalinguistic skills, Phonological Awareness and Morphological Awareness, differed between the two orthographies. LoLT influenced metalinguistic skills in isiXhosa and Setswana learners, but these differences were not statistically significant. Furthermore, LoLT did not have a significant effect on

determining grain size between the languages. The diagram (Figure 39) below illustrates the interaction between the three factors, metalinguistic skills, orthography and LoLT with grain size as found in this study.

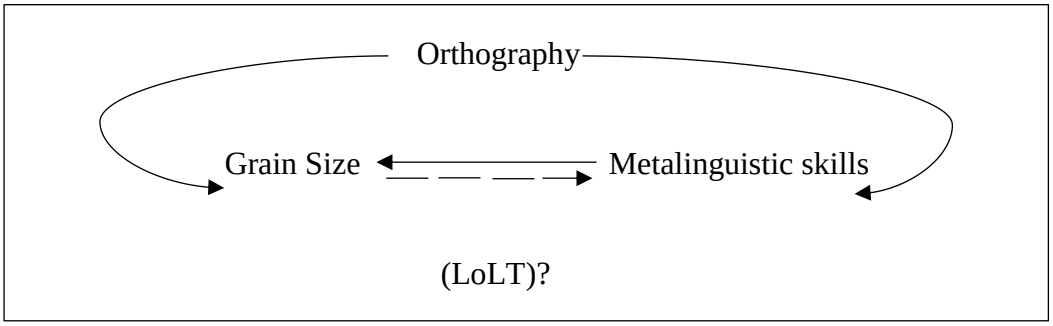


Figure 39. Model of the interaction found between grain size, metalinguistic skills, orthography and LoLT in determining word recognition strategies in the Southern-Bantu languages.

The following section explains the model presented above (Figure 39), illustrating the relationship between the factors. According to the literature, metalinguistic skills would be acquired before grain size, as the learner needs to be able to map sound to symbol first (Wolf 2008). A learner who is learning to read needs to first become familiar with the alphabetic principle; the concept that letters code phonological information and that there is a relationship between printed words and how they are pronounced. The alphabetic principle underlies the development of decoding; the active process of mapping orthography to phonology (Share 1995). According to Ziegler & Goswami (2005) reading involves a process of identifying and extracting units of correspondence between sounds and spelling in a language. These grain sizes are determined by linguistic constraints of the language and orthography. Once the learner has developed a grain size with which he/she uses when approaching word-reading, this grain size can further reinforce their metalinguistic skills. A reciprocal relationship is therefore found between the metalinguistic skills and grain size similar to that found in Phonological Awareness and reading. Phonological Awareness is necessary for decoding and decoding is essential for successful reading. Reading and the skills which are involved in reading however also enhance Phonological Awareness levels further (Diemer 2013, Chard and Dickson 1999, Adams 1990). A double arrow is thus shown between grain size and metalinguistic skills. The arrow from grain size to metalinguistic skills is perforated as grain size enhances metalinguistic skills. It does not necessarily influence them. The effect of LoLT (and bilingualism) has not yet been established in the literature. In the proposed model (Figure 39), LoLT has been indicated as a bystander. Although it did not significantly affect first-language reading in this study, it may influence

second-language reading. LoLT appears at the bottom of the model to indicate that it may play an underlying central role; however its role has not yet been fully established. LoLT therefore needs to be accounted for in future research.

4.4.1 Explaining the proposed model

This section begins with a discussion on orthography and its relationship to grain size, followed by a discussion on orthography and the metalinguistic skills. The third section presents an argument for the link between metalinguistic skills and grain size. This section examines the relationship between grain size and metalinguistic skills from both directions, closing the loop in the proposed model. An argument is presented for the potential influence of LoLT, concluding with a discussion on recommendations for future research needed to develop the proposed model further.

4. 4.1.1 Orthography and grain size

The relationship between orthography and grain size has been situated in word recognition models. This section discusses the predictions of the Dual-route Cascaded Model of word recognition (DRC), the Orthographic Depth Hypothesis (ODH) and the Psycholinguistic Grain Size Theory (PGST), to establish whether or not the findings of this study are consistent with these models. In other words, the question of whether the findings for isiXhosa and Setswana fit in the standard theory is answered. Studies on orthography have focused on comparisons between transparent and non-transparent orthographies. These languages are structurally and linguistically different. The two languages under investigation in this study are however closely related, both from the same language family. Furthermore, they share similar linguistic structures. The main difference between them being that isiXhosa uses a conjunctive writing system, while Setswana uses a disjunctive writing system.

The Dual-Route Cascade Model (DRC) of word recognition predicts that there are two distinct pathways along which reading takes place, a sublexical (phonological) route in which the reader relies on grapheme-to-phoneme mappings in their decoding, and a lexical (orthographic) route in which the reader relies on whole-word representations. The Orthographic Depth Hypothesis (ODH) was an extension of the DRC model of word recognition. The ODH attributed the use of the different routes (sublexical or lexical) to orthographic depth. The ODH predicted that readers of shallow, transparent orthographies rely on the phonological, (sublexical) route because of the

consistency between the mappings of grapheme to phoneme. Readers of deep, inconsistent orthographies however relied on the orthographic (lexical) route.

Studies which provided support for the DRC and ODH focused on non-word and real-word reading in order to establish the use of these two pathways used by readers (Ellis *et al*. 2004, 2001, Wimmer & Goswami 1994, Rack, Snowling & Olson 1992). This was based upon error types (see Wimmer & Hummer 1990). Probert (2013) provided support for the ODH in Southern-Bantu languages based on findings on word recognition tasks by isiXhosa/English emergent bilinguals. Probert (2013) found that isiXhosa learners who received first literacy in isiXhosa employed sublexical reading strategies when approaching real and pseudo-word reading. Similarly, the isiXhosa learners who received first literacy in English approach isiXhosa real word reading using sublexical reading strategies. Furthermore, learners who had received first literacy in English approached English pseudo-word reading using lexical strategies. Learners were thus shown to use a combination of sublexical and lexical reading strategies when approaching the reading of English words. These findings are consistent with weak ODH. As mentioned in section 2.4.1.1.3, the weak ODH states that decoding comes not only from grapheme to phoneme mappings, but is also accessible from stored memory (activating lexical reading strategies). The degree to which each is used is a function of the orthographic depth (Katz & Frost 1992).

The Psycholinguistic Grain Size Theory (PGST) was introduced building on from the predictions of the DRC and ODH. The PGST considers reading to depend upon the frequency of mappings between orthographic units and phonology. The PGST works on a continuum of grain sizes, and is therefore not restricted to an either/or approach. Similar to the DRC and ODH, the PGST argues that different orthographies use different strategies, with consistent orthographies relying more on smaller grain sizes than inconsistent orthographies, with neither restricted to a specific grain size (Ziegler & Goswami 2006). The PGST considers three factors which aid reading, availability, consistency and granularity (these are outlined in section 2.4.1.2). Furthermore, grain sizes emerge in response to different kinds of pressures: "(a) functional pressure toward smaller units that are orthographically less complex, (b) linguistic pressure toward bigger units that are phonologically more accessible, and (c) statistical pressure toward units that are more consistent than others" (Ziegler & Goswami 2005: 20). Thus according to the PGST, development of grain sizes in reading is dependent on task constraints, stimuli, method of reading instruction, and the language.

4.4.1.2 Compatibility of models with findings of this research

The Dual-route Cascade Model (DRC) can be ruled out as a model which is suitable for the Southern-Bantu languages as it only predicts the use of a sublexical and lexical strategy approach. The DRC does not take into consideration word length and how this may affect the use of these strategies. In the context of the Southern-Bantu languages word length is important given that a sentence can be expressed as a single word, for example,

1) Ndiyakuthanda (isiXhosa)
   1sg-pres-LOVE-fv
   'I love you'

Furthermore, it was shown in Probert (2013, 2014) that length influences reading strategies in isiXhosa learners. According to these studies, word length has two types of effects on reading: (a) It promotes sublexical decoding strategies over lexical strategies and (b) error rates increase as word length increases. Error rates are affected differently depending on whether the words are familiar or unfamiliar and whether lexical or sublexical strategies are used.

Probert (2013, 2014) looked at words in isolation, whereas the current study focused on sentence reading. Findings showed that the isiXhosa and Setswana learners applied grain size units larger than the phoneme-to-grapheme level, but not as large as whole word mappings. The syllable and morpheme were the grain size units employed by the learners. In order to make this fit the DRC, one might extend the definition of lexical to fit the Southern-Bantu languages, thus addressing the issues of word length in the Southern-Bantu languages. In English a whole-word is the whole orthographic word. This could be refined to the syllabic or morphemic level for Southern-Bantu languages. However, the morphemic level is also sublexical as the morpheme cannot exist in isolation. The distinction between sublexical and lexical is thus unclear in the Southern-Bantu languages. This challenges the applicability of the categorisation of lexical and sublexical to the Southern-Bantu Languages.

The findings of this study provide support for the weak ODH. The weak ODH suggests that reading involves the use of both lexical and sublexical reading processes. The difference between shallow and deep orthographies depends on the extent to which readers rely on each route. Readers of shallow orthographies rely more on sublexical strategies and readers of lexical orthographies rely more on lexical strategies. Evidence for this has been shown for shallow

orthographies: German, Welsh, Spanish and Greek, and for deep orthographies: English and French. The strong version of the ODH stated that readers of shallow orthographies always read using sublexical strategies (Turvey, Feldman & Lukatela 1984).

There were slight differences between isiXhosa and Setswana, with the syllable as the dominant grain size. The isiXhosa learners however also used the morpheme as a secondary grain. Furthermore, the Setswana learners displayed higher levels of Phonological Awareness, with the isiXhosa learners having higher Morphological Awareness.

Although both isiXhosa and Setswana are transparent orthographies they vary in complexity, which could be attributed to their writing system. As argued in section 4. 1. 3, if it is true to say that Setswana is more transparent than isiXhosa, it would be consistent with the ODH as the Setswana learners do better with Phonological Awareness than the isiXhosa learners. As stated in the weak ODH more transparent orthographies would have stronger Phonological Awareness, with a deep orthography relying more on a morphological (lexical) level (Katz & Frost 1992). It is logical that the isiXhosa learners do better with Morphological Awareness and use the morpheme as a grain size in contrast to the Setswana learners. Despite being transparent orthographies, learners employed the syllable and/or morpheme as grain sizes which provide evidence against the strong version of the ODH.

The PGST allows for a syllable level which is consistent with the findings of this study. This was also demonstrated in Adinis & Nunes (2001) who showed that Syllable Awareness was useful for Greek word recognition due to the orthography of the Greek language, with further support from McBride-Chang *et al*. (2005) who found the syllable to best explain character acquisition. The syllable was the dominant grain size in isiXhosa and Setswana learners, with learners doing better with Syllable Awareness than phoneme or Morphological Awareness. Syllable Awareness aided reading speed in both isiXhosa and Setswana.

4.4.1.3 Orthography and Metalinguistic skills

Learning to read is fundamentally metalinguistic. Understanding mappings in a writing system requires finding out what linguistic units are represented by the orthography, for example phonemes, syllable or morphemes. The learner thus needs to be able to make sense of these metalinguistic units (Nagy & Anderson 1995). Phonological Awareness relates to orthography in that, spelling-to-sound consistency varies across orthographies (Frost, Katz, & Bentin, 1987).

Furthermore, morphological relations also differ across orthographies. The relative contributions of these to reading development therefore differ depending on the writing systems (Cho, Chiu & McBride-Chang 2011: 384). Languages differ in their complexity of phonological structure. They also differ in how they represent the spoken language in written form, thus Phonological Awareness develops in relation to a particular language and orthography. Some of the first studies on how Phonological Awareness related to orthography considered how differences among languages many lead to differences in the development of Phonological Awareness. It has been found that reading is acquired at a faster rate in shallow orthographies in comparison to deep orthographies (Anthony & Francis 2005, Share 2008).

Findings of the current study showed that grain size was language specific. Furthermore, Setswana learners did better with Phonological Awareness than the isiXhosa leaners, whilst the isiXhosa learners did better with Morphological Awareness. These differences between the languages were statistically significant. As discussed in the data analysis section 4.2.1, transparency aside, Morphological Awareness plays a greater role for learners of a conjunctive orthography than the learners of a disjunctive orthography. Furthermore, as argued in section 4.2.3, if Setswana is considered to be the more transparent of the two orthographies it would be consistent with the literature that these leaners have higher levels of Phonological Awareness than the isiXhosa learners which is attributed to the nature of their writing systems. However, as you can recall the Setswana learners performed somewhat better on syllable and phoneme awareness tasks as well as comprehension and reading speed (in terms of characters per minute). The Setswana learners were thus slightly better readers overall and slightly better readers will perform better on these measures than weaker readers. The amount of exposure and attention given to reading in the two schools thus needs to be taken into consideration.

4.4.1.4 Grain size and metalinguistic skills

A question which arises from the relationship between grain size and the metalinguistic skills is whether the two are incidentally related or causally related. In other words, it is questioned whether there a correlation between the factors because they are both dependent on orthography, or is the correlation found because metalinguistic skills affect grain size (and vice versa). The current literature on grain size and metalinguistic skill has not emphasised the relationship between the two explicitly.

It has been outlined above that both grain size and metalinguistic skills are influenced by the orthography and/or writing system in which the learner is reading. As such it would follow that there should be a correlation between metalinguistic skills and grain size in line with the orthography. Grain size among isiXhosa and Setswana learners are consistent with the findings for the metalinguistic skills. The Setswana learners scored higher with syllables than the isiXhosa learners, with the isiXhosa learners scoring higher with morphemes. Thus for the isiXhosa learners, their higher levels of Morphological Awareness infiltrated into the use of the morpheme as a secondary grain as evidenced in the decomposition task.

In addition to this it has been proposed that Phonological Awareness follows a developmental sequence similar to that shown in the hierarchy of word structure relating to grain sizes (Figure 23, section 4.1.5.1) (Ziegler & Goswami 2005, Stanovich 1992). Thus Phonological Awareness and grain size are closely associated. The learners who had higher Syllable Awareness used the syllable as their dominant grain size, whilst those with higher Morphological Awareness displayed higher scores with morphemes on the decomposition task.

4.4.1.5 Language of Learning and Teaching (LoLT)

The PGST argued that the nature of instruction is important for understanding reading development. According to Zeigler & Goswami (2005), the grain size problem is tackled by the teacher. In alphabetic orthographies, the learner is often taught letter–sound correspondences, placing emphasis on phonemes, resulting in the development of smaller grain sizes at the grapheme-to-phoneme level. This works in languages with consistent orthographies such as Italian, but not in a deeper orthography such as English, where the focus often falls on the use of larger grain sizes due to the inconsistencies in the orthography. Ziegler & Goswami (2006) make mention of the different types of approaches which can be used in teaching differing grain sizes depending on orthography, for example, phonics-based teaching, large to small-grain size teaching and whole-word teaching approaches. These influence the grain size adopted by the learners. LoLT will thus affect use of grain size across orthographies.

LoLT is shown as separate in the model presented above in Figure 39. The exact relationship of LoLT in determining reading strategies in first-language reading is not yet fully established. LoLT did not significantly affect grain size, nor was it found to influence the metalinguistic skills significantly between the different schools. LoLT is therefore illustrated as a bystander. It is a reserve player who may come into play at a later stage, such as with second-language reading.

This study focused on first-language reading. Probert (2013, 2014) focused on the transfer of reading strategies from isiXhosa to English reading. Learners who received first literacy in their first-language were able to transfer those skills more easily than the learners who received first literacy in English. In addition to this, learners who received first literacy in their first-language were able to recognize the need for whole-word recognition and are able to implement it as a strategy when confronted with another language, despite not using it as a strategy in this first-language reading. Those learners who had received first literacy in English transferred skills but these were not always successful in that transfer of lexical strategies can set them up for failure and they failed to transfer sublexical decoding strategies to novel contexts. LoLT therefore still needs to be considered and accounted for but currently has no influence on first-language reading.

4.4.1.6 Conclusion

The syllable was the dominant grain size overall for isiXhosa and Setswana. The orthography of these languages privileges the syllable due to their characteristic trait of being syllable-timed languages. The syllable is thus a salient linguistic unit in the orthography. In addition to this both the isiXhosa learners and the Setswana learners scored higher with Syllable Awareness in comparison to their scores on the Phoneme Awareness and Morphological Awareness tasks. These three factors work together resulting in the dominant use of the syllable in word recognition strategies in isiXhosa and Setswana learners. The LoLT will influence this depending on the linguistic unit which is focused on by teachers in classrooms, be it at the phoneme-to-grapheme, syllable or whole-word level.

4.4.2 Most suitable-model of word recognition for the Southern-Bantu languages

None of the current models of word recognition (DRC, ODH and PGST) emphasise a central role for the morpheme in decoding strategies. The PGST does makes mention of intermediate levels of grain size which allows room for the morpheme. Furthermore, Ziegler & Goswami (2006) acknowledge that the PGST does not pay sufficient attention to the role of morphology in decoding. This was pointed out by Durgunoglu (2006), Frost (2006) and Caravolas (2006) who stated that phonological development cannot be considered in isolation from morphology, particularly in agglutinative languages. This is true to the Southern-Bantu languages. Furthermore, in Frost (2006) root morphemes in Hebrew, which are considered large grain sizes, are used for decoding. Thus smaller grain sizes were not utilised by these learners, because they were unavailable in the orthography, not because they are inconsistent. Ziegler & Goswami

acknowledge that morphology should be given a greater role in PGST, both in terms of predicting the availability of smaller grain sizes prior to literacy across languages, and in explaining the grain sizes used in decoding.

The PGST places too much emphasis phonological decoding. The DRC and ODH are binary and too simplistic to be fitted to the complexity of the Southern-Bantu languages, where the concept of a word is inconsistent. Furthermore, neither of the models takes word length into account, which the PGST does. According to the PGST, if reading is achieved by grapheme-to-phoneme conversions in shallow orthographies than reaction times should increase as a function of word length. A study on Italian by Peressotti & Mulatti (2005) confirmed this. They compared 5 and 6 long words in lexical decision and reading aloud tasks. This showed that just one letter was enough to elicit significant length effect in a shallow orthography. Weekes (1997) who investigated length effects in English, a deep orthography found that in comparing reaction times of 3 and 6 letter words in English, reaction times were the same for both. This suggests the use of the lexical route. Length effects were clear in shallow orthographies which show a dominance of grapheme-to-phoneme strategies. Length had no effect in deep orthographies which suggested that readers are most likely relying on larger units of phonological recoding or resort to multiple decoding strategies (Lima and Castro 2010).

The PGST is the most applicable model currently found in the literature. It acknowledges an intermediate level, due to its continuum of different developmental grain sizes, thus allowing for the morpheme to act as a potential grain size. The PGST considers word length effects which is essential in understanding word recognition in the Southern-Bantu languages. Furthermore, the PGST is the only model which currently considers the influence of medium of instruction on word recognition strategies.

The PGST schematic depiction of the main problems of reading acquisition: availability, consistency and granularity, is well suited to the model proposed earlier in this section (Figure 38). The relationship between the two models is shown below (Figure 39). The model has been manipulated to account for the granularity of morphemes as a grain size in the orthography and the addition of morphology under the availability problem. The morpheme has been represented diagonally as the morpheme can be range in represented from one or two letters to a whole word.

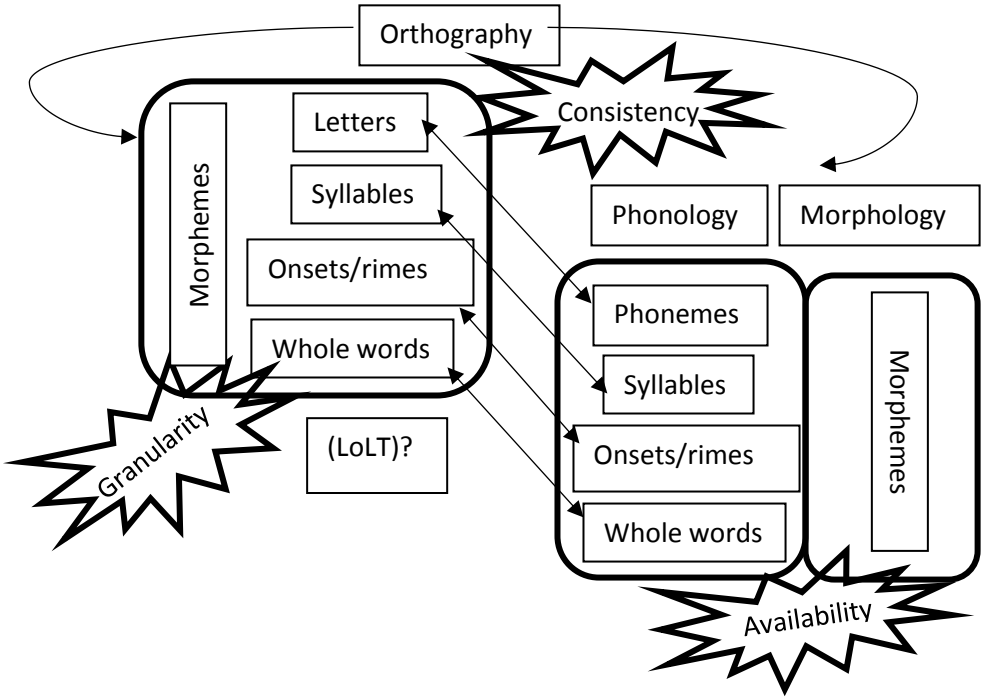


Figure 40. Schematic depiction of the revised PGST, including the three main problems of availability, granularity and consistency.

4.4.3 Recommendations for future research

This study has contributed to developing a proposed model of word recognition for the Southern-Bantu languages, based on the findings in first-language reading in isiXhosa and Setswana. More research is needed in order to develop the proposed model (Figure 39 & 40). The following topics are suggested;

- Influence of LoLT on determining word recognition strategies.
- Strength and direction of the relationship between grain size and metalinguistic skills
- Secondary grains: What are these? Should they be taught? Can they interfere?
- How does the model develop as the learner matures?

CHAPTER 5: CONCLUSION

In this thesis, I examined the reading strategies employed by isiXhosa and Setswana learners, with a specific focus on the different grain sizes adopted by learners approaching reading in either language. According to Probert (2013, 2014) there are three factors which are crucial for understanding word recognition in the Southern-Bantu languages. These are metalinguistic skills, orthography and language of learning and teaching (LoLT). The extent of their interaction with one another in reading has yet to be explored in the literature. This research will therefore contribute to existing knowledge about the relationship between metalinguistic skills and reading, as well as in determining the literacy processing unit/s used in reading strategies in the Southern-Bantu Languages.

There were two main research goals for this study, firstly to investigate the effect of Morphological and Phonemic grain sizes on reading in conjunctive and disjunctive orthographies and secondly to determine the relationship between L1 and LoLT and their relevant contribution to word recognition strategies, thus introducing L2 transfer into the study. These two major goals were divided according to five research questions,

1. What is the relevant contribution of Phonological Awareness and Morphological Awareness in determining grain size when reading sentences in isiXhosa and Setswana respectively?
2. (a). What effect do the disjunctivism and conjunctivism of an orthography have on word recognition strategies?
(b). How do the types of grain sizes differ between children learning in a conjunctive orthography and those learning in a disjunctive orthography?
3. When children approach word recognition tasks, are the grain sizes used in recognition strategies determined by their L1 when it is aligned with their LoLT or by their L2 LoLT?
4. How do the three themes (metalinguistic skills, orthography and language of learning and teaching) interact with each other in word recognition?
5. What models of word recognition are best suited to orthographic words in the Southern-Bantu languages?

A set of language-specific linguistic tests for isiXhosa and Setswana were designed for this study to assist in answering the above set of research questions. These tests include an open-ended decomposition task, designed to measure grain-size, a Phonological Awareness task, a Morphological Awareness task and an independent reading measure. This battery of tests was

designed in a collaborative effort under a combined Literacy research group. The tasks were tested in the learners' first-language.

This thesis began with an introduction chapter (Chapter 1) to introduce the reader to the topic at hand and contextualise the research. Chapter 2 was the literature review, which highlighted the lack of research in this area, specifically in South Africa and the Southern-Bantu languages. This study aimed to address this gap. Moreover, the literature review, defined important concepts, contextualised the research and related the current work to that found in the literature. In particular, the literature review outlined the orthographic and linguistic differences between isiXhosa and Setswana and introduced the reader to the different models of word recognition. The relationship between reading, reading strategies and the metalinguistic tasks under discussion, namely; Phonological Awareness and Morphological Awareness, were discussed.

The methodology chapter (Chapter 3) is of utmost importance to this study as the linguistic tests used were designed specifically to suit the languages under investigation: isiXhosa and Setswana. There is a lack of standardised tests in the Southern-Bantu language. It is thus essential that each task was comprehensively outlined, the difference between the isiXhosa and Setswana tasks discussed and the data coding systems explained.

The fourth chapter presented the data analysis and discussion and was comprised of four sections. Section 1 (4.1) investigated grain size literacy processing units in isiXhosa and Setswana to answer the question of the relevant contribution of Phonological Awareness and Morphological Awareness in determining the grain size unit used in reading strategies in children learning to read in isiXhosa and in Setswana respectively. Results showed that the syllable was the dominant grain size for both isiXhosa and Setswana learners, with the morpheme as a secondary grain in isiXhosa. The use of the syllable as the dominant grain was support by findings that both isiXhosa and Setswana learners did better with Syllable Awareness than they did with Phoneme Awareness and Morphological Awareness. These findings were situated in the hierarchical model of word structure (Ziegler & Goswami 2005, Anthony and Lonigan 2004, Scheule and Boudreau 2008). It was shown that, irrespective of the fact that IsiXhosa and Setswana are both alphabetic transparent orthographies and express a salience of the phoneme in the orthography, these languages privilege the syllable. The saliency of the linguistic unit in a language therefore determines the unit size which learners pay attention to when decoding (Bruck and Genesee 1995). Moreover, their higher Syllable Awareness may have contributed to the use of the

syllable as a grain size unit. Alternatively, the use of the syllable as a grain may have resulted in higher Syllable Awareness.

The use of the morpheme as a secondary grain in isiXhosa was supported by the findings that the isiXhosa learners did better with Morphological Awareness than the Setswana learners. The use of both the syllable and morpheme as grain sizes highlights the use of multiple grain sizes which was situated in the flexible unit hypothesis (Brown & Deavers 1999, Ziegler and Goswami 2005).

Learner's metalinguistic skills along with the grain size unit which they use as literacy processing units in reading is conditioned by the orthography the learner is reading in. Section 4.2 provided a comparison of isiXhosa and Setswana to establish how their differences in writing system influence their metalinguistic skills and grain size units. Section 4.2 explored the effect that disjunctivism and conjunctivism of an orthography has on reading strategies, to answer the question of whether grain sizes differ between children learning to read in a disjunctive orthography (Setswana) and in a conjunctive orthography (isiXhosa). Setswana learners did better with Phonological Awareness in comparison to the isiXhosa learners. The isiXhosa learners however did better with Morphological Awareness and Syllable Awareness. This was supported by results on the open-ended decomposition task, which investigated grain size unit used in reading. Setswana learners scored higher for syllables, with the isiXhosa learners scoring higher for morphemes. Transparency aside it thus appears that Morphological Awareness evidently plays a greater role for learners of a conjunctive orthography than the learners of a disjunctive orthography.

For comprehension, Setswana learners did significantly better than the isiXhosa learners. Syllable Awareness was correlated to comprehension (including reading speed) for both isiXhosa and Setswana learners. This became non-significant once the factor of speed was removed. Syllable Awareness was thus related to reading speed but not to accessing meaning from text.

Section 4.3 focused on the effect of LoLT on metalinguistic skills and grain size in reading strategies to answer the question of whether reading strategies are determined by the learner's first-language or by the language in which he/she received schooling. In particular, when a learner receives schooling in an additional (second) language, does this influence reading strategies in their first-language? For isiXhosa, the L1 LoLT learners scored higher for Syllable Awareness than the L2 English LoLT group. This finding was supported by findings of

Wilsenach (2013). In this study, the L1 learners were shown to do better with comprehension than the L2 Group. The L2 LoLT learners however did better with Phoneme Awareness and Morphological Awareness.

For Setswana, the L2 learners, in contrast did better with Syllable Awareness than the L1 LoLT group. They also did better with Phoneme Awareness. In addition, for Setswana, the L2 LoLT learners did better with comprehension. The L1 group however did better with Morphological Awareness, which was logical given the orthography of Setswana.

The isiXhosa and Setswana results for the two different types of schools contradict one another, with the exception of Phoneme Awareness. Phoneme Awareness was better in the English schools for isiXhosa and Setswana. This was attributed to an English teaching method, where a phonics teaching method is most often adopted. This transfers to their first-language skills.

Results on the metalinguistic skills for isiXhosa and Setswana were not found to be statistically significant. This suggests that LoLT has no significant effect on these linguistic skills. Thus the learners' first-language is the primary factor which determines performance on metalinguistic skills. Furthermore, the dominant grain size for isiXhosa and Setswana between the different schools was the syllable. This was consistent with the findings of the previous sections. For the open-ended decomposition task, which measured grain size, the L1 isiXhosa learners did better with both syllables and morphemes than the L2 group, whilst for Setswana, the L2 group did better with morphemes.

The final section of the data analysis (section 4.4) answered the remaining two research questions. The first question was to establish how the three themes (metalinguistic skills, orthography and LoLT) interact with each other in word recognition. The second question investigated which model of word recognition was best suited to orthographic words in the Southern-Bantu languages. For the Southern-Bantu languages under study, isiXhosa and Setswana, grain size was dependant on orthography. In particular, the writing system associated with each language, a conjunctive and disjunctive writing system respectively. Similarly, the metalinguistic skills, Phonological Awareness and Morphological Awareness differed between the two orthographies. LoLT influenced metalinguistic skills in isiXhosa and Setswana learners, but these differences were not statistically different. Furthermore, LoLT did not have a significant effect on determining grain size between the languages.

The PGST was shown to be the most applicable model to the Southern-Bantu languages. Due to its continuum of different developmental grain sizes, it allows for intermediate levels, such as the morpheme. The PGST takes into account word length effects which is essential in understanding word recognition in the Southern-Bantu languages. Furthermore, the PGST is the only model which currently considers the influence of medium of instruction on word recognition strategies.

The study proposed suggested adaptations to the PGST, as seen in the model in section 4.4.2, Figure 39. The PGST was used to design the model of word recognition for the Southern-Bantu languages. The PGST schematic depiction of the main problems of reading acquisition: availability, consistency and granularity model was manipulated to take into account the granularity of morphemes as a grain size in the orthography as well as the addition of morphology under the availability problem.

Learners approached word recognition based upon the writing systems and language-specific structures of the language. An understanding of reading in the Southern-Bantu languages should thus take into cognisance the linguistic literacy processing units which underpin reading strategies, as well as how the orthography informs metalinguistic awareness skills. In turn, teaching strategies and curriculum statements should be designed around orthographic-specific influences and the differing literacy processing units. This study designed a set of language-specific linguistic measures for the Southern-Bantu languages. The focus was on first-language reading. Research is still needed in second-language reading, which would introduce the question of transfer of grain-size. This would have implications for language policy.

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APPENDICIES

Appendix A - Instructions for the Decomposition Task (isiXhosa example)

Appendix B - Decomposition Task

Appendix C - Model Answers (Coding) for Decomposition Task

Appendix D1 - IsiXhosa Phonological Awareness Task

Appendix D2 - Setswana Phonological Awareness Task

Appendix E - Morphological Awareness Task

Appendix F - Oral Reading Fluency and Silent Reading Fluency Task

APPENDIX A

ISIXHOSA INSTRUCTIONS FOR DECOMPOSITION TASK

ENGLISH	ISIXHOSA
Hello	Molo
Today we are going to be playing a game with words	Namhlange sizokudlala umdlalo wamagama
It is not difficult and if you need anything to be repeated, you can just ask	Awukho nzima kwaye ukuba udinga into iphindwe suka nje ubuze
There is no right or wrong answer, we are just playing for fun	Akukho mpendulo ilungileyo okanye engalunganga, sidlala nje ukuze sonwabe.
When we read a word or a sentence, we break it up into parts to help us read	Xa ufunda igama okanye isivakalisi, uyaziqhawula ibenga malungu ukuze uncedakale ekuzifundeni
Can you show me how you would break up words or sentences when you read	ungandibonisa ukuba wena uwaqhawula njani amagama okanye izivakalisi xa ufunda
You can use this khoki and draw lines where you break up the word or sentence	ungasebenzisa le koki ukuzoba imigca apho uqhawula khona igama okanye isivakalisi
Okay, so let's try...	Kulungile masizame

APPENDIX B

CHILD'S CODE:

ISIXHOSA DECOMPOSITION TASK

Once you have read the instructions to the child and have made sure that they understand the task, you will present them with the sentences one by one. They will then use a marker to indicate where they break up the sentence when reading (DO NOT prime them in any way please). Once they have drawn in the lines indicating where they break up the sentences – you will need to replicate what they have done on this sheet using a coloured pen (please do not use pencil or black ink).

Once you have marked all their responses onto this sheet – you can rub out the marker so that the cards are clean for the next child to write on.

List of sentences:

No.	ENGLISH	ISIXHOSA
1	I am busy	Ndixakekile.
2	The children love each other	Abantwana bayathandana
3	They help each other	Bayancedisana
4	The house was built by my uncle	Indlu yakhiwa ngumalume wam
5	The food was eaten	Ukutya kwakutyiwe
6	He chopped the wood	Uzigawule iinkuni
7	I washed the dishes	Ndizihlambile izitya
8	Thembi spilled the milk	UThembi uluchithile
9	The man heard the story	indoda ilivile ibali
10	Mother didn't cook	Umama akaphekanga
11	He had the car washed	Uyihlambisile imoto
12	Thabo boiled the water	Uthabo uwabilisile amanzi
13	My grandmother made me a promise	Umakhulu wam wenza undenzele isithembiso
14	Sipho will show it to you	Uzokuyiboniswa nguSipho
15	The mom baked it for them	Umama wayibhakela bona
16	I cleaned the house for my mom	Ndimcocele indlu umama
17	The learners are not learning it	Abafundi abayifundi.
18	Patience was interrupted	UPatience waphazanyisiwe.
19	I don't know her	Andiyazi le ntombazana
20	The girl opened the door	Intombazana yavula ucango

CHILDS' CODE:

SETSWANA DECOMPOSITION TASK

Once you have read the instructions to the child and have made sure that they understand the task, you will present them with the sentences one by one. They will then use a marker to indicate where they break up the sentence when reading (DO NOT prime them in any way please). Once they have drawn in the lines indicating where they break up the sentences – you will need to replicate what they have done on this sheet using a coloured pen (please do not use pencil or black ink).

Once you have marked all their responses onto this sheet – you can rub out the marker so that the cards are clean for the next child to write on.

List of sentences:

No.	ENGLISH	SETSWANA
1	I am busy	Ke tshwaregile
2	The children love each other	Bana ba a ratana
3	They help each other	Ba a thusana
4	The house was built by my uncle	Ntlo e agiwa ke malome wa me
5	The food was eaten	Dijo di jelwe
6	He chopped the wood	O remile legong
7	I washed the dishes	Ke tlhatswitse dijana
8	Thembi spilled the milk	E tsholotswe ke Thembi
9	The man heard the story	Dikgang di utlwilwe ke monna yole.
10	Mother didn't cook	Mme ga a apaya
11	He had the car washed	O tlhatswisitse sejanaga.
12	Thabo boiled the water	Thabo o bidisitse metsi
13	My grandmother made me a promise	Koko o ntshepisitse
14	Sipho will show it to you	O tla e bontshiwa ke Sipho
15	The mom baked it for them	Mme o ba baketse tsona
16	I cleaned the house for my mom	Ke kolomaketse mme ntlo
17	The learners are not learning it	Baithuti gab a ithute yone
18	Patience was interrupted	Patience o ne a tsenwe mo ganong
19	I don't know her	Ga ke mo itse
20	The girl opened the door	Mosetsana o butse mojako

APPENDIX C

English	I am busy	The children love each other	They help each other	The house is being built by my uncle	The food was eaten
IsiXhosa	Ndixakekile.	Abantwana bayathandana	Bayancedisana.	Indlu yakhiwa ngumalume wam.	Ukutya kwakutyiwe
Broken up according to MORPHOLOGY	Ndi-xakek-ile	Aba-ntwana ba-ya-thand-an-a	Ba-ya-nced-is-an-a	I-ndlu ya-khi-w-a ngu-malume wam	u-kutya kwa-ku-ty-iwe
Score in BLUE	**2**	**5**	**5**	**5**	**4**
Broken up according to SYLLABLES	Ndi-xa-ke-ki-le	A-ba-ntwa-na ba-ya-tha-nda-na	Ba-ya -nce-di-sa-na	In-dlu ya-khi-wa ngu-ma-lu-me wam	u-ku-tya kwa-ku-tyi-we
Score in RED	**4**	**7**	**5**	**6**	**5**
Overlap between syllable and morpheme boundaries	**1**	**3**	**2**	**3**	**3**

English	He chopped the wood	I washed the dishes	Thembi spilled the milk	The man heard the story	Mother didn't cook
IsiXhosa	Uzigawule iinkuni	Ndizihlambile izitya	UThembi uluchithile	indoda ilivile ibali	Umama akaphekanga
Broken up according to MORPHOLOGY	U-zi-gawul-e ii-nkuni	Ndi-zi-hlamb-ile izi-tya	U-Thembi u-lu-chith-ile	I-ndoda i-li-v-ile i-bali	U-mama a-ka-phek-ang-a
Score in BLUE	**4**	**4**	**4**	**5**	**5**
Broken up according to SYLLABLES	u-zi-ga-wu-le ii-nku-ni	Ndi-zi-hla-mbi-le i-zi-tya	u-the-mbi u-lu-chi-thi-le	i-ndo-da i-li-vi-le i-ba-li	u-ma-ma a-ka-phe-ka-nga
Score in RED	**6**	**6**	**6**	**7**	**6**
Overlap between syllable and morpheme boundaries	**3**	**3**	**3**	**4**	**3**

English	He had the car washed	Thabo boiled the water	My grandmother made me a promise	Sipho will show it to you	The mom baked it for them
IsiXhosa	Uyihlambisile imoto	Uthabo uwabilisile amanzi	Umakhulu wam wenza undenzele isithemnbiso	Uzokuyiboniswa nguSipho	Umama wayibhakela bona
Broken up according to MORPHOLOGY	U-yi-hlamb-is-ile i-moto	U-Thabo u-wa-bil-is-ile ama-nzi	u-makhulu wam w-enz-a u-nd-enz-el-e isi-thembiso	U-zoku-yi-bon-is-w-a ngu-Sipho	U-mama wa-yi-bhak-el-a bona
Score in BLUE	**5**	**6**	**8**	**7**	**5**
Broken up according to SYLLABLES	u-yi-hla-mbi-si-le i-mo-to	u-Tha-bo u-wa-bi-li-si-le a-ma-nzi	u-ma-khu-lu wam we-nza un-den-ze-le i-si-the-mbi-so	u-zo-ku-yi-bo-ni-swa ngu-Si-pho	u-ma-ma wa-yi-bha-ke-la bo-na
Score in RED	**7**	**9**	**11**	**8**	**7**
Overlap between syllable and morpheme boundaries	**3**	**4**	**2**	**4**	**3**

English	I cleaned the house for my mom	The learners are not learning it	Patience was interrupted	I don't know her	The girl opened the door
IsiXhosa	Ndimcocele indlu umama	Abafundi abayifundi.	UPatience waphazanyisiwe	Andiyazi le ntombazana	Intombazana yavula ucango
Broken up according to MORPHOLOGY	Ndi-m-coc-el-e i-ndlu u-Mama	Aba-fundi a-ba-yi-fund-i	u-Patience wa-phazany-is-iwe	A-ndi-y-az-i le ntombazana	I-ntombazana y-a-vul-a u-cango
Score in BLUE	**6**	**5**	**4**	**4**	**5**
Broken up according to SYLLABLES	Ndi-mco-ce-le in-dlu u-ma-ma	A-ba-fu-ndi a-ba-yi-fu-ndi	u-Pa-tience wa- pha-za-nyi-si-we	a-ndi-ya-zi le nto-mba-za-na	i-nto-mba-za-na ya-vu-la u-ca-ngo
Score in RED	**6**	**7**	**7**	**6**	**8**
Overlap between syllable and morpheme boundaries	**2**	**4**	**2**	**2**	**2**

SETSWANA:

English	I am busy	The children love each other	They help each other	The house was built by my uncle	The food was eaten
Setswana	Ke tshwaregile	Bana ba a ratana	Ba a thusana	Ntlo e agiwa ke malome wa me	Dijo di jelwe
Broken up according to MORPHOLOGY	Ke tshwareg-il-e	Ba-na ba a rat-an-a	Ba a thus-an-a	Ntlo e ag-iw-a ke malome wame	Di-jo di jel-w-e
Score in BLUE	**2**	**3**	**2**	**2**	**3**
Broken up according to SYLLABLES	Ke tshwa-re-gi-le	Ba-na ba a ra-ta-na	Ba a thu-sa-na	Ntlo e a-gi-wa ke ma-lo-me wa me	Di-jo di je-lwe
Score in RED	3	3	2	4	2
Overlap between syllable and morpheme boundaries	**0**	**1**	**0**	**0**	**1**

English	He chopped the wood	I washed the dishes	The milk was spilled by Thembi	The story/news was heard by that man.	Mother doesn't cook
Setswana	O remile legong	Ke tlhatswitse dijana	E tsholotswe ke Thembi	Dikgang di utlwilwe ke monna yole	Mme ga a apaya
Broken up according to MORPHOLOGY	O rem-il-e legong	Ke tlhatsw-itse di-jana	E tsholots-w-e ke Thembi	Di-kgang di utlwil-w-e ke mo-nna yole	Mme ga a a-paya
Score in BLUE	**2**	**2**	**2**	**4**	**1**
Broken up according to SYLLABLES	O re-mi-le le-go-ng	Ke tlha-tswi-tse di-ja-na	E tsho-lo-tswe ke The-mbi	Di-kga-ng di u-tlwi-lwe ke mo-nna yo-le	Mme ga a a-pa-ya
Score in RED	**4**	**4**	**3**	**6**	**3**
Overlap between syllable and morpheme boundaries	**0**	**1**	**0**	**2**	**1**

English	He had the car washed	Thabo boiled the water	My grandmother made me a promise	You will be shown it by Sipho	The mom baked it for them
Setswana	O tlhatswisitse sejanaga	Thabo o bidisitse metsi	Koko o ntshepisitse	O tla e bontshwa ke Sipho	Mme o ba baketse tsona
Broken up according to MORPHOLOGY	O tlhatsw-is-its-e se-janaga	Thabo o bid-is-its-e metsi	Koko o ntshep-is-its-e	O tla e bo-ntsh-w-a ke Sipho	Mme o ba ba-kets-e tsona
Score in BLUE	**4**	**3**	**3**	**3**	**2**
Broken up according to SYLLABLES	O tlha-tswi-si-tse se-ja-na-ga	Tha-bo o bi-di-si-tse me-tsi	Ko-ko o ntshe-pi-si-tse	O tla e bo-ntshwa ke Si-pho	Mme o ba ba-ke-tse tso-na
Score in RED	**6**	**5**	**4**	**2**	**3**
Overlap between syllable and morpheme boundaries	**1**	**0**	**0**	**1**	**1**

English	I cleaned the house for my mom	The learners are not learning it	Patience was interrupted	The girl opened the door
Setswana	Ke kolomaketse mme ntlo	Baithuti ga ba ithute yone	Patience o ne a tsenwe mo ganong	Mosetsana o butse mojako
Broken up according to MORPHOLOGY	Ke kolomak-ets-e mme ntlo	Ba-ithuti ga ba ithut-e yone	Patience o ne a tsen-w-e mo ganong	Mo-setsana o bu-tse mo-jako
Score in BLUE	**2**	**2**	**2**	**3**
Broken up according to SYLLABLES	Ke ko-lo-ma-ke-tse m-me ntlo	Bai-thu-ti ga ba i-thu-te yo-ne	Patience o ne a tse-nwe mo ga-no-ng	Mo-se-tsa-na o bu-tse mo-ja-ko
Score in RED	**5**	**5**	**3**	**6**
Overlap between syllable and morpheme boundaries	**0**	**0**	**0**	**2**

APPENDIX D (1)

ISIXHOSA PA test: Syllable Segmenting, identification and deletion
General Instructions (*read these when you start the session)*

English	**Xhosa**
Hello	Molo
Today we are going to be playing a game with words	Namhlanje sizokudlala umdlalo wamagama.
It is not difficult and if you need anything to be repeated, you can just ask	Mo mdala akakhonzima ba ufuna uncedo uze ucele.
There is no right or wrong answer, we are just playing for fun	Ayikho impendulo eright okanye erongo, sidlala ubumnandi.
You are going to be told a word and then asked to do something to the word	Uzokunikwa igama wogqiba sizocela wenze into ngalo igama onikwe lona.
The words you will hear are made up words, so do not worry if you have never heard them before.	Lamagama uzowava awekho. Siwenze ngokwethu. Uzungakhathazeki ba awuwazi.
Record the participant's code and begin recording. Say the participant's code out loud so that it is recorded on the audio recorder.	

Remember:

- Say codes at the beginning of the recording
- When the child repeats the nonsense word, make sure they are actually repeating it correctly
- After the child gives a response, please repeat EXACTLY what they said in a clear voice so that I can hear it on the recording.
- When the child gives an incorrect answer, reply as if they did it correctly e.g. "well done" or "yes"
- Please remember to use letter SOUNDS not NAMES. E.g. when explaining the first sound of 'xola' you don't say 'ex', pronounce the actual click sound that corresponds to that letter

1.0.Segmenting of syllables

English	Xhosa
Do you know what a tortoise is? And are tortoises fast or slow creatures? They are slow. Did you know, because they walk so slowly, they have a special way of talking too?	Uyamazi uskolpati? Ooskolpati bayabaka okanye bayacotha? Bayacotha. Buyazi ukuba ngenxa becotha, banendlela yokuthetha eyeyabo.
Let me give you an example.	Nanku umzekelo.
When a tortoise says "vumaka" they say it much slower. This is what they sound like.	Xa uskolpati esithi "vumaka" batsho becotha kakhulu. Bathetha elihlobo.
(show the segmentation by opening the tortoises mouth) "vu" "ma" "ka"	
Let's do it together: Lets say "vumaka" like a tortoise would. "vu" "ma" "ka"	Masiyenze kunye. Masithi "vumaka" njengo skolpati. "vu" "ma" "ka"
Ok. Lets practice another one. If a tortoise wanted to say "bhefuza.	OK. Masiyekwakhona ngelinye igama. Masithi "bhefuza" njengo uskolpati.
The tortoise would say "bhe" "fu" "za"	Uskolpati angathi "bhe" "fu" "za"
Great, are you ready to try to speak like a tortoise now?	Uzokwazi ukuthetha njengoskolpati? Thatha wenze nawe.

<u>Instructions for segmenting</u>	
Say ___ How would the tortoise say ____	Ithi ___ Angathini uskolpati xa enobiza igama elithi____?
1.1.Letshaya	Le-tsha-ya
1.2.Kralesa	Kra-le-sa
1.3.Zarheno	Za-rhe-no
1.4.Lotsesa	Lo-tse-sa
1.5.Culafa	Cu-la-fa
1.6.Qolotshasa	Qo-lo-tsha-sa
1.7.Lupiliza	Lu-pi-li-za
1.8.Kushaleka	Ku-sha-le-ka
1.9.Dlobiseka	Dlo-bi-se-ka
1.10. vulutehla	Vu-lu-te-hla

2.0.Identification of syllables

Do you know that game we play outside called hopscotch? That's great! We are going to play hopscotch with the sounds in words. In this game, we have to make BIG jumps to the right/correct sound in the word and say it.	Uyakwazi ukudlala umdlalo obizwa ngoSkotshi? Sizokudlala uskotshi sisebenzise amagama. Kulomdlalo funeka uxhume ngapha nangapha xa usiva igama elithile kwaye utsibe kakhulu xa usiva igama kwagqiba ulibize.
Let me give you an example	Mandikunike umzekelo.
I will ask you to say a word. Say 'bofuka'	Ndizocela ubize igama elithi "bofuka"
Now we must jump to the first sound in this word (repeat word)	Funeka sitsibele kwisandi sokuqala ku"bofuka"
The first sound is 'bo' Listen, "bo" "fu" "ka" (show on fingers, first, second, third)	Igama lokuqala ngu-"bo" Mamela, 'bo' 'fu' 'ka' (Show on firngers, first, second, third)
Great. Let's try another one	Kulungile ke, masizame elinye igama.
Say 'cifala'	Ithi 'cifala'
Jump to the second sound in the word, 'cifala'. What is it?	Tsibela kwisound yesibini kweligama lithi 'cifala', lithini?
Yes that is correct, it is 'fa'. Listen, "ci" "fa" "la" (indicate with fingers, first, second, third)	Heke, utichanile, ngu'fa'. Mamela 'ci' 'fa' 'la. (Show on fingers)
Great. we both know how to play the game. I am going to ask you to make BIG jumps to some more sounds in words. Are you ready?	Kulingile ke, siyakwazi ukudlala uskotshi wamagama. Ndizocela utsibe kakhulu kwamanye amagama njengoba senzile ngoku. Siye kwakhone?

Instructions for Identification of syllables		
Say ____ Now, Jump to the first sound in _____ Now, Jump to the second sound in ____ Now, Jump to the (last) sound in ____ What is the sound?	Ithi____ Tsibela kwi-ndawo yokuqala kweli gama____ Tsibela kwi-ndawo yesibini ku_____ Tsibela kwindawo yokugqibela ku___ Lithini igama xa ulibiza ngezi ndawo?	
Asked for:	**Presented with:**	**Correct response:**
2.1.Jump to the first sound:	junala	Ju
2.2.Jump to the first sound	temala	Te
2.3.Jump to the last sound:	bontuka	Ka
2.4.Jump to the second sound:	nilema	Le
2.5.Jump to the second sound:	zatila	Ti
2.6.Jump to the last sound:	Sukiba	Ba
2.7.Jump to the second sound:	Zuwala	Wa
2.8.Jump to the last sound:	Rhivaqa	Qa
2.9.Jump to the first sound	Hlevasha	Hle
2.10. Jump to the last sound:	fumeta	Ta

3.0 Deletion of Syllables

For this game that we are going to play, we are going to say some secret passwords. We are going to say a word, and then we change the word to give us the password.	Kulo umdlalo kengoku sizokukhangela amagama fihlekileyo. Sizokubiza igama sithi sogqiba sitshintshe igama kuze sifumane elifihlekileyo.
Let me give you an example	Mandikunuke umzekelo.
I will ask you to say a word. Say ‘pemika’	Ndizokucela ubize igama elithi ‘pemika’
Now say ‘pemika’ without ‘pe’	Buza u’pemika’ ungabizanga u”pe”
The password is ‘mika’ ‘pemika’ without ‘pe’ is ‘mika’	Igama elifihliweyo ngu’mika’. U”pemika” ongena “he” ekugaleni ngu ‘mika’
Great. Let’s try another one	Kulingile, masizame elinye igama.
Say ‘fitshula’	Biza u’fitshula’
Say ‘fitshula’ without ‘tshu’	Biza u’fitshula’ ongena ‘tshu’.
Yes that is correct, it is ‘fila’. “fitshula’ without ‘tshu’ is fila	Ulichanile, igama ngu’fila. U’fitshala’ ongena ‘tshu’, ngu’fila’
Great. we both know how to play the game to make passwords. I am going to ask you to find some more secret words	Kulingile ke siyakwazi ukudlaa kunye ukhukhangela amagama afihliweyo. Ndizokucela undikhangele amanye amagama afihliweyo.

Are you ready?	Siyekwakhona?

<u>Instructions for deletion</u>	
Say ____ Now say ____ without ____ What is the password?	Ithi ___ Ngoku ithi ___ ngaphandle ko____ Lithini igama elifihliweyo?
2.11. Setika - se	tika
2.12. Torhale - le	Torha
2.13. Rhawelo - rha	welo
2.14. Tyigeno - no	tyige
2.15. Pelaza - la	Peza
2.16. Xolinga - li	Xoga
2.17. Bhubeka - be	Bhuka
2.18. Ncowula - nco	Wula
2.19. Pizila - zi	Pila
2.20. Qofoshi - shi	Qofo

PA test: Phoneme Segmenting, identification and deletion

General Instructions (*read these when you start the session)*

English	**Xhosa**
Hello	Molo
Today we are going to be playing a game with words	Namhlanje sizokudlala umdlalo wamagama.
It is not difficult and if you need anything to be repeated, you can just ask	Mo mdala akakhonzima ba ufuna uncedo uze ucele.
There is no right or wrong answer, we are just playing for fun	Ayikho impendulo eright okanye erongo, sidlala ubumnandi.
You are going to be told a word and then asked to do something to the word	Uzokunikwa igama wogqiba sizocela wenze into ngalo igama onikwe lona.
The words you will hear are made up words, so do not worry if you have never heard them before.	Lamagama uzowava awekho. Siwenze ngokwethu. Uzungakhathazeki ba awuwazi.
Record the participant's code and begin recording. Say the participant's code out loud so that it is recorded on the audio recorder.	

Remember:

- Say codes at the beginning of the recording
- When the child repeats the nonsense word, make sure they are actually repeating it correctly
- After the child gives a response, please repeat EXACTLY what they said in a clear voice so that I can hear it on the recording.
- When the child gives an incorrect answer, reply as if they did it correctly e.g. "well done" or "yes"
- Please remember to use letter SOUNDS not NAMES. E.g. when explaining the first sound of 'xola' you don't say 'ex', pronounce the actual click sound that corresponds to that letter

3.0.Segmenting of Phonemes

English	Xhosa
Do you know what a robot is? Yes, it's a man made of metal. Do you know what they sound like when they speak? they talk funny. In this game with words, we are going to speak like robots.	Uyayazi yintoni iRobot? Ngunodali owenzwe ngecangi. Uyayazi bathetha njani? Bathetha snaksi. Kulo mdlalo sizothetha nje ngeRobot.
When robots speak, they say each little sound in a word, because ti is difficult to say the whole word. Let me give you an example.	Xa zithetha iiRobor zibiza igama ingathi liqhekeziwe. Nanku Umzekelo.
When a robot says a word like "foma" they say it like this 'f' 'o' 'm' 'a'.	Xa iRbot Ibiza igama elinje ngo-"foma" zithi "f" "o" "m" "a".
Another example, when a robot says 'nosa' they break up the word and say 'n' 'o' 's' 'a'	Omnye umzekelo, xa irobot isithi "nosa" ziyalophula igama eli uhloba.
Let's do 'nosa' together like a robot would say it. 'n' 'o' 's' 'a'	Masenze u"nosa" kinye nje nge-robot. "n" "o" "s" "a"
Great, are you ready to try to speak like a robot now?	Heke, uzokwazi ukuthetha nje nge-robot ngoku?

<u>Instructions for segmenting</u>	
Say ____ How would the robot say ____	Ithi____ iRobot angalibiza njani igama elithi___?
3.1.Tuza	t-u-z-a
3.2.Gcena	Gc-e-n-a
3.3.hlama	Hl-a-m-a
3.4.Cakra	C-a-kr-a
3.5.foma	f-o-m-a
3.6.Gofotsa	g-o-f-o-ts-a
3.7.Rhagone	Rh-a-g-o-n-e
3.8.dopike	d-o-p-i-k-e
3.9.samatse	s-a-m-a-ts-e
3.10. gefina	g-e-f-i-n-a

4.0.Identification of Phonemes

Do you know that game we play outside called hopscotch? That's great! We are going to play hopscotch with the sounds in words. In this game, we have to make SMALL jumps to the right/correct sound in the word and say it.	Uyakwazi ukudlala umdlalo obizwa ngoSkotshi? Sizokudlala uskotshi sisebenzise amagama. Kulomdlalo funeka uxhume ngapha nangapha xa usiva igama elithile kwaye utsibe kancinci xa usiva igama kwagqiba ulibize.
Let me give you an example	Mandikunike umzekelo.
I will ask you to say a word. Say 'shama'	Ndizocela ubize igama elithi "shama"
Now we must jump to the first sound in this word? (repeat word)	Funeka sitsibele kwigaa lokuqala ku"shama"
The first sound is 'sh' Listen, "sh" "a" "m" "a" (show on fingers, first, second, third, fourth, really prolong the sound)	Igama lokuqala ngu-"bo" Mamela, "sh" "a" "m" "a" (Show on firngers, first, second, third etc)
Great. Let's try another one	Kulungile ke, masizame elinye igama.
Say 'xola'	Ithi 'xola'
Jump to the second sound in the word, 'xola'. What is it?	Tsibela kwisound yesibini kweligama lithi 'xola', lithini?
Yes that is correct, it is 'o'. Listen, "x" "o" "l" "a" (indicate with fingers, first, second, third, fourth)	Heke, utichanile, ngu'fa'. Mamela 'x' 'o' 'l' 'a'. (Show on fingers)
Great. we both know how to play the game. I am going to ask you to make small jumps to some more sounds in words. Are you ready?	Kulingile ke, siyakwazi ukudlala uskotshi wamagama. Ndizocela utsibe kancinci kwamanye amagama njengoba senzile ngoku. Siye kwakhone?

Instructions for Identification		
Say ____ Now, Jump to the first sound in _____ Now, Jump to the second sound in ____ Now, Jump to the third sound in ____ What is the sound?	Ithi____ Tsibela kwi-ndawo yokuqala kweli gama____ Tsibela kwi-ndawo yesibini ku_____ Tsibela kwindawo yesithathu ku___ Lithini igama xa ulibiza ngezi zandi?	
4.1.What is the first sound:	Werhata	W
4.2.What is the third sound:	Vamala	m
4.3.What is the first sound:	kolohla	K
4.4.What is the second sound:	leyisa	E
4.5.What is the second sound:	tolega	o
4.6.What is the third sound:	cufasa	f
4.7.What is the first sound in:	Tyizena	Ty
4.8.What is the third sound:	civuke	v
4.9.What is the second sound:	turhoza	u
4.10. What is the third sound:	tuzugo	z

5.0 Deletion of phonemes

For this game that we are going to play, we are going to find some secret passwords. We are going to say a word, and then we change the word to give us the password.	Kulo umdlalo kengoku sizokukhangela amagama fihlekileyo. Sizokubiza igama sithi sogqiba sitshintshe igama kuze sifumane elifihlekileyo.
Let me give you an example	Mandikunuke umzekelo.
I will ask you to say a word. Say ‘dlula’	Ndizokucela ubize igama elithi ‘dlula’
Now say ‘dlula’ without ‘dl’	Buza u’dlula’ ungabizanga u”dl”
It is ‘ula’ ‘dlula’ without ‘dl’ is ‘ula’	Igama elifihliweyo ngu’ula’. U”dlula” ongena “dl” ekugaleni ngu ‘ula’
Great. Let’s try another one	Kulingile, masizame elinye igama.
Say ‘tsifa’	Biza u’tsifa’
Say ‘tsifa’ without ‘ts’	Biza u’ts’ ongena ‘ifa’.
Yes that is correct, it is ‘ifa’. “tsifa’ without ‘ts’ is ‘ifa’	Ulichanile, igama ngu’ifa’. U’tsifa’ ongena ‘ts’, ngu’ifa’
Great. we both know how to play the game. I am going to ask you to find some more secret words Are you ready?	Kulingile ke siyakwazi ukudlala kunye ukhukhangela amagama afihliweyo. Ndizokucela undikhangele amanye amagama afihliweyo. Siyekwakhona?

Instructions for deletion	
Say ____ Now say ____ without ____ What is the password?	Ithi ___ Ngoku ithi ___ ngaphandle ko____ Lithini igama elifihliweyo?
1.1.Qetaza - q	Etaza
1.2.Dlashaza - dl	Ashaza
1.3.Gomveni - g	Omveni
1.4.Logeka - l	Ogeka
1.5.Hlenama - hl	Enama
1.6.Bocena - b	Ocean
1.7.Mekuma - m	Ekuma
1.8.Tsilaba - ts	Ilaba
1.9.Tshafiba - tsh	Afiba
1.10. Lutsiba - l	utsiba

APPENDIX D (2)

PA test: Syllable Segmenting, identification and deletion

General Instructions (Ditaelo) (*read these when you start the session)*

English	**Setswana**
Hello	Dumelang (Plural) / Dumela (Singular).
Today we are going to be playing a game with words	Gompieno re tlile go tshameka motshameko wa mafoko.
It is not difficult and if you need anything to be repeated, you can just ask	Motshameko o ga o thata, mme fa o tlhoka go boeletswe sengwe o ka nna wa bua jalo.
There is no right or wrong answer, we are just playing for fun	Ga gona karabo e e nepagetseng kgotsa e e sa nepagalang. Re tshamekela go itumedisa fela.
You are going to be told a word and then asked to do something to the word	O tlile go newa lefoko, mme o bo o kopiwa go dira sengwe ka lona.
The words you will hear are made up words, so do not worry if you have never heard them before.	Mafoko a o tlileng go a utlwa ke a maitirelo ka jalo o se tshwenyege fa o se o tsamaye o a utlwe.
Record the participant's code and begin recording. Say the participant's code out loud so that it is recorded on the audio recorder.	*Rekhota khoutu ya motsayakarolo o be o simolola go rekhota. Goeletsa khoutu ya motsayakarolo kwa godimo gore e rekhotege mo rekhotong.*

Remember: Gopola

- *Say codes at the beginning of the recording.*
- *When the child repeats the nonsense word, make sure they are actually repeating it correctly.*
- *After the child gives a response, please repeat EXACTLY what they said in a clear voice so that I can hear it on the recording.*
- *When the child gives an incorrect answer, reply as if they did it correctly e.g. "well done" or "yes".*
- *Please remember to use letter SOUNDS not NAMES. E.g. when explaining the first sound of 'xola' you don't say 'ex', pronounce the actual click sound that corresponds to that letter.*

1. Segmenting of syllables

English	Setswana
Do you know what a tortoise is? And are tortoises fast or slow creatures? They are slow. Did you know, because they walk so slowly, they have a special way of talking too?	A o a itse gore khudu ke eng? Gape, a dikhudu ke diphologolo tse di bonya kampo tse di bonako? Di bonya/di tsamaya di iketlile. (They are slow) A o ne o itse gore ka gonne di bonya/di tsamaya di iketlile, di bua ka mokgwa o o kgethegileng?
Let me give you an example.	A ke go neye sekai.
When a tortoise says "____" they say it much slower. This is what they sound like.	Fa Khudu e bua ere "___" e bua ka bonya/ e iketlile thata. Di utlwala jaana.
(show the segmentation by opening the tortoises mouth)	
Let's do it together: Lets say "basida" like a tortoise would.	A re dire jalo rotlhe: A re bue rere "basida" jaaka Khudu e ka dira.
Ok. Lets practice another one. If a tortoise wanted to say "ditaka"	Go siame. A re leke e nngwe. Fa Khudu e ne e batla gore "ditaka"
The tortoise would say di-ta-ka	Khudu e ne e tla re di-ta-ka
Great, are you ready to try to speak like a tortoise now?	Bontle, a o ipaakanyeditse go leka go bua jaaka Khudu jaanong?
Instructions for segmenting	
Say ___ How would the tortoise say ____	Gore ___ Khudu e ka bua ere ____
1.1.	Tusa
1.2.	Bena
1.3.	Tsama
1.4.	Phaja
1.5.	Tola
1.6.	Gofotsa
1.7.	Kgagone
1.8.	Lopike
1.9.	Samatse
1.10.	Gefina

2. Identification of syllables

Do you know that game we play outside called hopscotch? That's great! We are going to play hopscotch with the sounds in words. In this game, we have to make BIG jumps to the right/correct sound in the word and say it.	A o itse motshameko o o tshamekelwang kwa ntle o o bidiwang "hopscotch"? Go gontle! Re tlile go tshameka hopscotch ka medumo mo mafokong. Mo motshamekong o, re tshwanetse re tlolele thata kwa letsogong la moja/ baakanya modumo mo lefokong o be o le bitsa.
Let me give you an example	A ke go fe sekai
I will ask you to say a word. Say 'losala'	Ke tla go kopa gore o bitse lefoko. Gore 'losala'
Now we must jump to the first sound in this word (repeat word)	Jaanong re tshwanetse re tlolele kwa modumong wa ntlha mo lefokong le (boeletsa lefoko).
The first sound is 'lo' Listen, "lo-sa-la" (show on fingers, first, second, third)	Modumo wa ntlha ke 'lo' Reetsa, "lo-sa-la" (Dirisa menwana ya gago o bontshe, wa ntlha, wa bobedi, wa boraro)
Great. Let's try another one	Go gontle. A re leke e nngwe
Say 'mabure'	Gore 'mabure'
Jump to the second sound in the word, 'bu'. What is it?	Tlolela mo modumong wa bobedi mo lefokong, 'bu'. Ke eng?
Yes that is correct, it is 'bu'. Listen, "ma-bu-re" *(indicate with fingers, first, second, third)*	Ee o nepile, ke 'bu'. Reetsa, "ma-bu-re"
Great. we both know how to play the game. I am going to ask you to make BIG jumps to some more sounds in words. Are you ready?	Go gontle. Re le babedi re itse go tshameka motshameko o. Ke tlile go go kopa gore o tswelele ka go tlotlela kwa godimo mo medumong e e mo mafokong a. A o ipaakantse?

Instructions for Identification of syllables		
Say ____ Now, Jump to the first sound in _____ Now, Jump to the second sound in ____ Now, Jump to the (last) sound in ____ What is the sound?	Gore ___ Jaanong, tlolela mo modumong wa ntlha mo –-- Jaanong, tlolela mo modumong wa bobedi mo- Jaanong, tlolela mo modumong wa (bofelo) mo---- Ke modumo ofe?	
	Presented with:	**Correct response:**
a. FIRST	Wekgata	WE
b. LAST	Famala	LA
c. SECOND	Kgolotsa	LO
d. LAST	Leyisa	SA
e. FIRST	Tolega	TO
f. SECOND	Phufasa	FA
g. FIRST	Tsisena	TSI
h. LAST	Khifure	RE
i. SECOND	Tukgosa	KGO
j. FIRST	Rusogo	RU

3. Deletion of syllables

For this game that we are going to play, we are going to say some secret passwords. We are going to say a word, and then we change the word to give us the password.	Mo motshamekong o re tlileng go o tshameka, re tlile go bua dikhunololamoraba tsa sepiri. Re tlile go bua lefoko re be re le fetolela kwa khunololamorabeng.
Let me give you an example	A ke go fe sekai
I will ask you to say a word. Say ‘bolinga’	Ke tla go kopa gore o bue lefoko ‘bolinga’ Gore ‘bolinga’
Now say ‘bolinga’ without bo’	Jaanong gore ‘bolinga’ go sena ‘bo’
The password is ‘linga’ ‘bolinga’ without ‘bo’ is ‘linga’	Khunololamoraba ke ‘linga’ ‘bolinga’ go sena ‘bo’ ke ‘linga’
Great. Let’s try another one	Bontle. A re leke e nngwe
Say ‘bakhumo’	Gore bakhumo’
Say ‘bakhumo’ without ‘khumo’	Gore ‘bakhumo’ go sena ‘khumo’
Yes that is correct, it is ‘ba’. “bakhumo’ without ‘khumo’ is ‘ba’	Ee o nepile, ke ‘ba’. “bakhumo” go sena ‘khumo’ ke ‘ba’
Great. we both know how to play the game to make passwords. I am going to ask you to find some more secret words Are you ready?	Bontle. Re le babedi re itse go tshameka motshameko wa go itirela dikhunololamoraba Ke tlile go go kopa go batla mafoko a mangwe a sephiri A o ipaakantse?

Instructions for deletion		
Say ____ Now say ____ without ____ What is the password?	Gore ____ Jaanong gore ___ go sena ___ Khunololamoraba ke eng?	
a.	Presented with	CORRECT response
b. KHI	Khitasa	ITASA
c. SA	Tashasa	TASHA
d. NI	Thlogeni	THLOGE
e. DO	Dogekga	GEKGA
f. MA	Tsenama	TSENA
g. BO	Bophena	PHENA
h. MA	Metluma	METLU
i. LA	Tsilaba	TSIBA
j. FI	Kgofiba	KGOBA
k. BA	Kutsiba	KUTSI

PA test: Phoneme Segmenting, identification and deletion

General Instructions (*read these when you start the session)*

English	**Tswana**
Hello	Dumelang (Plural) / Dumela (Singular).
Today we are going to be playing a game with words	Gompieno re tlile go tshameka motshameko wa mafoko.
It is not difficult and if you need anything to be repeated, you can just ask	Motshameko o ga o thata, fa o tlhoka go boeletswe sengwe o ka nna wa bua jalo.
There is no right or wrong answer, we are just playing for fun	Ga gona karabo e e nepagetseng kgotsa e e sa nepagalang. Re tshamekela go itumedisa fela.
You are going to be told a word and then asked to do something to the word	O tlile go newa lefoko, mme o bo o kopiwa go dira sengwe ka lona.
The words you will hear are made up words, so do not worry if you have never heard them before.	Mafoko a o tlileng go a utlwa ke a maitirelo ka jalo o seka wa tshwenyega fa o se o tsamaye o a utlwe.
Record the participant's code and begin recording. Say the participant's code out loud so that it is recorded on the audio recorder.	

Remember:

- *Say codes at the beginning of the recording*
- *When the child repeats the nonsense word, make sure they are actually repeating it correctly*

- *After the child gives a response, please repeat EXACTLY what they said in a clear voice so that I can hear it on the recording.*
- *When the child gives an incorrect answer, reply as if they did it correctly e.g. "well done" or "yes"*
- *Please remember to use letter SOUNDS not NAMES. E.g. when explaining the first sound of 'xola' you don't say 'ex', pronounce the actual click sound that corresponds to that letter*

4. Phoneme Segmenting

English	Tswana
Do you know what a robot is? Yes, it's a man made of metal. Do you know what they sound like when they speak? they talk funny. In this game with words, we are going to speak like robots.	A o itse roboto gore ke eng? Ee, Ke monna o o dirilweng ka tshipi. A o itse gore ba utlwala jang fa ba bua? Ba bua ka tsela e e tshegisang. Mo motshamekong o wa mafoko, re tlile go bua jaaka diroboto.
When robots speak, they say each little sound in a word, because it is difficult to say the whole word. Let me give you an example.	Fa diroboto di bua, di ntsha modumo o monnye o mongwe le o mongwe mo lefokong, gonne go boima go bua lefoko le le feletseng. A ke go fe sekai.
When a robot says a word like "marubu" they say it like this 'm-a-r-u-b-u'	Fa diroboto di re "marubu" di bua jaana 'm-a-r-u-b-u'
Another example, when a robot says 'letsuka' they break up the word and say 'l-e-ts-u-k-a'	Sekai se sengwe ke se, fa roboto ere 'letsuka' di kgaoganya lefoko mme di re 'l-e-ts-u-k-a'
Great, are you ready to try to speak like a robot now?	Bontle, a o ipaakanyeditse go leka go bua jaaka roboto jaanong

<u>Instructions for segmenting</u>	
Say ____ How would the robot say ____	Gore ____ Roboto e ka re ___
a.	Pheraya
b.	Kgalesa
c.	Sakgeno
d.	Rotsesa
e.	Phulafa
f.	Solosa
g.	Tsulosa
h.	Shalekga
i.	Robiseka
j.	Fulutsa

5. Phoneme Identification

Do you know that game we play outside called hopscotch? That's great! We are going to play hopscotch with the sounds in words. In this game, we have to make SMALL jumps to the right/correct sound in the word and say it.	A o itse motshameko o re o tshamekang kwa ntle o o bidiwang hopscotch? Go gontle! Re tlile go tshameka hopscotch ka medumo mo mafokong. Mo motshamekong o, re tshwanetse re tlolele go le go nnye kwa letsogong la moja/baakanya modumo mo lefokong o be o le bitsa.
Let me give you an example	A ke go fe sekai
I will ask you to say a word. Say 'bataka'	Ke tla go kopa gore o bitse lefoko. Gore 'bataka'
Now we must jump to the first sound in this word? (repeat word)	Jaanong re tshwanetse re tlolele kwa modumong wa ntlha mo lefokong le (boeletsa lefoko).
The first sound is 'b' Listen, "b-a-t-a-k-a" *(show on fingers, first, second, third, fourth, really prolong the sound)*	Modumo wa ntlha ke 'b' Reetsa, "b-a-t-a-k-a"
Great. Let's try another one	Go gontle. A re leke e nngwe
Say 'dimale'	Gore 'dimale'
Jump to the second sound in the word, 'i'. What is it?	Tlolela mo modumong wa bobedi mo lefokong, 'i'. Ke eng?
Yes that is correct, it is 'i'. Listen, "d-i-m-a-l-e" *(indicate with fingers, first, second, third, fourth)*	Ee o nepile, ke 'i'. Reetsa, "d-i-m-a-l-e"
Great. we both know how to play the game. I am going to ask you to make small jumps to some more sounds in words. Are you ready?	Go gontle. Re le babedi re itse go tshameka motshameko o. Ke tlile go go kopa gore o tswelele ka go tlotlela kwa godimo mo medumong e e mo mafokong a. A o ipaakantse?
Instructions for Identification	
Say ____ Now, Jump to the first sound in _____ Now, Jump to the second sound in ____ Now, Jump to the third sound in ____ What is the sound?	Gore ___ Jaanong, tlolela mo modumong wa ntlha mo –--- Jaanong, tlolela mo modumong wa bobedi mo- Jaanong, tlolela mo modumong wa (bofelo) mo---- Ke modumo ofe?
	Presented with
a. FIRST	Junala
b. LAST	Temala

c. SECOND	Botuna
d. FIRST	Nilema
e. SECOND	Satila
f. FIRST	Sutliba
g. SECOND	Suwala
h. LAST	Kgifama
i. FIRST	Tsefasha
j. FIRST	Fumeta

6. Phoneme Deletion

For this game that we are going to play, we are going to find some secret passwords. We are going to say a word, and then we change the word to give us the password.	Mo motshamekong o re tlileng go o tshameka, re tlile go batla dikhunololamoraba tsa sepiri. Re tlile go bua lefoko re be re le fetolela kwa khunololamorabeng.
Let me give you an example	A ke go fe sekai
I will ask you to say a word. Say 'lempamo'	Ke tla go kopa gore o bue lefoko. Gore 'lempamo'
Now say 'lempamo' without 'l'	Jaanong gore 'lempamo' go sena 'l'
It is 'empamo' 'lempamo' without 'l' is 'empamo'	ke 'empamo' 'lempamo' go sena 'l' ke 'empamo'
Great. Let's try another one	Bontle. A re leke e nngwe
Say 'daluka'	Gore 'daluka'
Say 'daluka' without 'd'	Gore 'daluka' go sena 'd'
Yes that is correct, it is 'aluka'. "daluka" without 'd' is 'aluka'	Ee o nepile, ke 'aluka'. "daluka" go sena 'd' ke 'aluka'
Great. we both know how to play the game. I am going to ask you to find some more secret words Are you ready?	Bontle. Re le babedi re itse go tshameka motshameko o. Ke tlile go go kopa go batla mafoko a mangwe a sephiri. A o ipaakantse?

Instructions for deletion		
Say ____ Now say ____ without ____ What is the password?	Gore ___ Jaanong gore____ go sena ____ Khunololamoraba ke eng?	
a.	Setira	ETIRA
b.	Tokgale	OKGALE
c.	Kgawelo	AWELO
d.	Tligeno	IGENO
e.	Phelasa	ELASA
f.	Kholinga	OLINGA
g.	Rubekga	UBEKGA
h.	Thowula	OWULA
i.	Pisila	ISILA
j.	Rofoshi	OFOSHI

APPENDIX E

ISIXHOSA MA TASKS

Date:

Participant Code:

Task 1: 'Wugs'

1	amabada→___bada	pl→sg 6→5 two syllable stem
2	izimfadu → ____fadu	pl→sg 10→9 Bilabial/Interdental root
3	ooZoka → ____Zoka	pl→sg 2a→1a
4	umqo → ____qo	sg→pl 3→4(or 1→2)
5	izinka → ____ka	pl→sg 10→9
6	iimbabule → ___mbabule	pl→sg 8→7
7	amaxu→ ____xu	pl→sg 6→5 one syllable stem
8	isipuka → ____puka	sg→pl 7→8
9	abaZonko → ____Zonko	pl→sg 2→1

Task 3: Word/Sentence Building

List-of-words-built:

Task 2.1: Identification (Negation)

Examples:
Andisabaleki**i**
Utata**aka**thet**anga**
Akuy**o**ndoda

1. Izipili zange zifike
2. Asitheti
3. Aningobahlobo
4. Umama akaphekanga
5. Ukungathandi
6. Akuzoba yindoda

Task 2.2: Identification (Past Tense)

Ndicul**ile**
Isidlosiphek**we**nguThando
Utataakahlek**anga**

1. Ndibone inja
2. UThixo wadala ilizwe
3. Ndafika
4. Umama akaphekanga
5. Ukutya kuphekwe nguNomsa
6. USandile uculile izolo

Task 4: Analogy

Examples:
Ndisabaleka → Andisabaleki … Sisatheta → Asisatheti
Ndiyasela → Ndiselile … Ndiyathi→Ndithe
Ukubhala → Umbhali … Ukusebenza → Umsebenzi

1. Ndiyabona → Ndibonile … Uyadlala → _____
2. Ukambula→ Ukambatha... Ukuvula → _____
3. Anitheti → Anithetanga … Akufiki → _____
4. Ukuzingela→Umzingeli …Ukulwa → _____

5. Ndiza kutya isonka ngomso → Ndiya sitya isonka … Umama uza kubhaka ikeki ngomso → Umama _____ikeki

6. Kalusizi→ -Lusizi … Kakuhle → _____

7. Ukutshixa → Isitshixo … Ukubuza → _____

8. UThandile uza kuya esikolweni → UThandile akazo kuya esikolweni … Ndiza kutshata →_____kutshata

9. Ukuza → Ukuzisa ... Ukuthenga → _____

10. Siyatheta → Asitheti … Ndiyafika → _____

MA TASKS: SETSWANA
DATE:
PARTICIPANT CODE:

Task 1: 'Wugs'

2 Examples:
1. Bolingu → Malingu
2. Mosira → Basira

1	Ngwange → ___ange	Sg → pl 1 → 2 *variants
2	Lemparu → ___paru	Sg → pl 5 → 6
3	Mora → ___ra	Sg → pl 3 → 4
4	Losala→ __sala	Sg→ Pl 11 → 12
5	Dimabure → ___mabure	Pl → sg 8 → 7
6	Makgu → ___kgu	Pl → sg 6 → 5
7	Setsuka → ___tsuka	Sg → pl 7 → 8
8	Bakhumo →___khumo	Pl → sg 2 → 1
9	Mmitlo→ ___itlo	Sg → pl 3 → 4 *variants
10	Ditaka → ___Taka	Pl → sg 10 → 9 *exception

Task 2-1:Identification

Examples:

- *Malome o **segile** nama*
- *Mmemogolo wame o **tsentse** madi mo kgetsaneng*

1. Mme o re bontshitse tsela
2. Mosetsana o binile bontle.
3. Thapelo o palame setlhare.
4. Mapodisi ba tshwere mmolai.
5. Ke kwadile teko ya Setswana.
6. Ke arabile morutabana jaaka.

Task 2-2: Idenitification

Examples:

- **Ga** ke a kgona go ya sepetlele
- O **se** reme legong le

1. Ga ke a ya sekolong
2. O seka wa apaya
3. Rethabile o ne a sa itse
4. Mohau ga a tsamaya
5. Ga wa tshwanela go kopisa
6. O se mo utlwise botlhoko

Task 3: Word/Sentence Building

List of words/sentences built:

Task 4: Analogy

Examples:

- *Ke sa ntse ke tsamaya → ga ke sa tlhole ke tsamaya... Re santse re bua →* ***Ga re sa tlhole re bua***
- *Go tla → Go tlisa ... Go reka →* ***Go rekisa***

1. Go apola diaparo → Go apara diaparo...
   Go bula→ _____

2. Ga lo bue → Lo ne lo sa bue.... Ga o goroge → _____

3. Go lwa → Motlhabani … Go tsomo → _____

4. Ke tla ja borotho kamoso → ke tla ja borotho.... Mme o tla baka kuku kamoso → ___

5. Go nna botswa → Botswa ... Go utlwa botlhoko → ____

6. Thandile o tla ya sekolong → Thandile ga a kitla a ya sekolong ... ke tla nyalwa → __

APPENDIX F

ISIXHOSA Assessors' Copy ORF (Scores and Coding)

		Participant Code:	
		Date:	
Fluency:			
# attempted:		Ccpm:	
# of errors:			
Comprehension:			
1			
2			
3			
4			
5			

uSikihitshana somLingo

Kudaladala, kwaye kukho ixhegwazana elisisilumko nelinobubele kakhulu. || Lalihlala kwisiqithi esasiphakathi kulambokazi iNciba.

Xa abantu belali ekufutshane nendawo elihlala kuyo belamba, belibaphathela iintlanzi.|| Bebelibulela kakhulu baze balimeme ukuba lize kutya nabo. || Kodwa lona belisala.

Inkosi yelali leyo yayinomona kwaye izidla.

"Ungubani na wena?" imnkqanigise yatsho. ||"Usuka phi na khona? ||Kwaye kutheni le nto ndingaqalanga ndaphakelwa kuqala?"

Ixhegwazana eli lisuke nje lazincumela, laza lakwela kwisikhitshana salo laza langena phakathi lihamba ngomlambo lowo.

Le nto yayicaphukisa kakhulu inkosi, ngoku ke yaya yayilandela le nkondekazi. || Inkosi ihambe iiyure ezinzi yaza ekugqibeleni yasibona isiqitha esiphakathi emlanjeni. || Nantso le nkondekazi isehla kwisikhitshana salo, yaza yangena ngaphakathi endlwini. || Inkosi iye yalalisela apho igade eli xhegwazana.

ISIXHOSA Assessors' Copy SRF (Scores and Coding)

		Participant Code:	
		Date:	
Fluency:			
# attempted:		Ccpm:	
# of errors:			
Comprehension:			
1			
2			
3			
4			
5			

Linkonde ziyankqonkqoza

Kwakusekusasa kakhulu kwaye kusemnyama. Kuthe gqi izithunzi ezithathu zithe chu kancinane, zithoba indlela, zisingise elalini. Zema phambi komzi othile zaza zankqonkqoza emnyango.

Ngaphakathi endlwini, usapho lwaluvukile luthe qwa. Abantwana babethetha kwaye becula ngamazwi amakhulu, lo gama umama wabo wayepheka isidlo sakusasa. Kwathi kwakuba kuvuthiwe ukutya, usapho olulambileyo lwahlala phantsi lwathi nqwadalala, lwatya. Kube ngaloo mzuzu kuphela abathi beva ngawo ukunkqonkqozwa kwasemnyango.

Umama uye efestileni waza wakroba. Ngoku izithunzi zazisele ziphelile, nto leyo eyenze ukuba azibone ezo nkonde zilindile phandle.

Kukho iinkonde ezintathu apha phandle," uxelele utata. "Zimdaka kwaye zilambile, zifuna ukuncedwa."

"Kaloku kufuneka uzivulele, uzimeme zingene ngaphakathi," uthsilo umnyeni wakhe.

Kwa oko umama waya emnyango waza wazimema ezo nkonde ukuba zingene ngaphakathi.

SETSWANA Assessors' Copy ORF (Scores and Coding)

		Participant Code:	
		Date:	
Fluency:			
# attempted:		CCPM:	
# of errors:			
Comprehension – Please fill in child's first response.			
1			
2			
3			
4			
5			

Dinaka Fela

Pitse ya naga le Kgabo e ne e le ditsala tota. Ba ne ba ja mmogo. Ba opela mmogo. Go fetisa tsotlhe, ba ne ba rata go bina mmogo. Letsatsi lengwe ba bona dipholologolo dingwe di ya moletlong.

"A le rona re ka tla?" Pitse le Kgabo ba botsa. "Nnyaa!" ga bua Tshukuda. "Ke dipholologolo tse di dinaka fela tse di ka tlang moletlong o. Tsamayang!"

"O, ke eletsa re kabo re na le dinaka," ga bua Kgabo. "Le rona re ne re kaya moletlong." Kgabo a bo a nna le mogopolo. "A re itirele dinaka!" a bua. "Re ka dirisa dithobane le dimela."

Ka bonaka Kgabo le Pitse babo bana le dinaka tse dintle tse di metsu. Jaanong ba ne baka ya moletlong! Fa ba fitlha kwa moletlong, Tshukudu a ba letla go tsena. A re, "Amogelesegang." "Dipholologolo tsotlhe tse di dinaka di ka ja monate mmogo."

B bina, ba bina… Kgabo le Pitse e ne e le dikgantshwana tsa moletlo. Ka bonako moletlo wa khutla. Lonaka lwa ga Pitse lo ne lo le kae? "Tswang!" ga bua dipholologolo tse di dinaka. "Ga lo a letlelelwa fa!" Pitse le Kgabo ba tsamaya ba hutsafetse.

"Ke gopotse Pitse le Kgabo," ga bua Nare. "Re ne re se pelontle," ga bua Thutlwa. "Ke eng tot aba tshwanetse go nna le dinaka?" Photi a botsa. Dipholologolo tsa akanya tsa ba tsa akanya. Go ne go se ope yo o nang le karabo. Ka jalo ba bitsa Pitse le Kgabo go boela kwa moletlong. Dipholologolo tsotlhe tse di se nang dinaka le tsone di ne di ka tla. Tlou a, Kwena a tla, le Kuba a tla. E ne e le moletlo o o gaisang yotlhe!

SETSWANA Assessors' Copy SRF (Scores and Coding)

		Participant Code:	
		Date:	
Fluency:			
# attempted:		CCPM:	
# of errors:			
Comprehension – Please fill in child's first response.			
1			
2			
3			
4			
5			

<u>O tla go nna</u>

Mme le Rre ba tlhokafetse jaanong ke tshwanetse go tla go dula le Nkoko. Ke hutsafetse, le nkoko fela jalo. Re atlerelana thata, ke ikutlwa ke le botokanyana – go batlile go tshwana le pele AIDS e tsaya mme le rre.

Bosigo ke robala mo thoko ga nkoko ke bo ke reetse go hema ga gagwe go go bonojana. Bosigo bongwe ka bona nkoko a iname mo bo jelong. Lesedinyana la mmala wa gauta le bonesitse sefatlhego sa gagwe se se matsutsuba. A nyenya!

Ka tswa mo bolaong. Nkoko o nale thoto ya matsela a a hutaganeng fa pele ga gagwe. Ke tiisitse ke a di itse! "Mosese wag a Mmé" ka buela tlase fa ke tshwara diaparo, "le jeresi ya ga Rre." Nkoko a re, "Nthuse Thandi. Le makgasa a ka dira sengwe se sentle." Ke bona dibaga tsa ga Mmé. O ne a lebega jaaka kgosatsana fa a di apere.

Ra roka ra shomela, re tlhaba ka nnale re gogo tlhale. Dikgopolo dingwe di re ama dipelo. Re lela mmogo ka nako dingwe re a tshega. Ke tiisitse ke dupeletse tswina ya peipi ya gar re fela jaaka ke ne tlhola ke e dupelela fa e tlhakane le musi ko ntle. Ke gopolo ditlhase di tlola di tswa mo teng ga tanka jaaka dinaletsana.

Makgasa a rona a dirile mpopi. Jaanong se o se tlhokang ke sefatlhego. Ke penta matlho a gagwe mme a a phatsima. Le molomo ke o pentile jaanong e a nyenya. Letsatsi lengwe phakela, Ke reeditse nkoko a ntse a tshara diatla tsa gagwe tse di tsofetseng Baselini. Ka okomela mo dikobong ka fitlhela Nosipho… a nyenya a ntebile.

Ka mo atlarela ka dupelela peipi ya gar re mo boboeng bo bo golokegileng jo bo bonolo. Ga ke bone Mmé kgotsa Rre, fela Nosipho o nkaela gore ba sa ntse ba le bontlha bongwe jwa me. Makgasa a fetogile sengwe se se nt_ha.

ENGLISH TRANSLATIONS FOR READINGS

Note: These are informal translations provided by first-language speakers of isiXhosa and Setswana.

ISIXHOSA ORF: <u>The small magic boat</u>

Long long ago there was a wise old woman who was very nice/kind/altruistic. She lived on an island in the Kei river.

When people were starving, she would bring fish to them. They would thank her and invite her to eat with them. But she would refuse.

The king of the village was jealous. He was very proud.

"Who are you?" He rudely asked the lady. "Where are you from? And why wasn't I given the meal first?" (as is the custom)

The old woman just smiled and got on her small boat and she left.

The king was very angry and he followed the old woman. He travelled for many hours and at last he found the island that was in the middle of the river. The old woman got off her little boat and she went into her house. The king stood where he was, watching and waiting for the old woman (to come out).

ISIXHOSA SRF: <u>A story of West Africa</u>

It was still early in the day. The sun had not yet risen. Three shadows were walking slowly down to the village. They stood in front of a house and they began to knock.

Inside the house, the family was already awake. The children were chatting and singing loudly while mother was preparing breakfast. When breakfast was ready, they sat around the table and ate. It was then that they heard the knocking.

Mother went to the window and looked out. They were no longer shadows so she was able to see the "old men" (i.e. not shadows).

"There are three old animals outside," the mother told the father. "they look dirty and hungry. they need help."

"Then you should invite them inside" (You should open the door for them, invite them, so that they can come in" said her husband.

Then the mother went to the door and she invited the 'old men' to come in.

SETSWANA ORF: <u>Horns up.</u>

Zebra and Monkey were best friends. They ate together. They sang together. Most of all, they loved to dance together. One day, they saw some animals going to a party.

May we come too?' Zebra and Monkey asked.

'No' said Rhino. 'Only animals with horns can come to this party. Go away!'

'Oh I wish we had horns, ' said Monkey. 'Then we could go to the party too.'

Then Monkey had an idea. 'Let's make our own horns!' he said. 'We can use sticks and plants.'

Soon Monkey and Zebra had beautiful sharp horns. Now they could go to the party. They joined the other animals at the party. They danced and danced. Monkey and Zebra were the life of the party. They dances so much their horns fell off! Then suddenly the party stopped. Where was Zebra's horn? Where was monkey's horn?

'Get out!' said the animals with horns. 'You are not allowed in here.'

Zebra and Monkey walked away sadly.

The party wasn't much fun without Monkey and Zebra.

'I miss Zebra and Monkey,' said Buffalo.

'We were unkind' said Giraffe.

'Why must they have horns anyway?' asked Duiker.

The animals thought and thought. Nobody had an answer. So they called Zebra and Monkey back to the party. All the other animals with no horns could come too. Elephant came, Crocodile came , and Hippo came. It was the best party ever.

SETSWANA SRF: <u>He/She comes to me.</u>

My parents passed away therefore I have to go live with my grandmother. We are both very sad. When we hug, I feel much better, just as it was before HIV/AIDS took my parents away.

At night I sleep next to my grandmother and listen to her calm breathing. One night I saw my grandmother kneeling down on the bed. The golden light was shining on her wrinkled face. She smiled.

I got up from the bed. My grandmother had a bundle of clothes in front of her. I was certain that I knew them. ‘My mother’s dress.’ I quietly said as I touched the clothes, ‘and my father’s jersey.’ My grandmother said, ‘Help me Thandi.’ Even old clothes can make something new and pretty. I saw my mother’s beads, she always looked like a queen when wearing them.

We sew using needle and thread. Some thoughts are touching our hearts. We cried and laughed together at times. I am certain I even smelled my dad’s smoking pipe just as I used to outside. I remember the sparks coming out of the pipe like stars.

The old clothes made a doll. Now what we need is a face. I paint the doll’s face and it shines. I even pained the mouth and now the doll is smiling. One day in the morning I listened as my grandmother rubbed her hands with Vaseline. I peeked inside the blankets and found Nosipho looking at me, smiling.

I hugged her and could smell my father’s smoking pipe on the soft wool. I cannot see my mother or father but Nosipho is showing me that they are still part of me. The old clothes have become something new.

ORAL READING Comprehension Questions IsiXhosa:

1. Lalihlala phi eli xhegwazana?
2. Lalisiya njani kwilali ekufutshane nalo?
3. Lalibaphathela ntoni abantu bale lali xa belamba?
4. Babesenza ntoni ababantu lakubapha iintlanzi?
5. Kutheni ucinga ukuba laliye lingatyi naba bantu bale lali?

ORAL READING Comprehension Questions Setswana:

1. Tsala ya ga Pitse e ne e le mang?
2. Goneng diphologo tse dingwe ne digana go re Pitse le Kgabo battle moletlong?
3. Ke eng se Kgabo le Pitse ba ne ba rata go se dira fo feta dilo tsotlhe?
4. Kgabo le Pitse be kereile kae dinaka?
5. Ke phologo e fe e amogetseng Pitse le Kgabo moletlong?